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Coal Combustion Residue Impoundment
Round 12 - Dam Assessment Report

Weston Generating Station (Site 26)

Northeastern, Northwestern, Southeastern and Southwestern Secondary Bottom Ash Treatment Ponds
Wisconsin Public Service
Rothschild, Wisconsin

Prepared for:

United States Environmental Protection Agency
Office of Resource Conservation and Recovery

Prepared by:

Dewberry Consultants LLC
Fairfax, Virginia

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INTRODUCTION, SUMMARY CONCLUSIONS AND RECOMMENDATIONS

The release of over five million cubic yards from the Tennessee Valley Authority's Kingston, Tennessee facility in December 2008, which flooded more than 300 acres of land, damaging homes and property, is a wake-up call for diligence on coal combustion residue disposal units. We must marshal our best efforts to prevent such catastrophic failure and damage. A first step toward this goal is to assess the stability and functionality of the ash impoundments and other units, then quickly take any needed corrective measures.

This assessment of the stability and functionality of the following management units: Northeastern Secondary Pond, Northwestern Secondary Pond, Southeastern Secondary Pond, Southwestern Secondary Pond is based on a review of available documents and on the site assessment conducted by Dewberry personnel on Tuesday, August 21, 2012. The four management units are small (2.4 acres or less), low hazard impoundments. We found the supporting technical documentation inadequate (Section 1.1.3). The inability to produce the original design reports made a complete review problematic. As detailed in Sections 1.2.1-1.2.3, there are four recommendations based on field observations that may help to maintain a safe and trouble-free operation.

The Northeastern Secondary Pond is **POOR** for continued safe and reliable operation, with no recognized visual management unit safety deficiencies, associated with the low hazard dam.

The Northwestern Secondary Pond is **POOR** for continued safe and reliable operation, with no recognized visual management unit safety deficiencies, associated with the low hazard dam.

The Southeastern Secondary Pond is **POOR** for continued safe and reliable operation, with no recognized visual management unit safety deficiencies, associated with the low hazard dam.

The Southwestern Secondary Pond is **POOR** for continued safe and reliable operation, with no recognized visual management unit safety deficiencies, associated with the low hazard dam.

Two primary ponds were viewed during the site visit, however, due to their height (under 4 feet) and small size, these units were not included as part of this report. Additionally, a Tertiary Pond was viewed as part of the site visit, but since it contains no CCR, it was not assessed.

PURPOSE AND SCOPE

The U.S. Environmental Protection Agency (EPA) is investigating the potential for catastrophic failure of Coal Combustion Surface Impoundments (i.e., management units) at electric utilities in an effort to protect lives and property from the consequences of a dam failure or the improper release of impounded slurry. The EPA initiative is intended to identify conditions that may adversely affect the structural stability and functionality of a management unit and its appurtenant structures (if present); to note the extent of deterioration (if present), status of maintenance and/or a need for immediate repair; to evaluate conformity with current design and construction practices; and to determine the hazard potential classification for units not currently classified by the management unit owner or by a state or federal agency. The initiative will address management units that are classified as having a Less-than-Low, Low, Significant or High Hazard Potential ranking. (For Classification, see pp. 3-8 of the 2004 Federal Guidelines for Dam Safety)

In February 2009, the EPA sent letters to coal-fired electric utilities seeking information on the safety of surface impoundments and similar facilities that receive liquid-borne material that store or dispose of coal combustion residue. This letter was issued under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104(e), to assist the Agency in assessing the structural stability and functionality of such management units, including which facilities should be visited to perform a safety assessment of the berms, dikes, and dams used in the construction of these impoundments.

EPA requested that utility companies identify all management units including surface impoundments or similar diked or bermed management units or management units designated as landfills that receive liquid-borne material used for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. Utility companies provided information on the size, design, age and the amount of material placed in the units. The EPA used the information received from the utilities to determine preliminarily which management units had or potentially could have High Hazard Potential ranking.

The purpose of this report is **to evaluate the condition and potential of residue release from management units and rate the units for hazard potential classification**. This evaluation included a site visit. Prior to conducting the site visit, a two-person team reviewed the information submitted to EPA, reviewed any relevant publicly available information from state or federal agencies regarding the unit hazard potential classification (if any) and accepted information provided via telephone communication with the management unit owner. Also, after the field visit, additional information was received by Dewberry about the Northeastern, Northwestern, Southeastern and Southwestern Secondary Ponds, which was reviewed and used in preparation of this report.

Factors considered in determining the hazard potential classification of the management units(s) included the age and size of the impoundment, the quantity of coal combustion residuals or by-products that were stored or disposed of in these impoundments, its past operating history, and its geographic location relative to down gradient population centers and/or sensitive environmental systems.

This report presents the opinion of the assessment team as to the potential of catastrophic failure and reports on the condition of the management unit(s).

LIMITATIONS

The assessment of dam safety reported herein is based on field observations and review of readily available information provided by the owner/operator of the subject coal combustion residue management unit(s). Qualified Dewberry engineering personnel performed the field observations and review and made the assessment in conformance with the required scope of work and in accordance with reasonable and acceptable engineering practices. No other warranty, either written or implied, is made with regard to our assessment of dam safety.

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Doc 04:	Sargent & Lundy Drawing No. C-20, Grading, Roadwork, and Drainage Plan, Sheet 10
Doc 05:	Sargent & Lundy Drawing No. C-21, Grading, Roadwork, and Drainage Plan, Sheet 11
Doc 06:	Sargent & Lundy Drawing No. C-42, Miscellaneous Sections and Details, Sheet 1
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Doc 09:	Merrill Sand & Gravel Company, Laboratory Test Results, Proposed Soil Bentonite Liner, July 16, 1980
Doc 10:	WPSC correspondence to WDNR, regarding Modification of Bottom Ash Storage Lagoons, dated February 21, 2005
Doc 11:	Black & Veatch Drawing S3000, Grading & Drainage, Site Key Plan, General Notes & Legend
Doc 12:	Black & Veatch Drawing S3001, Grading & Drainage, Site Area 1 Plan
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1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

Conclusions are based on visual observations from a one-day site visit, Tuesday, August 21, 2012, and review of technical documentation provided by Wisconsin Public Service.

1.1.1 Conclusions Regarding the Structural Soundness of the Management Unit(s)

The dike embankments around the four impoundments did not exhibit obvious structural stability issues of concern based on the visual inspection. However, due to the fact that Wisconsin Public Service Corporation (WPSC, the Utility) could not provide relevant engineering analyses and/or reports, Dewberry engineers could not determine the structural stability of the dikes surrounding the management units. Therefore the ponds are rated POOR for structural stability.

1.1.2 Conclusions Regarding the Hydrologic/Hydraulic Safety of the Management Unit(s)

No hydrologic or hydraulic analyses were provided to Dewberry by the utility. Dewberry determined the ring dikes receive no drainage other than the surface area of the ponds. There have been two overtopping events of the northeastern secondary pond due to operational failures. The lack of emergency overflow spillways is a potential concern. The units are therefore rated POOR for hydrologic/hydraulic safety.

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

The supporting technical documentation is not adequate since the design report for the original management units (constructed in 1981, designed by Sargent & Lundy, Chicago, IL) has not been provided by the utility, nor did Dewberry receive any relevant analysis information on these units. Construction specifications and liner permeability related to the original design was provided by the utility. An engineering report related to embankment construction for the new embankments constructed in 2005 when a railroad loop was constructed was provided by WPSC.

1.1.4 Conclusions Regarding the Description of the Management Unit(s)

The description of the management units provided by the owner was an accurate representation of what Dewberry engineers observed in the field.

1.1.5 Conclusions Regarding the Field Observations

Dewberry staff was provided access to all areas in the vicinity of the management units and was able to conduct a thorough field observation. The visible parts of the embankment dikes and outlet structure were observed to have no signs of overstress, significant settlement, shear failure, or other signs of instability. Embankments appear structurally sound. There are no apparent indications of unsafe conditions or conditions needing remedial action.

1.1.6 Conclusions Regarding the Adequacy of Maintenance and Methods of Operation

The current maintenance and methods of operation appear to be adequate for all four bottom ash management units observed.

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

The Weston Generating Station does not have a formal surveillance program. The informal monitoring program in place currently appears to be appropriate. The bottom ash basins have water level sensors. An alarm will sound in the plant if the ponds begin to approach an overfilling situation.

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operation

The four CCR management units are each rated POOR for continued safe and reliable operation due to the lack of sufficient engineering and structural stability data. Implementation of the recommendations in Section 1.2 would help improve the rating. It is anticipated that all ponds would be considered satisfactory for continued safe and reliable operation upon receipt and review of acceptable engineering design calculations (including but not limited to Factors of Safety for critical static load scenarios, and seismic considerations).

1.2 RECOMMENDATIONS

1.2.1 Recommendations Regarding the Structural Stability

The utility needs to perform structural stability calculations for the pond dikes under static and seismic conditions to show the dikes have sufficient Factors of Safety to prevent failure and releases to the environment.

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety

Hydrologic and hydraulic analyses of pond performance under flood conditions should be performed. Also, consideration should be given to the construction of overflow spillways on the embankments. This would allow for controlled channeling of any unforeseen overtopping incidents and provide for quicker recovery and return to normal operations.

1.2.3 Recommendations Regarding the Supporting Technical Documentation

We recommend communication with Sargent & Lundy to provide the dike design data to the USEPA; this should specifically include any and all analysis information available relative to the structural stability of the impoundments investigated within this report. The lack of that information will result in POOR ratings for the CCR management units.

1.2.4 Recommendations Regarding Continued Safe and Reliable Operation

No recommendations other than those described in Sections 1.2.1-1.2.3 above appear warranted at this time.

1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

1.3.1 List of Participants

Mark Metcalf, Integrys Business Support
Dave Molzann, Wisconsin Public Service Corporation
Randy Oswald, Integrys Business Support
Kevin Mataczynski, Integrys Business Support
Gerard Skrzypchak, Wisconsin Public Service Corporation
Steve Schaefer, Wisconsin Public Service Corporation
John Myers, Integrys Business Support
Cleighton Smith, Cleighton Smith Engineering LLC (Dewberry)
Lauren Ohotzke, Dewberry

1.3.2 Acknowledgement and Signature

We acknowledge that the management units referenced herein have been assessed on August 21, 2012.

Cleighton D. Smith, P.E.	Lauren Ohotzke, P.E.

2.0 DESCRIPTION OF THE COAL COMBUSTION RESIDUE MANAGEMENT UNIT(S)

2.1 LOCATION AND GENERAL DESCRIPTION

The WPSC – Weston Generating Station is located at 2501 Morrison Avenue, Rothschild, Wisconsin. The Station is about 10 miles south of the city of Wausau in Marathon County, in north central Wisconsin. The western property line of the plant is adjacent to the Wisconsin River. The below image has been referenced from Google Maps.

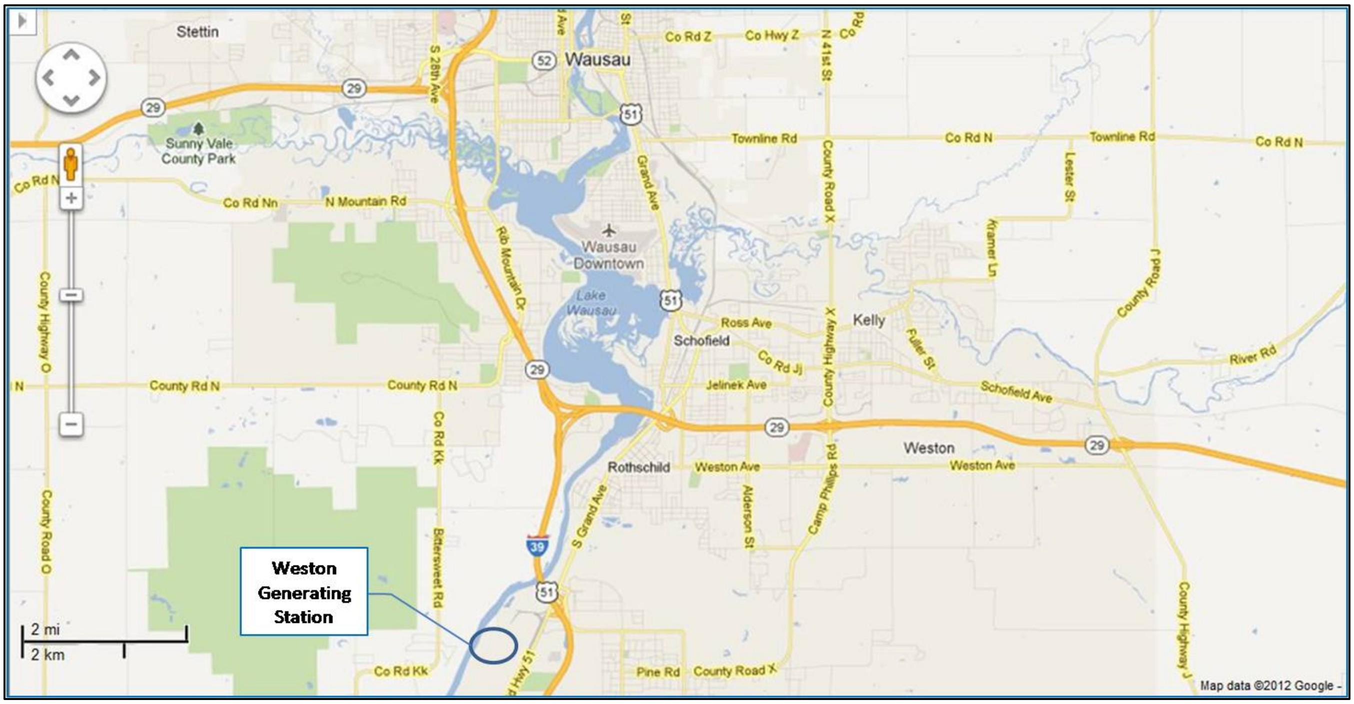

Figure 2.1a: Google Map of the Weston Generating Station

At the Weston Generating Station there are four coal fired boilers used for the production of electricity. WPSC utilizes sub-bituminous coal from the Powder River Basin (PRB) as the primary fuel in the boilers. As a result of the combustion process, coal combustion residuals (CCRs) are generated. CCRs can generally be classified as either fly ash or bottom ash. WPSC actively markets CCRs, both fly ash and bottom ash, produced at the facility for beneficial reuse in accordance with Chapter NR 538, Wisconsin Administrative Code. The biggest reuse for CCRs generated at the site is the use of fly ash as a replacement for Portland cement in concrete applications. The next biggest use for ash is in structural fill projects such as highway embankments followed by the use of bottom ash as a daily cover at local landfills. In the event that WPSC is unable to find a beneficial reuse project for CCRs generated at the facility, the material is taken to a licensed landfill for disposal. Section 2.2 of this report describes the CCR handling activities at the Weston Generating Station.

The impoundments assessed in this report are as follows:

Northeastern Secondary
Northwestern Secondary
Southeastern Secondary
Southwestern Secondary

Table 2.1a: Summary of Dam Dimensions and Size

	Northeastern Secondary Ash Pond
Dam Height (ft)	8.5
Crest Width (ft)	10
Length (ft)	513
Side Slopes (upstream) H:V	3:1
Side Slopes (downstream) H:V	3:1

Table 2.1b: Summary of Dam Dimensions and Size

	Northwestern Secondary Ash Pond
Dam Height (ft)	8.5
Crest Width (ft)	10
Length (ft)	405
Side Slopes (upstream) H:V	3:1
Side Slopes (downstream) H:V	3:1

Table 2.1c: Summary of Dam Dimensions and Size

	Southeastern Secondary Ash Pond
Dam Height (ft)	11
Crest Width (ft)	10
Length (ft)	575
Side Slopes (upstream) H:V	3:1
Side Slopes (downstream) H:V	3:1

Table 2.1d: Summary of Dam Dimensions and Size	
	Southwestern Secondary Ash Pond
Dam Height (ft)	11
Crest Width (ft)	10
Length (ft)	325
Side Slopes (upstream) H:V	3:1
Side Slopes (downstream) H:V	3:1

The three aerial maps featured below, referencing Bing Maps, depict the specific location of the treatment ponds described above.

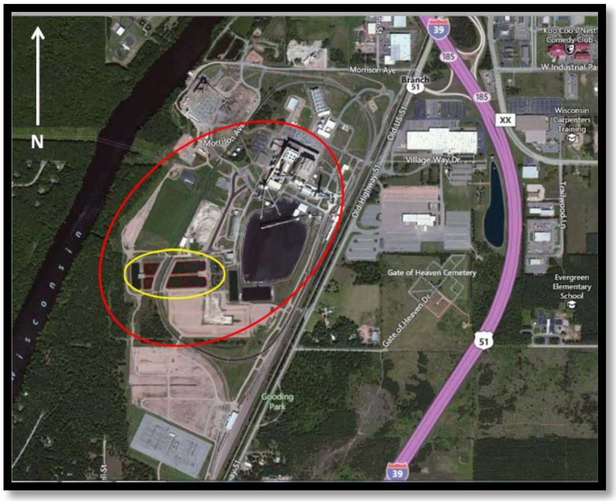

Figure 2.1b: General Area of Facility

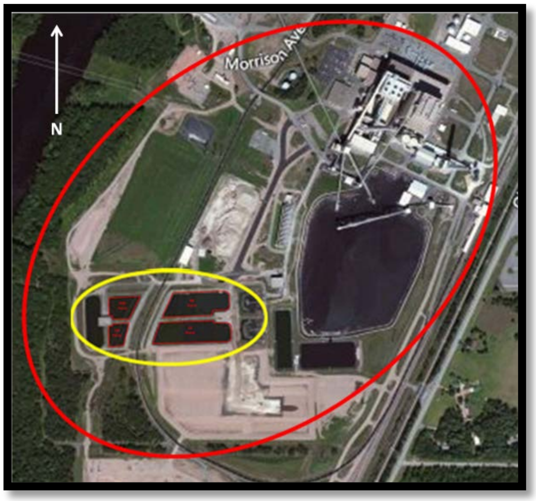

Figure 2.1c: Weston Generating Station

Figure 2.1d: Treatment Ponds at Weston Generating Station

2.2 COAL COMBUSTION RESIDUE HANDLING

2.2.1 Fly Ash

Fly ash generated at the facility is handled dry. Fly ash generated by Units 3 and 4 is removed with a baghouse. Fly ash removed from the flue gas is collected in hoppers, and pneumatically transferred to a storage silo (see Photo 1 within Appendix C, Doc 20). Fly ash stored in the silo is unloaded via the silo discharge chute by either a dry or wet method. If the dry method is used, a telescopic spout is connected to an enclosed tanker truck and an automatic gate is opened to transfer ash to the truck. Dry fly ash is transported to the various vendors that typically use the product as a concrete replacement. The wet method utilizes a rotary mixer/unloader which uses water to condition the fly ash before it is loaded onto a dump truck and transferred to a temporary ash storage pad on site. The majority of Unit 4 fly ash is unloaded wet and transferred to the onsite temporary storage pad for use in beneficial reuse projects (see Photo 2 within Appendix C, Doc 20).

2.2.2 Bottom Ash and Boiler Slag

Bottom ash and boiler slag from Weston Unit 3 are collected in hoppers located directly beneath the boiler. These CCRs are sluiced from the boiler to a series of treatment basins designed to allow settling for the removal the CCRs. Specifically, the bottom ash is sluiced directly from the boiler to one of two primary settling basins (see Photo 3 within Appendix C, Doc 20). The facility has redundant basins for the removal of CCRs, which allows the facility to perform maintenance on one set of basins while the other basins are kept in service. These redundant basins have been labeled Northern and Southern Primary Ponds, within this report.

Within the primary basins, the majority of bottom ash is dewatered and quickly settles out. Bottom ash in the primary basins is removed weekly with a front end loader and transported via truck to a temporary storage pad for future beneficial reuse or used as daily cover in a local landfill (see Photo 2 within Appendix C, Doc 20).

Bottom ash and boiler slag from Weston Unit 4 are received, cooled, and dewatered by a submerged bottom ash scraper and conveyor located directly beneath the boiler. Ash collected in the economizer hoppers and rejects from the pulverizing mills are also transferred to the receiving trough of the submerged scraper conveyor. After dewatering, the comingled material is transferred to a truck which transports the material to a temporary storage area (see Photo 2 within Appendix C, Doc 20). The Unit 4 bottom ash/slag accumulated in the temporary storage area is loaded onto trucks and transported offsite for beneficial reuse projects.

Sluice water and bottom ash fines then flow via gravity into a secondary settling basin. The secondary basins are designed to allow for settling of the fines by providing residence time for the sluice water. The facility also uses sediment curtains within the secondary basins to assist in settling of fines (see Photos 4 and 5 within Appendix C, Doc 20). In 2005, the secondary basins were separated by a loop railroad line to serve the needs of the plant. The secondary basins have been labeled Northeastern, Northwestern, Southeastern, and Southwestern. Equalizing underground conduits allow these basins to maintain the same elevations.

Sluice water from the secondary basins is then treated for pH and/or total suspended solids (as needed) prior to being pumped into a tertiary basin.

Water in the tertiary basin is either pumped back to the unit for use in the closed loop sluice water system or discharged to the Wisconsin River in accordance with the WPDES permit number WI-0042756-07-0 for Weston Units 3 and 4 (See Appendix A, Doc 01). WSPC does not consider the tertiary basin to be a basin that contains CCRs. Based on the description of plant operations and visual assessment, Dewberry concurs.

Bottom ash and boiler slag from Units 1 and 2 are treated in basins considered to be incisions and therefore are not considered to be impoundments assessed as part of this report; WSPC refers to these as Seepage Basins. These incised basins were observed as part of the site visit (see Photos 6 through 13 within Appendix C, Doc 20. Units 1 and 2 operate under WPDES Permit No. WI-0003131-06-0 (see Appendix A, Doc 02).

2.2.3 Flue Gas Desulfurization Sludge

Not applicable; no flue gas desulfurization sludge is generated at this plant.

2.3 SIZE AND HAZARD CLASSIFICATION

Based on the impoundment size classifications in Table 2.2a, all CCR impoundments at the Weston Generating Station are classified as “Small”; all heights are less than 25 feet and all storage capacities are less than 1,000 ac-ft.

Table 2.2a: USACE ER 1110-2-106
Size Classification

Category	**Impoundment** **Storage (Ac-ft)**	**Height (ft)**
Small	50 and < 1,000	25 and < 40
Intermediate	1,000 and < 50,000	40 and < 100
Large	> 50,000	> 100

Based on the hazard classifications in Table 2.2b, all CCR impoundments at Weston should be classified as Low Hazard. In the event of a failure, no loss of human life would be expected, and economic, environmental, and lifeline losses would be low and generally limited to the plant.

Table 2.2b: FEMA Federal Guidelines for Dam Safety Hazard Classification

	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None Expected	Low and generally limited to owner
Significant	None Expected	Yes
High	Probable. One or more expected	Yes (but not necessary for classification)

2.4 AMOUNT AND TYPE OF RESIDUALS CURRENTLY CONTAINED IN THE UNIT(S) AND MAXIMUM CAPACITY

The CCRs treated in the ponds at Weston are bottom ash and boiler slag. The maximum capacities are shown in Tables 2.3a through 2.3d.

Table 2.3a: Maximum Capacity of Unit

Northeastern Secondary Pond

Surface Area (acre)	0.92
Total Storage Capacity (Max) (cubic yards)	7366
Total Storage Capacity (acre-feet)	4.6
Crest Elevation (feet)	1182

Table 2.3b: Maximum Capacity of Unit

Northwestern Secondary Pond

Surface Area (acre)	1.91
Total Storage Capacity (Max) (cubic yards	14,583
Total Storage Capacity (acre-feet)	9.0
Crest Elevation (feet)	1182

Table 2.3c: Maximum Capacity of Unit

Southeastern Secondary Pond

Surface Area (acre)	2.34
Total Storage Capacity (Max) (cubic yards)	17,862
Total Storage Capacity (acre-feet)	11.1
Crest Elevation (feet)	1182

Table 2.3d: Maximum Capacity of Unit	
Southwestern Secondary Pond	
Surface Area (acre)	0.61
Total Storage Capacity (Max) (cubic yards)	4863
Total Storage Capacity (acre-feet)	3.0
Crest Elevation (feet)	1182

2.5 PRINCIPAL PROJECT STRUCTURES

2.5.1 Earth Embankment

The secondary treatment ponds are formed by earthen embankments in the form of a ring dike. The embankments were designed by Sargent & Lundy, Chicago, IL, around 1980 and constructed in 1981. Appendix A, Document 3 contains construction specifications dated 03-19-1980. In addition, design drawings C-20, C-21, C-42, C-43 and C-44, referenced in the construction specifications are attached in Appendix A Documents 4, 5, 6, 7 and 8, respectively.

These design drawings specify upstream and downstream side slopes at 3:1. The drawings and construction specifications also indicate that a 1.0 foot layer of bentonite was specified for the upstream side slope, with a maximum hydraulic conductivity of 1 x 10^{-7} cm/sec. Appendix A, Document 9 contains laboratory test results (dated July 16, 1980) performed by Merrill Gravel & Construction Company intended to meet the specifications of the bentonite liner.

The design specifies 1.0-foot soil cover above the bentonite liner and a 2.0-foot layer of crushed gravel above the soil cover. The majority of the remainder of the embankments specifies compacted fill, and seeding with 4 inches of topsoil on the downstream side slopes.

In 2005, the railroad loop was constructed which essentially split the four secondary basins. New embankments were constructed with an underground connection to allow the secondary basins to operate as one hydraulically connected pond. This design was performed by Black & Veatch, Kansas City, MO in 2004. Appendix A, Document 10, correspondence from WPSC to Wisconsin DNR, dated Feb 21, 2005, contains pertinent details of the design. This document contains specification for maintaining permeability specification for a bentonite layer to be 1 x 10^{-7} cm/sec (same as original design). Appendix A, Documents 11, 12, 13, 14, 15 and 16 are key Black & Veatch drawings related to the design of the railroad line through the secondary treatment ponds.

2.5.2 Outlet Structures

As shown in Appendix A, Documents 12 and 16, the Northeastern and Southeastern Secondary Ponds each have two 24-inch submerged CDHPE culverts connecting to the Northwestern Pond and Southwestern Secondary Ponds, respectively. These culverts are submerged beneath the railroad tracks between the east and west Secondary Ponds.

The Northwestern and Southwestern Secondary Ponds have no outlet structure. Water is pumped out as needed for treatment in the Tertiary Pond.

2.6 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

Critical infrastructure within five miles downstream is nearly non-existent. This area is a rural, wooded reach of the Wisconsin River in Marathon County, upstream of the Mosinee Dam in Mosinee, Wisconsin.

From the site visit, it appeared that the embankment with the greatest potential for release of CCR to off-site, possibly to the Wisconsin River, was the southwest portion of the embankment of the Southwestern Secondary Pond. A view of the potential release path is shown in Photos 14 and 15 within Appendix C, Doc 20. During the site visit this potential failure path was observed to intersect a perimeter ditch, originally constructed as part of construction storm water management (see Photos 16 and 17 within Appendix C, Doc 20). This ditch terminates at a berm, which would prevent releases from entering the Wisconsin River.

3.0 SUMMARY OF RELEVANT REPORTS, PERMITS, AND INCIDENTS

3.1 SUMMARY OF REPORTS ON THE SAFETY OF THE MANAGEMENT UNIT

WPSC does not have a formal inspection program. As a result plant personnel were not able to produce inspection reports related to the safety of the impoundments. As mentioned in Sections 8.2 and 9.2, there are informal inspections made by plant personnel and a water level monitoring system.

3.2 SUMMARY OF LOCAL, STATE, AND FEDERAL ENVIRONMENTAL PERMITS

The impoundments are not under the jurisdiction of any regulatory agency.

Treated water discharged from the tertiary pond into the Wisconsin River is regulated by the Wisconsin Department of Natural Resources under the Wisconsin Pollutant Discharge Emissions System (WPDES). Weston Units 3 and 4 operate under WPDES Permit No. WI-0042765-07-0, issued April 1, 2010. (See Appendix A, Doc 01).

3.3 SUMMARY OF SPILL/RELEASE INCIDENTS

While briefly mentioned during the site investigation, the majority of the information collected regarding two overtopping events at the Weston Generating Station was received via e-mail correspondence between Dewberry and the utility.

WPSC has had two overtopping events of the secondary bottom ash treatment basins at the Weston Generating Station. The first occurrence was in January 2008, during the startup of Weston Unit 4. A surge tank used to store treated river water had a level sensor failure, which resulted in an overflow of the surge tank to a sump that directs water to the secondary treatment basin. Approximately 120,000 gallons of treated river water was pumped to the Northern Secondary Pond, which resulted in an overflow of that pond. At the time of the incident, the bottom ash treatment system was discharging treated water to the Wisconsin River. Once the bypass was discovered, the treatment rate of the bottom ash treatment system was increased. WPSC estimated that the over-topping lasted approximately 48 hours and that approximately 8,700 gallons had over topped the basin into an adjacent ditch (i.e., 3 gpm).

A second overtopping event occurred in February 2008. At the time of the incident, the bottom ash treatment system was out of service. As the facility was not able to treat bottom ash transport water, the level increased and eventually over topped the basin. Portable pumps were brought in to transfer water from the bottom ash basin to the metal cleaning water basin where the water was treated and discharged. It was estimated that less than 2,000 gallons of water were released.

Both overtopping events occurred at a low point on the Northeastern Ash Pond embankment on the northern portion approximately 100 feet east of the northwest corner of the embankment.

In response to these events in 2008 WPSC installed level meters on the basins to monitor water elevation to prevent any future overflow of the secondary or tertiary basins.

4.0 SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION

4.1 SUMMARY OF CONSTRUCTION HISTORY

4.1.1 Original Construction

The original construction of the bottom ash treatment basins took place in 1981.

The construction specifications from Sargent & Lundy Engineers (Appendix A, Doc. 3), specify a soil bentonite lining, composted of bentonite, soil for a bentonite soil mixture and protective sand layer and a protective rock layer of crushed stone or crushed gravel.

Fill for the dikes was specified to be "CCF1 compacted". The subgrade for the basin lining was said to be compacted to 90% of the maximum Standard Proctor density as determined by ASTM D 698, Method B. Then, before the 1 foot bentonite lining could be placed, the sides of the basins were to be drained and bladed smooth. Any holes seen in the basin were to be filled with a dry mixture of one part bentonite and four parts sand, blended dry.

There was also to be a clay lining installed. This clay was to have a plasticity index (PI) greater than or equal to 15 and more than 50% of the clay particles must have passed a #200 sieve as determined by ASTM D1140. Immediately prior to the installation of the clay liner, the basin slopes and bottom were to be compacted to a density not less than 90% of the Standard Laboratory Maximum Dry Density (ASTM D698). Once installed, the clay was then to be compacted using a sheep's foot roller to 95% of the Modified Laboratory Maximum Dry Density (ASTM D1557). Next a protective sand and rock later was to be installed.

4.1.2 Significant Changes/Modifications in Design since Original Construction

The railroad track embankment that split the secondary treatment basins was constructed in 2005.

4.1.3 Significant Repairs/Rehabilitation since Original Construction

No significant repairs or rehabilitation appear to have been performed to the bottom ash treatment basins since original construction.

4.2 SUMMARY OF OPERATIONAL PROCEDURES

4.2.1 Original Operational Procedures

Basic operations for treatment of CCRs at this site were described in Section 2.2 of this report.

4.2.2 Significant Changes in Operational Procedures and Original Startup

With the exception of the railroad loop, essentially separating the secondary treatment basins, there has been no change in operations since original start up.

4.2.3 Current Operational Procedures

Current operations are the same as original.

4.2.4 Other Notable Events since Original Startup

Based on the overtopping events described in Section 3.2, additional water level monitoring has been added and is used in operations to prevent future overtopping incidents.

5.0 FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

Dewberry personnel Cleighton Smith, P.E. and Lauren Ohotzke, E.I.T. performed a site visit on Tuesday, August 21, 2012 with the participants listed in 1.3.1.

The site visit began at about 9:00 AM. The weather was warm, approximately 75º F, with clear, sunny skies. Please refer to the Dam Inspection Checklists in Appendix B, Doc 19, for specific information gathered during this visit. Selected photographs are included here for ease of visual reference. All pictures were taken by Dewberry personnel during the site visit.

The overall assessment of the dam, based on the site visit, was that it was in satisfactory condition and no significant findings were noted.

There is a northern and southern system of treatment ponds that can be run simultaneously or independently if necessary (shut down the north to work/clean the south and vice versa). The ponds within this system are described in the following sections; all ponds appeared to be constructed similarly and visually appeared to be in the same or similar condition.

5.2 NORTHEASTERN SECONDARY POND

5.2.1 Crest

The crest appeared to be in sound, structural condition with no obvious signs of settling, cracking or other areas of concern.

5.2.2 Upstream/Inside Slope

We observed a side slope that was in good condition, with no sloughing, animal burrows, excess vegetation or other areas of concern. The composition appeared to be that of an earthen clayey-silt.

5.2.3 Outside Slope and Toe

The outside slope and toe were composed of earthen materials showing no visual signs of sand boils, indications of seepage, or other areas of concern.

5.2.4 Abutments and Groin Areas

As these management units are essentially ring dikes, there are no abutments or groin areas.

Field conditions of the Northeastern Secondary Ash Pond embankments are shown in the photos below.

Photo 5.2.4a: Looking West at berm between Northern and Southern Secondary Ponds

Photo 5.2.4b: Looking Northwest from Southeast corner of Northeastern Secondary Pond (water level ~4' deep)

Photo 5.2.4c: Looking Northeast from berm between Northeastern and Southeastern Secondary Ponds

Photo 5.2.4d: Looking Northwest from midpoint of Northeastern Secondary Pond's Southern embankment (note silt curtain in foreground)

Photo 5.2.4e: Looking Northwest from midpoint of Northeastern Secondary Pond's Southern embankment (note silt curtain in foreground)

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Photo 5.2.4f: Crest on West berm of Northeastern Secondary Pond

Photo 5.2.4g: Crest beside Southeastern Secondary Pond

5.3 NORTHWESTERN SECONDARY POND

5.3.1 Crest

The crest appeared to be in sound, structural condition with no obvious signs of settling, cracking or other areas of concern.

5.3.2 Upstream/Inside Slope

We observed a side slope that was in good condition, with no sloughing, animal burrows, excess vegetation or other areas of concern. The composition appeared to be that of an earthen clayey-silt.

5.3.3 Downstream/Outside Slope and Toe

The outside slope and toe were composed of earthen materials showing no visual signs of sand boils, indications of seepage, or other areas of concern.

5.3.4 Abutments and Groin Areas

As these management units are essentially ring dikes, there are no abutments or groin areas.

Field conditions of the Northwestern Secondary Ash Pond embankments are shown in the photos below.

Photo 5.3.4a: Looking Southwest from Northeast corner of Northwest Secondary Pond; Treatment center at Southwest corner of Northwest Secondary Pond

Photo 5.3.4b: Outside slope from Northwest corner of Northwest Secondary Pond

5.4 SOUTHEASTERN SECONDARY POND

5.4.1 Crest

The crest appeared to be in sound, structural condition with no obvious signs of settling, cracking or other areas of concern.

5.4.2 Upstream/Inside Slope

We observed a side slope that was in good condition, with no sloughing, animal burrows, excess vegetation or other areas of concern. The composition appeared to be that of an earthen clayey-silt.

5.4.3 Downstream/Outside Slope and Toe

The outside slope and toe were composed of earthen materials showing no visual signs of sand boils, indications of seepage, or other areas of concern.

5.4.4 Abutments and Groin Areas

As these management units are essentially ring dikes, there are no abutments or groin areas.

Field conditions of the Southeastern Secondary Ash Pond embankments are shown in the photos below as well as Photos 5.2.4a, 5.2.4f, and 5.2.4g above.

Photo 5.4.4a: Southeast Secondary Pond (water level ~4' deep)

Photo 5.4.4b: Looking Northeast at Plant and Southeastern Secondary Pond

5.5 SOUTHWESTERN SECONDARY POND

5.5.1 Crest

The crest appeared to be in sound, structural condition with no obvious signs of settling, cracking or other areas of concern.

5.5.2 Upstream/Inside Slope

We observed a side slope that was in good condition, with no sloughing, animal burrows, excess vegetation or other areas of concern. The composition appeared to be that of an earthen clayey-silt.

5.5.3 Downstream/Outside Slope and Toe

The outside slope and toe were composed of earthen materials showing no visual signs of sand boils, indications of seepage, or other areas of concern.

5.5.4 Abutments and Groin Areas

As these management units are essentially ring dikes, there are no abutments or groin areas.

Field conditions of the Southwestern Secondary Ash Pond embankments are shown in the photos below.

Photo 5.5.4a: Pump at Southwest corner of Southwestern Secondary Pond

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Photo 5.5.4b: Crest along Southwestern Secondary Pond's berm

5.6 OUTLET STRUCTURES

5.6.1 Overflow Structure

There are no overflow structures.

5.6.2 Outlet Conduit

The inlets and outlets were seen to be in good working condition. The conduits themselves were beneath the ground with a drivable crest above them. Seeing as though water seemed to be flowing from one pond to the next, we can say that the conduits would also appear to be in good working condition.

5.6.3 Emergency Spillway

Emergency spillways are not present for any ponds at this site.

5.6.4 Low Level Outlet

No low level outlets exist for this site.

6.0 HYDROLOGIC/HYDRAULIC SAFETY

6.1 SUPPORTING TECHNICAL DOCUMENTATION

6.1.1 Flood of Record

No documentation has been provided about the flood of record.

6.1.2 Inflow Design Flood

No documentation has been provided about the inflow design flood.

6.1.3 Spillway Rating

There is not a spillway present at this site.

6.1.4 Downstream Flood Analysis

No downstream flood analysis was provided.

6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Supporting documentation was not adequate. Hydraulic calculations, assumptions, and hydrology data were not provided.

6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY

Design reports have not been provided for verification; however, it appears that there is no drainage area other than the surface area of the ponds. There is no analysis to determine whether overtopping will occur from an extreme rainfall event. Low points on the northeastern secondary pond have resulted in overtopping due to improper operations on two occasions. As a result, additional water level monitoring has been added and is used in operations with the intent of preventing future overtopping incidents.

The overall rating for hydrologic/hydraulic safety is POOR.

7.0 STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCUMENTATION

7.1.1 Stability Analyses and Load Cases Analyzed

Structural stability cannot be assessed without the design report and static and seismic stability analyses.

7.1.2 Design Parameters and Dam Materials

Design parameters cannot be assessed without the design report. Significant information regarding embankment materials is contained in the construction specifications (Appendix A, Document 3; also, see section 4.1.1).

7.1.3 Uplift and/or Phreatic Surface Assumptions

This information cannot be assessed without the design report.

7.1.4 Factors of Safety and Base Stresses

This information cannot be assessed without the design report.

7.1.5 Liquefaction Potential

No liquefaction potential information was provided.

Dewberry's review of the U.S.G.S. Seismic Hazard Map for the Central and Eastern United States indicates the estimated peak ground acceleration for a 2-percent probability of exceedance in 50 years is 0.02g. The 0.02g is the lower limit of mapped values.

Available geologic data indicates surface deposits in the Weston Plant area consist of glacial till (Figure 7.6b) made up of sandy silts and silty sands (Figure7.6b). These soil types are considered only somewhat susceptible to liquefaction.

Based on the estimated low 2-percent probability of exceedance peak ground acceleration at the site and the presence of soils with a relatively low susceptibility to liquefaction, Dewberry does not consider liquefaction to be a concern at the site.

7.1.6 Critical Geological Conditions

No information on area geology was provided by the Utility. However, utilizing “wisconsingeologicalsurvey.org”, we can confirm that the general area of Rothschild, WI has bedrock composed of a basaltic to rhyolitic metavolcanic rock with some metasedimentary rock; deposits of till are present as a result of the ice age. The town of Rothschild is on the boarder of forested, sandy soils and forested, silty soils over igneous/metamorphic rock. Lastly, the thickness of unconsolidated material in this area ranges from 0 to 100 feet.

The maps seen below were taken from wisconsingeologicalsurvey.org. We have outlined the county of Marathon and called out the city of Rothschild for visual clarity, as the Weston Generating Station is located in Rothschild, WI within the county of Marathon in the state of Wisconsin.

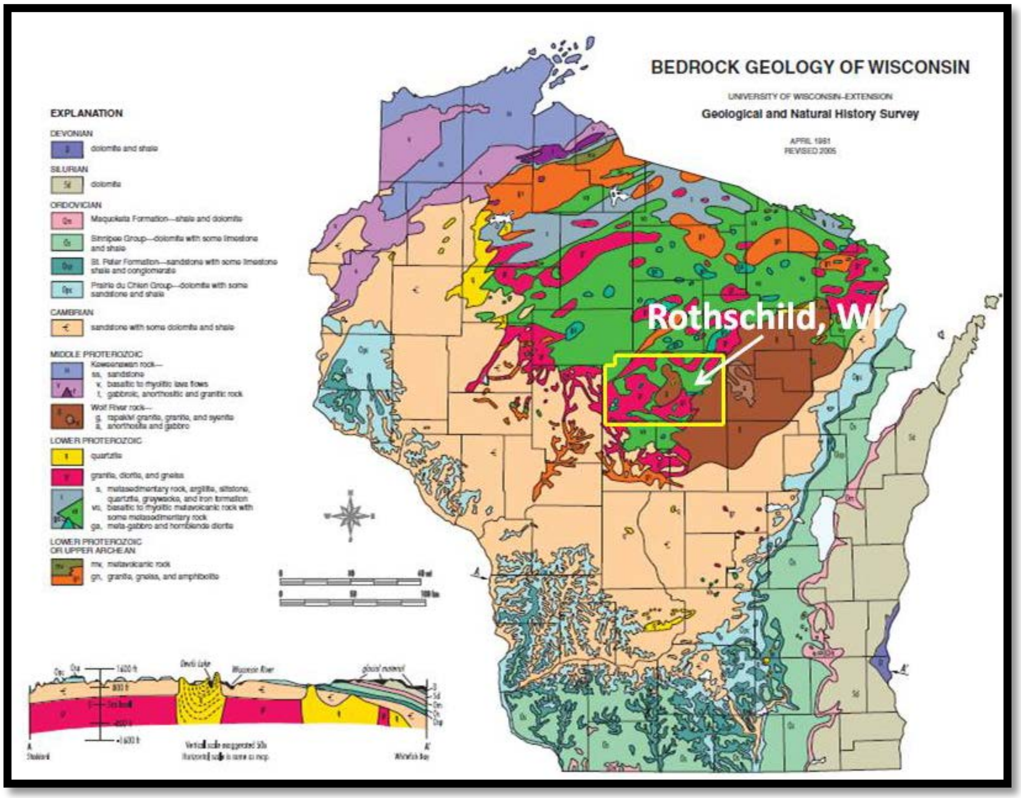


Figure 7.1.6a: Bedrock Geology of Wisconsin

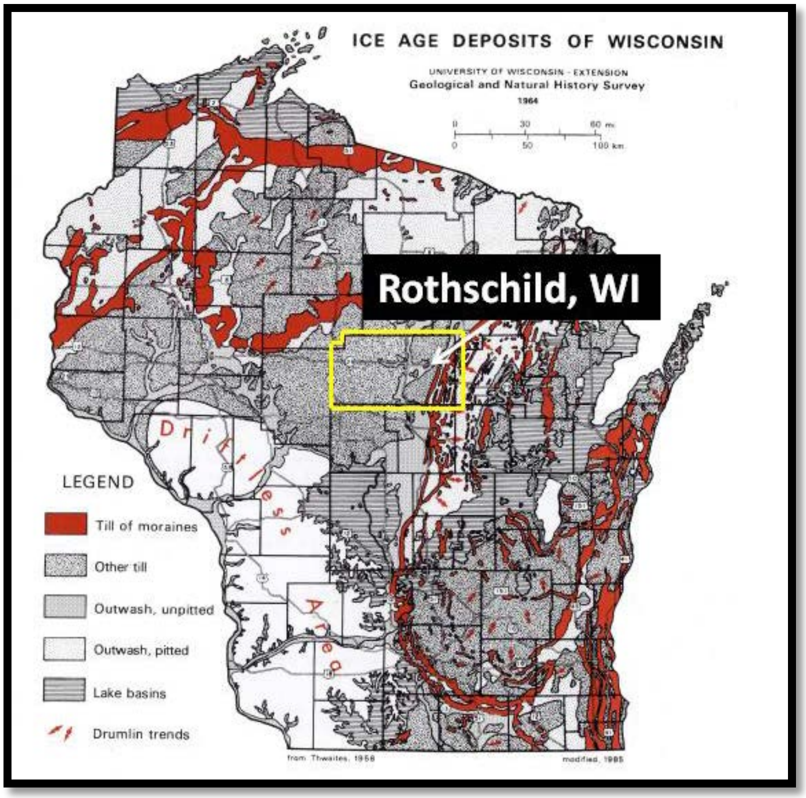


Figure 7.1.6b: Ice Age Deposits of Wisconsin

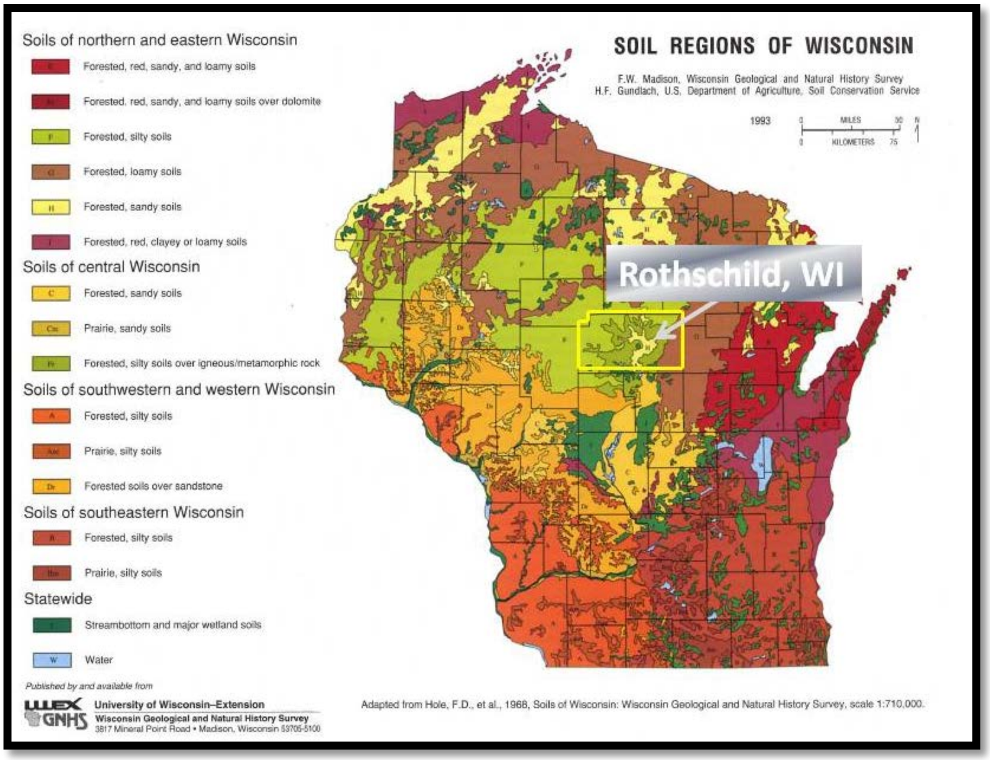


Figure 7.1.6c: Soil Regions of Wisconsin

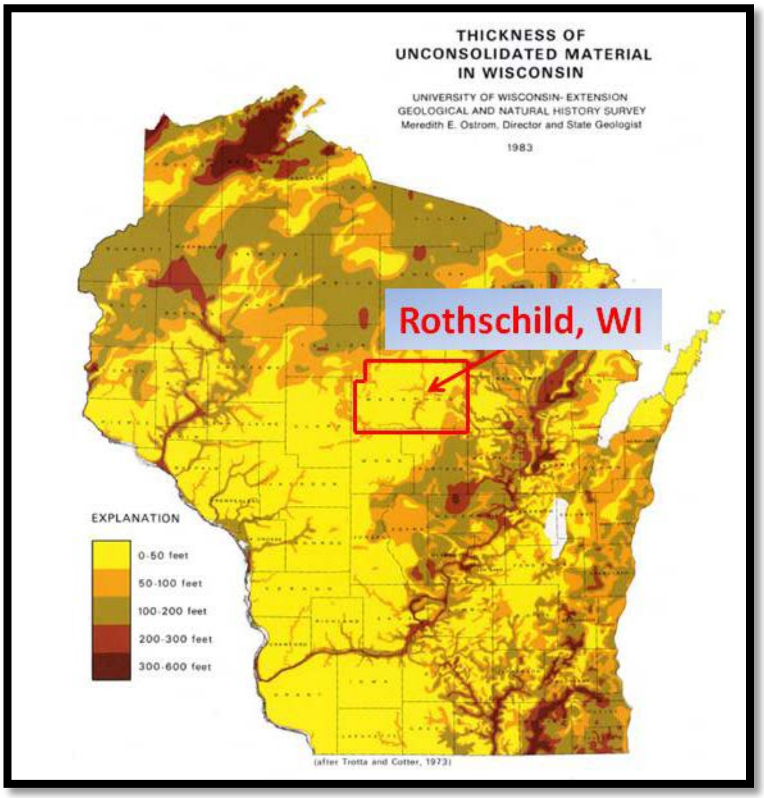


Figure 7.1.6d: Thickness of Unconsolidated Material in Wisconsin

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Structural stability documentation is considered to be inadequate.

7.3 ASSESSMENT OF STRUCTURAL STABILITY

Based on the one site visit and inadequate supporting documentation, an assessment of structural stability cannot be made and therefore the Northeastern Secondary Pond, Northwestern Secondary Pond, Southeastern Secondary Pond, Southwestern Secondary Pond management units are each rated POOR for structural stability.

8.0 ADEQUACY OF MAINTENANCE AND METHODS OF OPERATION

8.1 OPERATING PROCEDURES

Operating methods appear appropriate; especially since level monitors have been installed to prevent accidental overfilling of the ponds.

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

Routine site visits by plant personnel are made of the embankments. Indications of seepage, settling, sloughing, and erosion are part of a visual check. Vegetative growth is maintained as appropriate.

8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATIONS

8.3.1 Adequacy of Operating Procedures

Based on the assessments of this report, operating procedures appear to be adequate.

8.3.2 Adequacy of Maintenance

Based on the assessments of this report, maintenance procedures appear to be adequate.

9.0 ADEQUACY OF SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

WPSC does not have a formal surveillance plan at this plant.

9.2 INSTRUMENTATION MONITORING

The Weston Generating Station bottom ash impoundment dikes do not have an instrumentation monitoring system. There are water level monitors to prevent accidental overfilling. A typical record of this monitor is shown in Appendix A, Document 17.

9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

9.3.1 Adequacy of Inspection Program

Based on the data reviewed by Dewberry, including observations during the site visit, as well as review of the WPSC Weston Power Plant draft Preventative Maintenance Procedures (Appendix A, Document 18), the inspection program is adequate. The impoundments are small and low hazard.

9.3.2 Adequacy of Instrumentation Monitoring Program

The instrumentation monitoring (water level monitors) is adequate for these small, low hazard impoundments.

APPENDIX A

Document 1

Wisconsin Pollution Discharge Emission System Permit No. WI-0042765-07-0

WISCONSIN
DEPT. OF NATURAL RESOURCES

WPDES PERMIT

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

PERMIT TO DISCHARGE UNDER THE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM

Wisconsin Public Service Corporation - Weston Units 3 & 4

is permitted, under the authority of Chapter 283, Wisconsin Statutes, to discharge from a facility
located at
2501 Morrison Avenue, Rothschild, WI
to
The Upper Wisconsin River in Marathon County

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in this permit.

The permittee shall not discharge after the date of expiration. If the permittee wishes to continue to discharge after this expiration date an application shall be filed for reissuance of this permit, according to Chapter NR 200, Wis. Adm. Code, at least 180 days prior to the expiration date given below.

State of Wisconsin Department of Natural Resources
For the Secretary

By Russell Rasmussen
Russell Rasmussen
Director, Bureau of Watershed Management

March 30, 2010
Date Permit Signed/Issued

PERMIT TERM: EFFECTIVE DATE - April 01, 2010 **EXPIRATION DATE - March 31, 2015**

TABLE OF CONTENTS

1 Influent Requirements

1.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
701	River water intake sampling point for Wisconsin River supply for Weston units 3 and 4

1.2 Monitoring Requirements

The permittee shall comply with the following monitoring requirements.

1.2.1 Sampling Point 701 - INTAKE WATER

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Mercury, Total Recoverable		ng/L	Monthly	Grab	Optional monitoring, see paragraph 1.2.1.1

1.2.1.1 Mercury Monitoring

The permittee shall collect and analyze all mercury samples according to the data quality requirements of ss. NR 106.145(9) and (10), Wisconsin Administrative Code. The limit of quantitation (LOQ) used for the effluent and field blank shall be less than 1.3 ng/L, unless the samples are quantified at levels above 1.3 ng/L. The permittee shall collect at least one mercury field blank for each set of mercury samples (a set of samples may include combinations of intake, influent, effluent or other samples all collected on the same day). The permittee shall report results of samples and field blanks to the Department on Discharge Monitoring Reports.

1.2.1.1 Influent Mercury Sampling

The Department **highly recommends** that the permittee collect a monthly sample that is representative of the intake water from the river and have it analyzed for low level mercury to help determine the intake mercury contribution to the discharge. This permit does not **require** that the permittee report an influent mercury sample result for any month.

1.2.1.2 Cooling Water Intake Structure (CWIS)

The permittee shall at all times properly operate and maintain all CWIS equipment. The permittee shall give advance notice to the Department of any planned changes in the location, design, operation, or capacity of the CWIS.

2 In-Plant Requirements

2.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
112	Discharge from the coal pile runoff containment/detention pond that is treated for metals precipitation, suspended solids removal and pH control
102	Discharge from the metal wastewater treatment pond that includes wastewaters from boiler water acid/caustic demineralizer regeneration, reverse osmosis membrane cleaning, and non-chemical metal surface cleaning that are equalized and treated for metals precipitation, suspended solids removal and pH control
103	Discharge from the Weston 3 bottom ash wastewater treatment pond that includes wastewater from bottom ash sluicing, floor & equipment drain water, and reverse osmosis reject water from groundwater (treated to supply the boiler), that is equalized, treated to remove solids and adjusted for pH control
104	The blowdown discharge from the Weston 3 recycled water, condenser cooling tower system to control the concentration of dissolved solids
105	The blowdown discharge from the Weston 4 recycled water, condenser cooling tower system to control the concentration of dissolved solids
106	Total discharge from the combination of the unit 3 cooling tower blowdown (104) and unit 4 cooling tower blowdown (105) discharges
109	Effluent field blank sample needed to check for contamination of samples collected from outfall 002

2.2 Monitoring Requirements and Limitations

The permittee shall comply with the following monitoring requirements and limitations.

2.2.1 Sampling Point 112 - TREATED COAL PILE RUNOFF

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Total Daily	
Suspended Solids, Total	Daily Max	50 mg/L	3/Week	24-Hr Comp	See note 2.2.2.2
pH (Minimum)	Daily Min	4.0 su	Daily	Continuous	See note 2.2.3.1
pH (Maximum)	Daily Max	11 su	Daily	Continuous	See note 2.2.3.1
pH Total Exceedance Time Minutes	Monthly Total	446 minutes	Daily	Calculated	See note 2.2.3.1
pH Exceedances Greater Than 60 Minutes	Monthly Total	0 Number	Daily	Calculated	See note 2.2.3.1

2.2.2 Sampling Point 102 - METAL TREATMENT WASTEWATER

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Total Daily	
pH (Minimum)	Daily Min	4.0 su	Daily	Continuous	See note 2.2.3.1
pH (Maximum)	Daily Max	11 su	Daily	Continuous	See note 2.2.3.1
pH Total Exceedance Time Minutes	Monthly Total	446 minutes	Daily	Calculated	See note 2.2.3.1
pH Exceedances Greater Than 60 Minutes	Monthly Total	0 Number	Daily	Calculated	See note 2.2.3.1
Suspended Solids, Total	Daily Max	100 mg/L	3/Week	24-Hr Comp	See note 2.2.2.2
Suspended Solids, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Comp	See note 2.2.2.2
Oil & Grease (Hexane)	Daily Max	20 mg/L	Weekly	Grab	
Oil & Grease (Hexane)	Monthly Avg	15 mg/L	Weekly	Grab	
Iron, Total Recoverable	Daily Max	1.0 mg/L	Daily	24-Hr Comp	
Copper, Total Recoverable	Daily Max	1.0 mg/L	Daily	24-Hr Comp	

2.2.2.1 Metals Analyses

Unless specified otherwise in the table above, metals analyses shall measure metals as total recoverable. Measurements of total metals and total recoverable metals shall be considered as equivalent.

2.2.2.2 TSS Monitoring (Including Frequency Increase Following Limit Exceedence)

Total Suspended Solids shall be monitored three times per week (if possible, not on consecutive days), except as provided below. A daily sampling frequency for Total Suspended Solids (TSS) is required for 7 days from when sample results are available to the permittee to determine a daily maximum TSS limit exceedence has occurred. A daily sampling frequency for TSS shall be required for 30 days from when sample results are available to the permittee to determine a monthly average TSS limit exceedence has occurred.

2.2.3 Sampling Point 103 - BOTTOM ASH SLUICE WATER

Monitoring Requirements and Limitations

Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Total Daily	
pH (Minimum)	Daily Min	4.0 su	Daily	Continuous	See note 2.2.3.1
pH (Maximum)	Daily Max	11 su	Daily	Continuous	See note 2.2.3.1
pH Total Exceedance Time Minutes	Monthly Total	446 minutes	Daily	Calculated	See note 2.2.3.1
pH Exceedances Greater Than 60 Minutes	Monthly Total	0 Number	Daily	Calculated	See note 2.2.3.1
Suspended Solids, Total	Daily Max	100 mg/L	3/Week	24-Hr Comp	See note 2.2.3.2
Suspended Solids, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Comp	See note 2.2.3.2
Oil & Grease (Hexane)	Daily Max	20 mg/L	Weekly	Grab	
Oil & Grease (Hexane)	Monthly Avg	15 mg/L	Weekly	Grab	

2.2.3.1 Limitations for Continuous pH Monitoring

The permittee shall maintain the pH of the discharge within the range of 6.0 to 9.0 standard units (s.u.), except excursions are permitted subject to the following conditions:

- The pH is monitored continuously;
- The total time during which the pH is outside the range of 6.0 to 9.0 s.u. shall not exceed 446 minutes in any calendar month;
- No individual pH excursion outside the range of 6.0 to 9.0 s.u. shall exceed 60 minutes in duration; and
- No individual pH excursion shall be outside the range of 4.0 to 11.0 s.u.

2.2.3.2 TSS Monitoring (Including Frequency Increase Following Limit Exceedence)

Total Suspended Solids shall be monitored three times per week (if possible, not on consecutive days), except as provided below. A daily sampling frequency for Total Suspended Solids (TSS) is required for 7 days from when sample results are available to the permittee to determine a daily maximum TSS limit exceedence has occurred. A daily sampling frequency for TSS shall be required for 30 days from when sample results are available to the permittee to determine a monthly average TSS limit exceedence has occurred.

2.2.4 Sampling Point 104 - COOLING TOWER BLOWDOWN 3

Monitoring Requirements and Limitations

Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Total Daily	
pH Field	Daily Max	9.0 su	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
Chlorine, Total Resdl Discharge Time	Daily Max	120 min/day	Daily	See Permit	See note 2.2.4.1 below
Chlorine, Total Residual		µg/L	Daily	Grab	See note 2.2.4.2 below
Chlorine, Variable Limit		µg/L	Daily	Calculated	See note 2.2.4.3 below
Chlorine, Total Resdl Computed Compliance	Daily Max	0 Number	Daily	Calculated	

2.2.4.1 Time of Chlorine Discharge

Neither free available chlorine nor total residual chlorine shall be discharged for more than 2 hours per unit per day, except when chlorinating for macro-invertebrate control (as allowed in s. NR 290.12(2)(c), Wisconsin Adm. Code) in accordance with a Department approved macro-invertebrate management plan. The time of chlorine discharge shall be reported as the time that detectable levels of chlorine, using the analysis methods specified in this permit's "Chlorine Compliance and Analysis Methods" Standard Condition, are present in the cooling water discharge. The time of total residual chlorine discharge shall be monitored and summed for each day that chlorine is added to the condenser cooling water system.

2.2.4.2 Chlorine Sampling Procedure

At least one grab sample for total residual chlorine shall be collected during the peak chlorine discharge of each chlorination event. The discharge monitoring reported value shall be the maximum of the chlorination events for that day. A continuous monitor may be used to determine the peak value and length of chlorine discharge as long as it duplicates the accuracy of a NR 219 approved method.

2.2.4.3 Total Residual Chlorine Limitations

The daily maximum limit for total residual chlorine is 200 µg/L when chlorine is discharged for 160 minutes per day or less. If chlorine is discharged for more than 160 minutes per day, the daily maximum limit is 38 µg/L.

2.2.4.4 Cooling Tower Maintenance Chemicals

This discharge may not contain detectable amounts of any of the 126 priority pollutants contained in cooling tower maintenance chemicals including Chromium and Zinc.

2.2.5 Sampling Point 105 - COOLING TOWER BLOWDOWN 4

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Total Daily	
pH Field	Daily Max	9.0 su	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
Chlorine, Total Resdl Discharge Time	Daily Max	120 min/day	Daily	See Permit	See note 2.2.5.1 below
Chlorine, Total Residual		μg/L	Daily	Grab	See note 2.2.5.2 below
Chlorine, Variable Limit		μg/L	Daily	Calculated	See note 2.2.5.3 below
Chlorine, Total Resdl Computed Compliance	Daily Max	0 Number	Daily	Calculated	

2.2.5.1 Time of Chlorine Discharge

Neither free available chlorine nor total residual chlorine shall be discharged for more than 2 hours per unit per day, except when chlorinating for macro-invertebrate control (as allowed in s. NR 290.12(2)(c), Wisconsin Adm. Code) in accordance with a Department approved macro-invertebrate management plan. The time of chlorine discharge shall be reported as the time that detectable levels of chlorine, using the analysis methods specified in this permit's "Chlorine Compliance and Analysis Methods" Standard Condition, are present in the cooling water discharge. The time of total residual chlorine discharge shall be monitored and summed for each day that chlorine is added to the condenser cooling water system.

2.2.5.2 Chlorine Sampling Procedure

At least one grab sample for total residual chlorine shall be collected during the peak chlorine discharge of each chlorination event. The discharge monitoring reported value shall be the maximum of the chlorination events for that day. A continuous monitor may be used to determine the peak value and length of chlorine discharge as long as it duplicates the accuracy of a NR 219 approved method.

2.2.5.3 Total Residual Chlorine Limitations

The daily maximum limit for total residual chlorine is 200 μg/L when chlorine is discharged for 160 minutes per day or less. If chlorine is discharged for more than 160 minutes per day, the daily maximum limit is 38 μg/L.

2.2.5.4 Cooling Tower Maintenance Chemicals

This discharge may not contain detectable amounts of any of the 126 priority pollutants contained in cooling tower maintenance chemicals including Chromium and Zinc.

2.2.6 Sampling Point 106 - TOWER BLOWDOWN TOTAL 3 & 4

Monitoring Requirements and Limitations

Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Total Daily	
Chlorine, Total Resdl Discharge Time	Daily Max	240 min/day	Daily	See Permit	See note 2.2.6.1 below
Chlorine, Total Residual		µg/L	Daily	Grab	See note 2.2.6.2 below
Chlorine, Total Residual	Daily Max	0.9 lbs/day	Daily	Calculated	See note 2.2.6.3 below
Chlorine, Variable Limit		µg/L	Daily	Calculated	See note 2.2.6.4 below
Chlorine, Total Resdl Computed Compliance	Daily Max	0 Number	Daily	Calculated	

2.2.6.1 Time of Chlorine Discharge

Neither free available chlorine nor total residual chlorine shall be discharged for more than 2 hours per unit per day, except when chlorinating for macro-invertebrate control (as allowed in s. NR 290.12(2)(c), Wisconsin Adm. Code) in accordance with a Department approved macro-invertebrate management plan. The time of chlorine discharge shall be reported as the time that detectable levels of chlorine, using the analysis methods specified in this permit's "Chlorine Compliance and Analysis Methods" Standard Condition, are present in the cooling water discharge. The time of total residual chlorine discharge shall be monitored and summed for each day that chlorine is added to the condenser cooling water system.

2.2.6.2 Chlorine Sample Reporting Procedure

Report the highest result from the daily sample for total residual chlorine collected during the peak chlorine discharge from sample point 104 (unit 3 cooling tower blowdown) or from sample point 105 (unit 4 cooling tower blowdown). The discharge monitoring reported value shall be the maximum of the chlorination events for that day. A continuous monitor may be used to determine the peak value and length of chlorine discharge as long as it duplicates the accuracy of a NR 219 approved method.

2.2.6.3 Chlorine Mass Limit and Reporting

The total residual chlorine mass limit of 0.9 pounds/day and chlorine mass discharge reporting only applies if chlorine is discharged via sample point 106 for more than 160 minutes per day.

2.2.6.4 Total Residual Chlorine Limitations

The daily maximum limit for total residual chlorine is 200 µg/L when chlorine is discharged for 160 minutes per day or less. If chlorine is discharged for more than 160 minutes per day, the daily maximum limits are 38 µg/L and 0.9 lbs/day.

2.2.6.5 Use of Cooling System Water for Dust Suppression

Weston 3 & 4 condenser cooling water, including water monitored via sample point 106, may be used for fugitive dust control on roads and parking lots within the Weston power plant site. The application of this water shall be limited so the dust control water seeps into the ground within the Weston power plant site.

2.2.7 Sampling Point 109 - EFFLUENT FIELD BLANK

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Mercury, Total Recoverable		ng/L	Monthly	Grab	

2.2.7.1 Mercury Monitoring

The permittee shall collect and analyze all mercury samples according to the data quality requirements of ss. NR 106.145(9) and (10), Wisconsin Administrative Code. The limit of quantitation (LOQ) used for the effluent and field blank shall be less than 1.3 ng/L, unless the samples are quantified at levels above 1.3 ng/L. The permittee shall collect at least one mercury field blank for each set of mercury samples (a set of samples may include combinations of intake, influent, effluent or other samples all collected on the same day). The permittee shall report results of samples and field blanks to the Department on Discharge Monitoring Reports.

3 Surface Water Requirements

3.1 Sampling Point(s)

The discharge(s) shall be limited to the waste type(s) designated for the listed sampling point(s).

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
002	Wastewater discharge to the Wisconsin River that is a combination of the process wastewater discharges from sample points 112, 102, 103 and 106
003	Condenser cooling water (from Weston 1&2) that is used for the Weston 3 & 4 operation for dust suppression or to prevent ice formation on the intake screen
004	River water discharged while backwashing the water intake traveling screens
005	Discharge of once-through noncontact cooling water to the Wisconsin River

3.2 Monitoring Requirements and Effluent Limitations

The permittee shall comply with the following monitoring requirements and limitations.

3.2.1 Sampling Point (Outfall) 002 - PROCESS WTR TO WIS RIVER

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
Temperature Maximum		deg F	Weekly	Grab	See temperature monitoring paragraph below
Mercury, Total Recoverable	Daily Max	11 ng/L	Monthly	Grab	See mercury monitoring paragraph 3.2.4.5
Copper, Total Recoverable	Daily Max	63 µg/L	Quarterly	Composite	
Copper, Total Recoverable	Daily Max	1.5 lbs/day	Quarterly	Composite	
Hardness, Total as $CaCO_3$		mg/L	Annual	24-Hr Comp	
Acute WET		TU_a	Annual	24-Hr Comp	See WET paragraph for specific quarters for testing

3.2.1.1 Temperature Monitoring

The amount of heat discharged to the Wisconsin River through outfall 002 shall be sampled at least weekly by (1) grab sample measurement of the 002 discharge temperature, or (2) grab or continuous measurement of the temperature of the cooling tower blowdown (sample point 104) from Weston unit 3 and the cooling tower blowdown (sample point 105) from Weston unit 4. Enter the maximum measured temperature for the day in the discharge monitoring report.

3.2.1.2 Copper Analysis Method

The permittee shall utilize test methods listed in Ch. NR 219, Wis. Adm. Code, when analyzing for Total Recoverable Copper, except that use of other equivalent analysis methods may be approved in writing by the Department. The selected Total Recoverable Copper test shall have a method detection level of 1 ug/L or less. Measurement of total metals and total recoverable metals shall be considered to be equivalent.

3.2.1.3 Composite Sample

A representative composite sample of the wastewater discharge shall be created by combining at least three individual grab samples of equal volume taken at approximately equal intervals over a 24 hour period. There shall be at least 1 hour between individual grab samples. The permittee may collect a 24 hour composite sample in lieu of a composite sample.

3.2.1.4 24 hour Composite Sample

A representative composite sample of the wastewater discharge shall be created by combining individual grab samples in proportion to the volume of discharge flow during the 24 hour period as specified in NR 218.04(12), Wisconsin Adm. Code.

3.2.1.5 Polychlorinated Biphenyls

The permittee shall manage polychlorinated biphenyl compounds (PCB's) used in the facility (such as in transformer fluid) so PCB's from the facility are not discharged to the river.

3.2.1.6 Whole Effluent Toxicity (WET) Testing

WET Testing Frequency: Acute whole effluent toxicity tests are required during the following quarters.

- **Acute:** 2nd quarter 2010, 3rd quarter 2011, 4th quarter 2012, 2nd quarter 2013, and 1st quarter 2014.

Primary Control Water: The Wisconsin River, upstream of the WPS Weston discharges. The control water samples shall be collected from areas outside of the mixing zone of any other discharger, if possible.

Dilution series: At least five effluent concentrations and dual controls must be included in each test.

- **Acute:** 100, 50, 25, 12.5, 6.25% and any additional selected by the permittee.

Reporting: The permittee shall report test results on the Discharge Monitoring Report form, and also complete the "Whole Effluent Toxicity Test Report Form" (Section 6, "*State of Wisconsin Aquatic Life Toxicity Testing Methods Manual, 2nd Edition*"), for each test. The original, complete, signed version of the Whole Effluent Toxicity Test Report Form shall be sent to the Biomonitoring Coordinator, Bureau of Watershed Management, 101 S. Webster St., P.O. Box 7921, Madison, WI 53707-7921, within 45 days of test completion. The original Discharge Monitoring Report (DMR) form and one copy shall be sent to the contact and location provided on the DMR by the required deadline.

Determination of Positive Results: An acute toxicity test shall be considered positive if the Toxic Unit - Acute (TU_a) is greater than 1.0 for either species. The TU_a shall be calculated as follows: If $LC_{50} \geq 100$, then $TU_a = 1.0$. If LC_{50} is < 100, then $TU_a = 100 \div LC_{50}$.

Additional Testing Requirements: Within 90 days of a WET test which showed a positive result, the permittee shall submit the results of at least 2 retests to the Biomonitoring Coordinator on "Whole Effluent Toxicity Test Report Forms". The 90 day reporting period shall begin the day after completion of the test which showed a positive result. The retests shall be completed using the same species and test methods specified for the original test (see the Standard Requirements permit section).

3.2.2 Sampling Point (Outfall) 003 - INTAKE DE-ICE WATER

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Monthly	Estimated	

3.2.2.1 Use of Noncontact Cooling Water for Dust Suppression

Noncontact cooling water, including water allowed to be discharged through outfall 003, can be utilized as source water for dust suppression on roads within the Weston power plant site.

3.2.3 Sampling Point (Outfall) 004 - SCREEN BACKWASH WATER

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Monthly	Estimated	

3.2.3.1 Intake Screen Backwash Discharges

Trash and coarse debris accumulated on the condenser cooling (river) water intake screen shall be captured so it is not returned to the river with the intake screen backwash discharge. The captured material shall be stored and disposed of in a manner to prevent any pollutant from the materials from entering the waters of the State pursuant to s. NR 205.07(3)(a), Wis. Adm. Code. Fine debris, aquatic organisms and vegetation may be returned to the river if they cannot reasonably be captured from the screen backwash water discharge.

3.2.4 Sampling Point (Outfall) 005 - NCCW TO WIS RIVER

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Total Daily	
Chlorine, Total Resdl Discharge Time	Daily Max	120 min/day	Daily	Calculated	See paragraph 3.2.4.1 below
Chlorine, Total Residual		µg/L	Daily	Grab	See paragraph 3.2.4.2 below
Chlorine, Variable Limit		µg/L	Daily	Calculated	See paragraph 3.2.4.3 below
Chlorine, Total Resdl Computed Compliance	Daily Max	0 Number	Daily	Calculated	
Chlorine, Total Residual	Daily Max	1.1 lbs/day	Daily	Calculated	See paragraph 3.2.4.4 below
Temperature Maximum		deg F	Weekly	Grab	Report maximum measure temperature for the day
Mercury, Total Recoverable		ng/L	Quarterly	Grab	See mercury monitoring paragraph 3.2.4.5

3.2.4.1 Time of Chlorine Discharge

Neither free available chlorine nor total residual chlorine shall be discharged for more than 2 hours per unit per day, except when chlorinating for macro-invertebrate control (as allowed in s. NR 290.12(2)(c), Wisconsin Adm. Code) in accordance with a Department approved macro-invertebrate management plan. The time of chlorine discharge may be reported as being equivalent to the time of chlorine addition or, alternatively, as the time that detectable levels of chlorine, using the analysis methods specified in this permit's "Chlorine Compliance and Analysis Methods" Standard Condition, are present in the cooling water discharge. The time of total residual chlorine discharge shall be monitored and summed for each day that chlorine is added to the condenser cooling water system.

3.2.4.2 Chlorine Sampling Procedure

At least one grab sample for total residual chlorine shall be collected during the peak chlorine discharge of each chlorination event. The discharge monitoring reported value shall be the maximum of the chlorination events for that day. A continuous monitor may be used to determine the peak value and length of chlorine discharge as long as it duplicates the accuracy of a NR 219 approved method.

3.2.4.3 Total Residual Chlorine Limitations

The daily maximum limit for total residual chlorine is 200 µg/L when chlorine is discharged for 160 minutes per day or less. If chlorine is discharged for more than 160 minutes per day, the daily maximum limits are 38 µg/L and 1.1 lbs/day.

3.2.4.4 Chlorine Mass Limit and Reporting

The total residual chlorine mass limit of 1.1 pounds/day and chlorine mass discharge reporting only apply if chlorine is discharged for more than 160 minutes per day.

3.2.4.5 Mercury Monitoring

The permittee shall collect and analyze all mercury samples according to the data quality requirements of ss. NR 106.145(9) and (10), Wisconsin Administrative Code. The limit of quantitation (LOQ) used for the effluent and field blank shall be less than 1.3 ng/L, unless the samples are quantified at levels above 1.3 ng/L. The permittee shall collect at least one mercury field blank for each set of mercury samples (a set of samples may include combinations of intake, influent, effluent or other samples all collected on the same day). Mercury testing of the water taken in from the Wisconsin River is also highly recommended. The permittee shall report results of samples and field blanks to the Department on Discharge Monitoring Reports.

3.2.4.6 Use of Noncontact Cooling Water for Dust Suppression

Noncontact cooling water, including water allowed to be discharged through outfall 005, may be used for fugitive dust control on roads and parking lots within the Weston power plant site. The application of this water shall be limited so the dust control water seeps into the ground within the Weston power plant site.

4 Schedules of Compliance

4.1 Mercury Pollutant Minimization Program

The permittee shall continue to implement a pollutant minimization program as defined in s. NR 106.145(2), Wis. Adm. Code.

Required Action	Date Due
Submit Annual Status Reports: The permittee shall submit to the Department an annual status report on the progress of the PMP as required by s. NR 106.145(7), Wis. Adm. Code. Submittal of the first annual status report is required by the December 31, 2010. Note: If the permittee wishes to apply for an alternative mercury effluent limitation, that application is due with the application for permit reissuance by 6 months prior to permit expiration. The permittee should submit or reference the PMP plan as updated by the Annual Status Report or more recent developments as part of that application.	12/31/2010
Mercury Removal Enhancement Study: Wisconsin Public Service shall submit a study plan to the Department for an evaluation to determine whether Weston 3&4 wastewater treatment system modifications, such as consistent operation of the tertiary filters for the BAT wastewater discharge through sample point 103 or diversion of the sludge belt press filtrate to the wastewater treatment system, would result in a reduction in the discharge of mercury to the Wisconsin River.	12/31/2010
Mercury Removal Enhancement Study: By June 30, 2011, Wisconsin Public Service shall commence the evaluation of whether Weston 3&4 wastewater treatment system modifications, such as consistent operation of the tertiary filters for the BAT wastewater discharge through sample point 103 or diversion of the sludge belt press filtrate to the wastewater treatment system, would result in a reduction in the discharge of mercury to the Wisconsin River.	06/30/2011
Mercury Removal Enhancement Study Report: Wisconsin Public Service shall submit the results of the study evaluating whether Weston 3&4 wastewater treatment system modifications, such as consistent operation of the tertiary filters for the BAT wastewater discharge through sample point 103 or diversion of the sludge belt press filtrate to the wastewater treatment system, would result in a reduction in the discharge of mercury to the Wisconsin River.	12/31/2012

5 Standard Requirements

NR 205, Wisconsin Administrative Code (Conditions for Industrial Dischargers): The conditions in ss. NR 205.07(1) and NR 205.07(3), Wis. Adm. Code, are included by reference in this permit. The permittee shall comply with all of these requirements. Some of these requirements are outlined in the Standard Requirements section of this permit. Requirements not specifically outlined in the Standard Requirement section of this permit can be found in ss. NR 205.07(1) and NR 205.07(3).

5.1 Reporting and Monitoring Requirements

5.1.1 Monitoring Results

Monitoring results obtained during the previous month shall be summarized and reported on a Department Wastewater Discharge Monitoring Report. The report may require reporting of any or all of the information specified below under 'Recording of Results'. This report is to be returned to the Department no later than the date indicated on the form. When submitting a paper Discharge Monitoring Report form, the original and one copy of the Wastewater Discharge Monitoring Report Form shall be submitted to the return address printed on the form. A copy of the Wastewater Discharge Monitoring Report Form or an electronic file of the report shall be retained by the permittee.

All Wastewater Discharge Monitoring Reports submitted to the Department should be submitted using the electronic Discharge Monitoring Report system. Permittees who may be unable to submit Wastewater Discharge Monitoring Reports electronically may request approval to submit paper DMRs upon demonstration that electronic reporting is not feasible or practicable.

If the permittee monitors any pollutant more frequently than required by this permit, the results of such monitoring shall be included on the Wastewater Discharge Monitoring Report.

The permittee shall comply with all limits for each parameter regardless of monitoring frequency. For example, monthly, weekly, and/or daily limits shall be met even with monthly monitoring. The permittee may monitor more frequently than required for any parameter.

An Electronic Discharge Monitoring Report Certification sheet shall be signed and submitted with each electronic Discharge Monitoring Report submittal. This certification sheet, which is not part of the electronic report form, shall be signed by a principal executive officer, a ranking elected official or other duly authorized representative and shall be mailed to the Department at the time of submittal of the electronic Discharge Monitoring Report. The certification sheet certifies that the electronic report form is true, accurate and complete. Paper reports shall be signed by a principal executive officer, a ranking elected official, or other duly authorized representative.

5.1.2 Sampling and Testing Procedures

Sampling and laboratory testing procedures shall be performed in accordance with Chapters NR 218 and NR 219, Wis. Adm. Code and shall be performed by a laboratory certified or registered in accordance with the requirements of ch. NR 149, Wis. Adm. Code. Groundwater sample collection and analysis shall be performed in accordance with ch. NR 140, Wis. Adm. Code. The analytical methodologies used shall enable the laboratory to quantitate all substances for which monitoring is required at levels below the effluent limitation. If the required level cannot be met by any of the methods available in NR 219, Wis. Adm. Code, then the method with the lowest limit of detection shall be selected. Additional test procedures may be specified in this permit.

5.1.3 Recording of Results

The permittee shall maintain records which provide the following information for each effluent measurement or sample taken:

- the date, exact place, method and time of sampling or measurements;
- the individual who performed the sampling or measurements;
- the date the analysis was performed;
- the individual who performed the analysis;
- the analytical techniques or methods used; and
- the results of the analysis.

5.1.4 Reporting of Monitoring Results

The permittee shall use the following conventions when reporting effluent monitoring results:

- Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 0.1 mg/L, report the pollutant concentration as < 0.1 mg/L.

- Pollutant concentrations equal to or greater than the limit of detection, but less than the limit of quantitation, shall be reported and the limit of quantitation shall be specified.

- For the purposes of reporting a calculated result, average or a mass discharge value, the permittee may substitute a 0 (zero) for any pollutant concentration that is less than the limit of detection. However, if the effluent limitation is less than the limit of detection, the department may substitute a value other than zero for results less than the limit of detection, after considering the number of monitoring results that are greater than the limit of detection and if warranted when applying appropriate statistical techniques.

5.1.5 Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit for a period of at least 3 years from the date of the sample, measurement, report or application, except for sludge management forms and records, which shall be kept for a period of at least 5 years.

5.1.6 Other Information

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or correct information to the Department.

5.2 System Operating Requirements

5.2.1 Noncompliance Notification

- The permittee shall report the following types of noncompliance by a telephone call to the Department's regional office within 24 hours after becoming aware of the noncompliance;
  - any noncompliance which may endanger health or the environment;
  - any violation of an effluent limitation resulting from an unanticipated bypass;
  - any violation of an effluent limitation resulting from an upset; and
  - any violation of a maximum discharge limitation for any of the pollutants listed by the Department in the permit.

- A written report describing the noncompliance shall also be submitted to the Department's regional office within 5 calendar days after the permittee becomes aware of the noncompliance. On a case-by-case basis, the Department may waive the requirement for submittal of a written report within calendar 5 days and instruct the permittee to submit the written report with the next regularly scheduled monitoring report. In either case, the written report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; the steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and if the noncompliance has not been corrected, the length of time it is expected to continue.

- The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

NOTE: Section 292.11(2)(a), Wisconsin Statutes, requires any person who possesses or controls a hazardous substance or who causes the discharge of a hazardous substance to notify the Department of Natural Resources **immediately** of any discharge not authorized by the permit. The discharge of a hazardous substance that is not authorized by this permit or that violates this permit may be a hazardous substance spill. To report a hazardous substance spill, call DNR's 24-hour HOTLINE at **1-800-943-0003**.

5.2.2 Unscheduled Bypassing

Any unscheduled bypass or overflow of wastewater at the treatment works or from the collection system is prohibited, and the Department may take enforcement action against a permittee for such occurrences under s. 283.89, Wis. Stats., unless:

- The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
- There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
- The permittee notified the Department as required in this Section.

Whenever there is an unscheduled bypass or overflow occurrence at the treatment works or from the collection system, the permittee shall notify the Department within 24 hours of initiation of the bypass or overflow occurrence by telephoning the wastewater staff in the regional office as soon as reasonably possible (FAX, email or voice mail, if staff are unavailable).

In addition, the permittee shall within 5 days of conclusion of the bypass or overflow occurrence report the following information to the Department in writing:

- Reason the bypass or overflow occurred, or explanation of other contributing circumstances that resulted in the overflow event. If the overflow or bypass is associated with wet weather, provide data on the amount and duration of the rainfall or snow melt for each separate event.
- Date the bypass or overflow occurred.
- Location where the bypass or overflow occurred.
- Duration of the bypass or overflow and estimated wastewater volume discharged.
- Steps taken or the proposed corrective action planned to prevent similar future occurrences.
- Any other information the permittee believes is relevant.

5.2.3 Scheduled Bypassing

Any construction or normal maintenance which results in a bypass of wastewater from a treatment system is prohibited unless authorized by the Department in writing. If the Department determines that there is significant public interest in the proposed action, the Department may schedule a public hearing or notice a proposal to approve the bypass. Each request shall specify the following minimum information:

- proposed date of bypass;
- estimated duration of the bypass;
- estimated volume of the bypass;
- alternatives to bypassing; and
- measures to mitigate environmental harm caused by the bypass.

5.2.4 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit. The wastewater treatment facility shall be under the direct supervision of a state certified operator as required in s. NR 108.06(2), Wis. Adm. Code. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training as required in ch. NR 114, Wis. Adm. Code, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

5.2.5 Spill Reporting

The permittee shall notify the Department in accordance with ch. NR 706 (formerly NR 158), Wis. Adm. Code, in the event that a spill or accidental release of any material or substance results in the discharge of pollutants to the waters of the state at a rate or concentration greater than the effluent limitations established in this permit, or the spill or accidental release of the material is unregulated in this permit, unless the spill or release of pollutants has been reported to the Department in accordance with s. NR 205.07 (1)(s), Wis. Adm. Code.

5.2.6 Planned Changes

In accordance with ss. 283.31(4)(b) and 283.59, Stats., the permittee shall report to the Department any facility expansion, production increase or process modifications which will result in new, different or increased discharges of pollutants. The report shall either be a new permit application, or if the new discharge will not violate the effluent limitations of this permit, a written notice of the new, different or increased discharge. The notice shall contain a description of the new activities, an estimate of the new, different or increased discharge of pollutants and a description of the effect of the new or increased discharge on existing waste treatment facilities. Following receipt of this report, the Department may modify this permit to specify and limit any pollutants not previously regulated in the permit.

5.2.7 Duty to Halt or Reduce Activity

Upon failure or impairment of treatment facility operation, the permittee shall, to the extent necessary to maintain compliance with its permit, curtail production or wastewater discharges or both until the treatment facility operations are restored or an alternative method of treatment is provided.

5.3 Surface Water Requirements

5.3.1 Permittee-Determined Limit of Quantitation Incorporated into this Permit

For pollutants with water quality-based effluent limits below the Limit of Quantitation (LOQ) in this permit, the LOQ calculated by the permittee and reported on the Discharge Monitoring Reports (DMRs) is incorporated by reference into this permit. The LOQ shall be reported on the DMRs, shall be the lowest quantifiable level practicable, and shall be no greater than the minimum level (ML) specified in or approved under 40 CFR Part 136 for the pollutant at the time this permit was issued, unless this permit specifies a higher LOQ.

5.3.2 Appropriate Formulas for Effluent Calculations

The permittee shall use the following formulas for calculating effluent results to determine compliance with average limits and mass limits:

Weekly/Monthly average concentration = the sum of all daily results for that week/month, divided by the number of results during that time period.

Weekly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the week.

Monthly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the month.

5.3.3 Visible Foam or Floating Solids

There shall be no discharge of floating solids or visible foam in other than trace amounts.

5.3.4 Total Residual Chlorine Requirements (For De-Chlorinated Effluent)

Test methods for total residual chlorine, approved in ch. NR 219 - Table B, Wis. Adm. Code, normally achieve a limit of detection of about 20 to 50 micrograms per liter and a limit of quantitation of approximately 100 micrograms per liter. Reporting of test results and compliance with effluent limitations for chlorine residual and total residual halogens shall be as follows:

- Sample results which show no detectable levels are considered to show compliance with the concentration limits. These test results shall be reported on Wastewater Discharge Monitoring Report Forms as "< 100 μg/L". (Note: 0.1 mg/L converts to 100 μg/L)

- Sample results showing detectable traces of chlorine will be considered to be in compliance with the 38 ug/L limit if measured at less than 100 μg/L, unless there is a consistent pattern of detectable values in this range for total residual chlorine discharges lasting more than 160 minutes per day. These values shall also be reported on Wastewater Discharge Monitoring Report Forms as "<100 μg/L". The facility operating staff shall record actual readings on logs maintained at the plant, shall take action to determine the reliability of detected results (such as re-sampling and/or calculating dosages), and shall adjust the chemical feed system if necessary to reduce the chances of detected results.

- When total residual chlorine is discharged for more than 160 minutes a day, a sample result showing a detectable level greater than 100 μg/L shall be considered as an exceedance of the 38 ug/L daily maximum limitation, and shall be reported as measured.

- To calculate average or mass discharge values, a "0" (zero) may be substituted for any test result less than 100 μg/L. Calculated values shall then be compared directly to the average or mass limitations to determine compliance.

5.3.5 Additives

For water treatment additives that will be contained in the wastewater discharge to the Wisconsin River, if the permittee wishes to commence use of a water treatment additive, or increase the usage of an additive greater than indicated in the permit application, the permittee must get a written approval from the Department prior to initiating such changes. This written approval shall provide authority to utilize the additives at the specific rates until the permit can be either reissued or modified in accordance with s. 283.53, Stats. Restrictions on the use of the additives may be included in the authorization letter.

5.3.6 Whole Effluent Toxicity (WET) Monitoring Requirements

In order to determine the potential impact of the discharge on aquatic organisms, static-renewal toxicity tests shall be performed on the effluent in accordance with the procedures specified in the *"State of Wisconsin Aquatic Life Toxicity Testing Methods Manual, 2nd Edition" (PUB-WT-797*, November 2004) as required by NR 219.04, Table A, Wis. Adm. Code). All of the WET tests required in this permit, including any required retests, shall be conducted on the *Ceriodaphnia dubia* and fathead minnow species. Receiving water samples shall not be collected from any point in contact with the permittee's mixing zone and every attempt shall be made to avoid contact with any other discharge's mixing zone.

5.3.7 Whole Effluent Toxicity (WET) Identification and Reduction

If a WET retest shows a positive result, the permittee shall submit a written report to the Biomonitoring Coordinator, Bureau of Watershed Management, 101 S. Webster St., PO Box 7921, Madison, WI 53707-7921, within a 60 day period that begins the day after completion of the positive retest. The WET Identification and Reduction report shall contain, at a minimum, the following information:

- A description of actions the permittee has taken or will take to remove toxicity and to prevent the recurrence of toxicity;

- A description of toxicity reduction evaluation (TRE) investigations that have been or will be done to identify potential sources of toxicity, including some or all of the following actions:

  (a) Evaluate the performance of the treatment system to identify deficiencies contributing to effluent toxicity (e.g., operational problems, chemical additives, incomplete treatment)
  (b) Identify the compound(s) causing toxicity
  (c) Trace the compound(s) causing toxicity to their sources (e.g., industrial, commercial, domestic)
  (d) Evaluate, select, and implement methods or technologies to control effluent toxicity (e.g., in-plant or pretreatment controls, source reduction or removal)

- Where corrective actions including a TRE have not been completed, an expeditious schedule under which corrective actions will be implemented;

- If no actions have been taken, the reason for not taking action.

The permittee may also request approval from the Department to postpone additional retests in order to investigate the source(s) of toxicity. Postponed retests must be completed after toxicity is believed to have been removed.

6 Summary of Reports Due

FOR INFORMATIONAL PURPOSES ONLY

Description	**Date**	**Page**
Mercury Pollutant Minimization Program -Submit Annual Status Reports	December 31, 2010	13
Mercury Pollutant Minimization Program -Mercury Removal Enhancement Study	December 31, 2010	13
Mercury Pollutant Minimization Program -Mercury Removal Enhancement Study	June 30, 2011	13
Mercury Pollutant Minimization Program -Mercury Removal Enhancement Study Report	December 31, 2012	13
Wastewater Discharge Monitoring Report	no later than the date indicated on the form	14

Report forms shall be submitted to the address printed on the report form. Any facility plans or plans and specifications for municipal, industrial, industrial pretreatment and non industrial wastewater systems shall be submitted to the Bureau of Watershed Management, P.O. Box 7921, Madison, WI 53707-7921. All other submittals required by this permit shall be submitted to:

Dept. of Natural Resources – WCR Wausau, Attn: Watershed Engineer, 5301 Rib Mountain Drive, Wausau, WI 54401

APPENDIX A

Document 2

Wisconsin Pollution Discharge Emission System Permit No. WI-0003131-06-0

WISCONSIN
DEPT. OF NATURAL RESOURCES

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary

101 South Webster Street
P.O. Box 7921
Madison, WI 53707-7921
Telephone (608) 266-2621
FAX (608) 267-3579
TTY Access via relay - 711

Randal Oswald
Manager- Environmental Program
Wisconsin Public Service Corp Weston Power
700 N Adams Street
P O Box 19002
Green Bay, WI 54307-9002

SUBJECT: WPDES Permit Reissuance No. WI-0003131-06-0
Wisconsin Public Service Corp Weston Power , 2501 Morrison Avenue

Dear Permittee:

Your Wisconsin Pollutant Discharge Elimination System (WPDES) Permit is enclosed. The conditions of the enclosed permit reissuance were determined using the permit application, information from your WPDES permit file, other information available to the Department, comments received during the public notice period, and applicable Wisconsin Administrative Codes. All discharges from this facility and actions or reports relating thereto shall be in accordance with the terms and conditions of the enclosed permit.

This enclosed permit requires you to submit monitoring results to the Department on a periodic basis. Blank copies of the appropriate monitoring forms and instructions for completing them will be mailed to you under separate cover.

The WPDES permit program has been approved by the Administrator of the U.S. Environmental Protection Agency pursuant to Section 402(b) of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. Section 1342 (b)). The terms and conditions of the enclosed permit are accordingly subject to enforcement under ss. 283.89 and 283.91, Stats., and Section 309 of the Federal Act (33 U.S.C. Section 1319).

The Department has the authority under chs. 160 and 283, Stats., to establish effluent limitations, monitoring requirements, and other permit conditions for discharges to groundwater and surface waters of the State. The Department also has the authority to issue, reissue, modify, suspend, or revoke WPDES permits under ch. 283, Stats.

The enclosed permit contains total residual chlorine water quality-based effluent limitations that are necessary to ensure the water quality standards for the Wisconsin River are met. You may apply for a variance from the water quality standard used to derive the limitations pursuant to s. 283.15, Stats., by submitting an application to the Director of the Bureau of Watershed Management, P.O. Box 7921, Madison, Wisconsin 53707 within 60 days of the date the permit was issued (see "Date Permit Signed/Issued" after the signature on the front page of the enclosed permit). Subchapter III of ch. NR 200, Wis. Adm. Code, specifies the procedures that must be followed and the information that must be included when submitting an application for a variance.

To challenge the reasonableness of or necessity for any term or condition of the enclosed permit, s. 283.63, Stats., and ch. NR 203, Wis. Adm. Code, require that you file a verified petition for review with the Secretary of the Department of Natural Resources within 60 days of the date the permit was issued (see "Date Permit Signed/Issued" after the signature on the front page of the enclosed permit).

Sincerely,

Russell Rasmussen

Russell Rasmussen
Director, Bureau of Watershed Management

Dated: January 4, 2007

cc: Legal Permit File
Cyndi Barr, WT/2
U.S. Fish and Wildlife Service (Electronic Copy via Email)
Eric Donaldson

WISCONSIN
DEPT. OF NATURAL RESOURCES

WPDES PERMIT

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

PERMIT TO DISCHARGE UNDER THE
WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM

Wisconsin Public Service Corporation - Weston Units 1 & 2

is permitted, under the authority of Chapter 283, Wisconsin Statutes, to discharge from a facility located at
2501 Morrison Avenue, Rothschild, Wisconsin
to
the Wisconsin River in Marathon County

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in this permit.

The permittee shall not discharge after the date of expiration. If the permittee wishes to continue to discharge after this expiration date an application shall be filed for reissuance of this permit, according to Chapter NR 200, Wis. Adm. Code, at least 180 days prior to the expiration date given below.

State of Wisconsin Department of Natural Resources
For the Secretary

By Russell Rasmussen
Russell Rasmussen
Director, Bureau of Watershed Management

January 4, 2007
Date Permit Signed/Issued

PERMIT TERM: EFFECTIVE DATE - February 01, 2007 EXPIRATION DATE - December 31, 2011

TABLE OF CONTENTS

1 In-Plant Requirements

1.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)
110	Noncontact cooling water from the unit 1 steam condenser.
111	Noncontact cooling water from the unit 2 steam condenser

1.2 Monitoring Requirements and Limitations

The permittee shall comply with the following monitoring requirements and limitations.

1.2.1 Sampling Point 110 - UNIT 1 CONDENSER COOLING WATER

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Chlorine, Total Resdl Discharge Time	Daily Max	120 min/day	Daily	Record of Addition	See note 1.2.2.1 below

1.2.2 Sampling Point 111 - UNIT 2 CONDENSER COOLING WATER

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Chlorine, Total Resdl Discharge Time	Daily Max	120 min/day	Daily	Record of Addition	See note 1.2.2.1 below

1.2.2.1 Time of Chlorine Discharge

Neither free available chlorine nor total residual chlorine shall be discharged for more than 2 hours per unit per day, except when chlorinating for macro-invertebrate control (as allowed in s. NR 290.12(2)(c), Wisconsin Adm. Code) in accordance with a Department approved macro-invertebrate management plan. The time of chlorine discharge may be reported as being equivalent to the time of chlorine addition or, alternatively, as the time that detectable levels of chlorine, using the analysis methods specified in this permit's "Chlorine Compliance and Analysis Methods" Standard Condition, are present in the cooling water discharge. The time of total residual chlorine discharge shall be monitored and summed for each day that chlorine is added to the condenser cooling water system.

2 Surface Water Requirements

2.1 Sampling Point(s)

The discharge(s) shall be limited to the waste type(s) designated for the listed sampling point(s).

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
001	Condenser cooling water from units 1 and 2 discharged to the Wisconsin River
002	River water discharged while backwashing the cooling water intake traveling screens.
004	Condenser cooling water that is recirculated back to the river intake to prevent winter ice formation.

2.2 Monitoring Requirements and Effluent Limitations

The permittee shall comply with the following monitoring requirements and limitations.

2.2.1 Sampling Point (Outfall) 001 - COOLING WATER TO WI RIVER

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Chlorine, Total Resdl Discharge Time		minutes	Daily	Record of Addition	See note 2.2.1.1 below
Chlorine, Total Resdl Discharge Time	Daily Max	240 min/day	Daily	Measure	See note 2.2.1.1 below
Chlorine, Total Residual	Daily Max - Variable	µg/L	Daily	Grab	See note 2.2.1.2 below
Chlorine, Variable Limit		µg/L	Daily	Calculated	See note 2.2.1.3 below
Chlorine, Total Residual	Daily Max	37 lbs/day	Daily	Calculated	See note 2.2.1.5 below
Flow Rate		MGD	Daily	Continuous	
Temperature Maximum		deg F	Daily	Continuous	

2.2.1.1 Time of Chlorine Discharge

Neither free available chlorine nor total residual chlorine shall be discharged for more than 2 hours per unit per day, except when chlorinating for macro-invertebrate control (as allowed in s. NR 290.12(2)(c), Wisconsin Adm. Code) in accordance with a Department approved macro-invertebrate management plan. The time of chlorine discharge may be reported as being equivalent to the time of chlorine addition or, alternatively, as the time that detectable levels of chlorine, using the analysis methods specified in this permit's "Chlorine Compliance and Analysis Methods" Standard Condition, are present in the cooling water discharge. The time of total residual chlorine discharge shall be monitored and summed for each day that chlorine is added to the condenser cooling water system.

2.2.1.2 Chlorine Sampling Procedure

At least one grab sample for total residual chlorine shall be collected during the peak chlorine discharge of each chlorination event. The discharge monitoring reported value shall be the maximum of the chlorination events for that day. A continuous monitor may be used to determine the peak value and length of chlorine discharge as long as it duplicates the accuracy of a NR 219 approved method.

2.2.1.3 Total Residual Chlorine Limitations

The daily maximum limit for total residual chlorine is 200 µg/L when chlorine is discharged for 160 minutes per day or less. If chlorine is discharged for more than 160 minutes per day, the daily maximum limits are 38 µg/L and 37 lbs/day.

2.2.1.4 Reporting A Total Residual Chlorine Concentration Limit Exceedence

The number of days that the total residual chlorine concentration sample value exceeds the daily maximum variable limit shall be reported in the Daily Max summary box for the "Chlorine, Total Residual" parameter.

2.2.1.5 Chlorine Mass Limit and Reporting

The total residual chlorine mass limit of 37 pounds/day and chlorine mass discharge reporting only apply if chlorine is discharged for more than 160 minutes per day.

2.2.1.6 Three Grab Composite Sample

A representative composite sample of the wastewater discharge shall be created by combining at least three individual grab samples of equal volume taken at approximately equal intervals over an 8 hour period. There shall be at least 1 hour between individual grab samples. The permittee may collect a 24 hour composite sample in lieu of a composite sample.

2.2.2 Sampling Point (Outfall) 002 - SCREEN BACKWASH WATER

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Monthly	Estimated	

2.2.2.1 Intake Screen Backwash Discharges

Trash and coarse debris accumulated on the condenser cooling (river) water intake screen shall be captured so it is not returned to the river with the intake screen backwash discharge. The captured material shall be stored and disposed of in a manner to prevent any pollutant from the materials from entering the waters of the State pursuant to s. NR 205.07(3)(a), Wis. Adm. Code. Fine debris, aquatic organisms and vegetation that cannot reasonably be sorted from living fish may be returned to surface waters.

2.2.3 Sampling Point (Outfall) 004 - INTAKE DEICE WATER

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Monthly	Estimated	

3 Land Treatment Requirements

3.1 Sampling Point(s)

The discharge(s) shall be limited to the waste type(s) designated for the listed sampling point(s).

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, Waste Description/Sample Contents and Treatment Description (as applicable)**
005	Discharge to settling/absorption ponds of non-contact cooling waters and ash sluice waters, with small amounts of boiler blowdown and other low volume wastewaters.

3.2 Monitoring Requirements and Limitations

The permittee shall comply with the following monitoring requirements and limitations.

3.2.1 Sampling Point (Outfall) 005 - ASH POND WASTEWATER , Solids Settling Basin

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Weekly	Estimated	
Copper, Total Recoverable		µg/L	Annual	Grab	
Sulfate Dissolved		mg/L	Annual	Grab	
pH Field		su	Annual	Grab	

3.2.1.1 Polychlorinated Biphenyls

The permittee shall manage polychlorinated biphenyl compounds (PCB's) used in the facility (such as in transformer fluid) so that PCB's are not added to the wastewater discharge.

3.2.1.2 Total Metals Analysis

Measurement of total metals and total recoverable metals shall be considered to be equivalent.

4 Schedules of Compliance

4.1 Impingement Mortality and Entrainment Characterization Study

Conduct a study to support development of a scientifically valid estimate of impingement mortality and entrainment impact on all life stages of fish and shellfish found in the vicinity of the existing Weston units 1 & 2 Wisconsin River intake system.

Required Action	Date Due
Submit proposed plan of study for comment: Submit a proposed plan of study for evaluating the impingement mortality and entrainment impact of the Weston units 1 & 2 river water intake system. The purpose of the study is to provide information to: (1) characterize current impingement mortality and entrainment at the site, and (2) support the development of an estimate of impingement mortality and entrainment to be used as the calculation baseline for the facility.	02/15/2007
Begin Impingement Mortality and Entrainment Characterization Study: Begin the study for evaluation of the current impingement mortality and entrainment impact on all life stages of fish and shellfish found in the vicinity of the existing Weston units 1 & 2 Wisconsin River water intake system.	03/01/2007

4.2 Comprehensive Demonstration Study

The Comprehensive Demonstration Study documents the evaluation and selection of an appropriate alternative that demonstrates compliance with best technology available to minimize adverse environmental impact for the Weston units 1 & 2 intake system.

Required Action	Date Due
Submit the Comprehensive Demonstration Study: Submit the documentation of the Comprehensive Demonstration Study that: (1) characterizes the impingement mortality and entrainment at the permittee's site, (2) describes the operation of the cooling water intake structures, and (3) confirms that the technologies, operational measures, and/or other features that the permittee has selected and installed, or will install meets the requirement for installation of best technology available for minimizing adverse environmental impact from the water intake system at this facility.	01/07/2008

5 Standard Requirements

NR 205, Wisconsin Administrative Code (Conditions for Industrial Dischargers): The conditions in ss. NR 205.07(1) and NR 205.07(3), Wis. Adm. Code, are included by reference in this permit. The permittee shall comply with all of these requirements. Some of these requirements are outlined in the Standard Requirements section of this permit. Requirements not specifically outlined in the Standard Requirement section of this permit can be found in ss. NR 205.07(1) and NR 205.07(3).

5.1 Reporting and Monitoring Requirements

5.1.1 Monitoring Results

Monitoring results obtained during the previous month shall be summarized and reported on a Department Wastewater Discharge Monitoring Report Form in either electronic or paper format. The report form may require reporting of any or all of the information specified below under 'Recording of Results'. This report form is to be returned to the Department no later than the date indicated on the form. When submitting a paper Discharge Monitoring Report form, the original and one copy of the Wastewater Discharge Monitoring Report Form shall be submitted to the return address printed on the form. A copy of the Wastewater Discharge Monitoring Report Form shall be retained by the permittee.

Electronic discharge monitoring reports may be submitted instead of paper reports. Prior to submitting any electronic discharge monitoring reports, the permittee shall obtain a Trading Partner Agreement that is signed by both the permittee and the Department. The Trading Partner Agreement becomes effective upon the date of signature by both parties and continues in effect until modified or terminated. An Electronic Discharge Monitoring Report Certification sheet shall also be signed and submitted with each electronic Discharge Monitoring Report submittal. This certification sheet, which is not part of the electronic report form, shall be signed by a principal executive officer, a ranking elected official or other duly authorized representative and shall be mailed to the Department at the time of submittal of the electronic Discharge Monitoring Report. The certification sheet certifies that the electronic report form is true, accurate and complete.

If the permittee monitors any pollutant more frequently than required by this permit, the results of such monitoring shall be included on the Wastewater Discharge Monitoring Report Form.

The permittee shall comply with all limits for each parameter regardless of monitoring frequency. For example, monthly, weekly, and/or daily limits shall be met even with monthly monitoring. The permittee may monitor more frequently than required for any parameter.

Monitoring reports shall be signed by a principal executive officer, a ranking elected official, or other duly authorized representative.

5.1.2 Sampling and Testing Procedures

Sampling and laboratory testing procedures shall be performed in accordance with Chapters NR 218 and NR 219, Wis. Adm. Code and shall be performed by a laboratory certified or registered in accordance with the requirements of ch. NR 149, Wis. Adm. Code. Groundwater sample collection and analysis shall be performed in accordance with ch. NR 140, Wis. Adm. Code. The analytical methodologies used shall enable the laboratory to quantitate all substances for which monitoring is required at levels below the effluent limitation. If the required level cannot be met by any of the methods available in NR 219, Wis. Adm. Code, then the method with the lowest limit of detection shall be selected. Additional test procedures may be specified in this permit.

5.1.3 Recording of Results

The permittee shall maintain records which provide the following information for each effluent measurement or sample taken:

- the date, exact place, method and time of sampling or measurements;
- the individual who performed the sampling or measurements;
- the date the analysis was performed;
- the individual who performed the analysis;
- the analytical techniques or methods used; and
- the results of the analysis.

5.1.4 Reporting of Monitoring Results

The permittee shall use the following conventions when reporting effluent monitoring results:

- Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 0.1 mg/L, report the pollutant concentration as < 0.1 mg/L.

- Pollutant concentrations equal to or greater than the limit of detection, but less than the limit of quantitation, shall be reported and the limit of quantitation shall be specified.

- For the purposes of reporting a calculated result, average or a mass discharge value, the permittee may substitute a 0 (zero) for any pollutant concentration that is less than the limit of detection. However, if the effluent limitation is less than the limit of detection, the department may substitute a value other than zero for results less than the limit of detection, after considering the number of monitoring results that are greater than the limit of detection and if warranted when applying appropriate statistical techniques.

5.1.5 Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit for a period of at least 3 years from the date of the sample, measurement, report or application, except for sludge management forms and records, which shall be kept for a period of at least 5 years.

5.1.6 Other Information

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or correct information to the Department.

5.2 System Operating Requirements

5.2.1 Noncompliance Notification

- The permittee shall report the following types of noncompliance by a telephone call to the Department's regional office within 24 hours after becoming aware of the noncompliance;
  - any noncompliance which may endanger health or the environment;
  - any violation of an effluent limitation resulting from an unanticipated bypass;
  - any violation of an effluent limitation resulting from an upset; and
  - any violation of a maximum discharge limitation for any of the pollutants listed by the Department in the permit.

- A written report describing the noncompliance shall also be submitted to the Department's regional office within 5 days after the permittee becomes aware of the noncompliance. On a case-by-case basis, the

Department may waive the requirement for submittal of a written report within 5 days and instruct the permittee to submit the written report with the next regularly scheduled monitoring report. In either case, the written report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; the steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and if the noncompliance has not been corrected, the length of time it is expected to continue.

- The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

NOTE: Section 292.11(2)(a), Wisconsin Statutes, requires any person who possesses or controls a hazardous substance or who causes the discharge of a hazardous substance to notify the Department of Natural Resources **immediately** of any discharge not authorized by the permit. The discharge of a hazardous substance that is not authorized by this permit or that violates this permit may be a hazardous substance spill. To report a hazardous substance spill, call DNR's 24-hour HOTLINE at **1-800-943-0003**.

5.2.2 Unscheduled Bypassing

Any unscheduled bypass or overflow of wastewater at the treatment works or from the collection system is prohibited, and the Department may take enforcement action against a permittee for such occurrences under s. 283.89, Wis. Stats., unless:

- The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
- There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
- The permittee notified the Department as required in this Section.

Whenever there is an unscheduled bypass or overflow occurrence at the treatment works or from the collection system, the permittee shall notify the Department within 24 hours of initiation of the bypass or overflow occurrence by telephoning the wastewater staff in the regional office as soon as reasonably possible (FAX, email or voice mail, if staff are unavailable).

In addition, the permittee shall within 5 days of conclusion of the bypass or overflow occurrence report the following information to the Department in writing:

- Reason the bypass or overflow occurred, or explanation of other contributing circumstances that resulted in the overflow event. If the overflow or bypass is associated with wet weather, provide data on the amount and duration of the rainfall or snow melt for each separate event.
- Date the bypass or overflow occurred.
- Location where the bypass or overflow occurred.
- Duration of the bypass or overflow and estimated wastewater volume discharged.
- Steps taken or the proposed corrective action planned to prevent similar future occurrences.
- Any other information the permittee believes is relevant.

5.2.3 Scheduled Bypassing

Any construction or normal maintenance which results in a bypass of wastewater from a treatment system is prohibited unless authorized by the Department in writing. If the Department determines that there is significant public interest in the proposed action, the Department may schedule a public hearing or notice a proposal to approve the bypass. Each request shall specify the following minimum information:

- proposed date of bypass;
- estimated duration of the bypass;
- estimated volume of the bypass;
- alternatives to bypassing; and
- measures to mitigate environmental harm caused by the bypass.

5.2.4 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit. The wastewater treatment facility shall be under the direct supervision of a state certified operator as required in s. NR 108.06(2), Wis. Adm. Code. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training as required in ch. NR 114, Wis. Adm. Code, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

5.2.5 Spill Reporting

The permittee shall notify the Department in accordance with ch. NR 706 (formerly NR 158), Wis. Adm. Code, in the event that a spill or accidental release of any material or substance results in the discharge of pollutants to the waters of the state at a rate or concentration greater than the effluent limitations established in this permit, or the spill or accidental release of the material is unregulated in this permit, unless the spill or release of pollutants has been reported to the Department in accordance with s. NR 205.07 (1)(s), Wis. Adm. Code.

5.2.6 Planned Changes

In accordance with ss. 283.31(4)(b) and 283.59, Stats., the permittee shall report to the Department any facility expansion, production increase or process modifications which will result in new, different or increased discharges of pollutants. The report shall either be a new permit application, or if the new discharge will not violate the effluent limitations of this permit, a written notice of the new, different or increased discharge. The notice shall contain a description of the new activities, an estimate of the new, different or increased discharge of pollutants and a description of the effect of the new or increased discharge on existing waste treatment facilities. Following receipt of this report, the Department may modify this permit to specify and limit any pollutants not previously regulated in the permit.

5.2.7 Duty to Halt or Reduce Activity

Upon failure or impairment of treatment facility operation, the permittee shall, to the extent necessary to maintain compliance with its permit, curtail production or wastewater discharges or both until the treatment facility operations are restored or an alternative method of treatment is provided.

5.3 Requirements for Discharges to Surface Waters

5.3.1 Permittee-Determined Limit of Quantitation Incorporated into this Permit

For pollutants with water quality-based effluent limits below the Limit of Quantitation (LOQ) in this permit, the LOQ calculated by the permittee and reported on the Discharge Monitoring Reports (DMRs) is incorporated by reference into this permit. The LOQ shall be reported on the DMRs, shall be the lowest quantifiable level practicable, and shall be no greater than the minimum level (ML) specified in or approved under 40 CFR Part 136 for the pollutant at the time this permit was issued, unless this permit specifies a higher LOQ.

5.3.1.1 Chlorine Compliance and Analysis Methods

Compliance with the daily maximum Total Residual Chlorine limits can be demonstrated by reporting an analysis result of less than the limitation. A second way to demonstrate compliance is by the use of Standard Method #408B (amperometric back titration), Standard Method #408D or #408E (DPD titration or colorimetric), or by using an ion specific electrode or other method approved in Ch. NR 219, Wis. Adm. Code, and reporting a result of less than the method detection limit. The numerical method detection limit shall be established by the permittee for the condenser cooling water discharge, and it shall be reported on the discharge monitoring report. A zero amount may be substituted for any TRC analysis result of less than the method detection limit for calculating average or maximum pounds/day discharge values.

5.3.2 Appropriate Formulas for Effluent Calculations

The permittee shall use the following formulas for calculating effluent results to determine compliance with average limits and mass limits:

Weekly/Monthly average concentration = the sum of all daily results for that week/month, divided by the number of results during that time period.

Weekly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the week.

Monthly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the month.

5.3.3 Visible Foam or Floating Solids

There shall be no discharge of floating solids or visible foam in other than trace amounts.

5.3.4 Additives

In the event that the permittee wishes to commence use of a water treatment additive, or increase the usage of the additives greater than indicated in the permit application, the permittee must get a written approval from the Department prior to initiating such changes. This written approval shall provide authority to utilize the additives at the specific rates until the permit can be either reissued or modified in accordance with s. 283.53, Stats. Restrictions on the use of the additives may be included in the authorization letter.

5.4 Land Treatment Requirements for Industrial Discharges

NR 214, Wisconsin Administrative Code: The requirements of this section are based on ss. NR 214.12, Wis. Adm. Code, and apply to wastewater discharges to designed and constructed absorption pond treatment systems.

5.4.1 Absorption Pond Discharge Restrictions

The volume of discharge to the absorption pond system shall be limited so that the discharge volume combined with the precipitation from a 10-year frequency, 24-hour duration rainfall event does not reduce the available freeboard to less than 1 foot below the top of the dike.

5.4.2 Discharges to the Absorption Pond System

No discharge to the absorption pond system may have physical or chemical characteristics which prevent the proper operation of the system.

6 Summary of Reports Due

FOR INFORMATIONAL PURPOSES ONLY

Description	**Date**	**Page**
Impingement Mortality and Entrainment Characterization Study -Submit proposed plan of study for comment	February 15, 2007	6
Impingement Mortality and Entrainment Characterization Study -Begin Impingement Mortality and Entrainment Characterization Study	March 1, 2007	6
Comprehensive Demonstration Study -Submit the Comprehensive Demonstration Study	January 7, 2008	6
Wastewater Discharge Monitoring Report Form	no later than the date indicated on the form	7

All submittals required by this permit shall be submitted to the West Central Region, 1300 W. Clairemont Ave., P.O. Box 4001, Eau Claire, WI 54702-4001, except as follows. Report forms shall be submitted to the address printed on the report form. Any construction plans and specifications for industrial wastewater systems shall be submitted to the Bureau of Watershed Management, P.O. Box 7921, Madison, WI 53707-7921.

APPENDIX A

Document 3

Sargent & Lundy Construction Specifications (03-19-80)

STD-EF-121 - Pulling-In Iron for Manholes (10-5-79).

STD-EF-125 - Straight Thru Manhole, 1 or 2 Cables Horiz. 12' Max. Inside Height (2-28-66).

STD-EF-126 - Corner Type Manhole 1 or 2 Cables Horizontal 12' Max. Inside Height (2-28-66).

STD-EF-136 - Steel Covers for Control Manholes (5-2-55).

202.2 Dates for the foregoing Sargent & Lundy Standard Specifications are indicated in the written material for each Standard Specification. Suffix letters A, B, C, etc., indicate revisions, and the latest date for each Standard Specification is for the latest revision (if any). References to these Standard Specifications elsewhere in this Project Specification or on the Design Drawings do not include the letter suffix after the form number.

202.3 Reference throughout this Project Specification to specific Articles or Paragraphs of the indicated Standard are for convenience only and shall not relieve Contractor from all obligations of all other applicable requirements of these Standards.

202.4 Wherever the terms "approve", "approval", "approved", etc., are used in Sargent & Lundy Standards in reference to Contractor's drawings and data, they shall mean "review", "reviewal", "reviewed", etc.

202.5 In the event of variation between the indicated Standards and this Project Specification or the Design Drawings, this Project Specification and the Design Drawings shall govern.

203. DESIGN DRAWINGS (CONSULTING ENGINEERS')

203.1 The following design drawings by the Consulting Engineers, dated or revised December 10, 1979 (unless otherwise indicated) form a part hereof:

a. Structural Design Drawings:

C-8	Site Plan General Arrangement (12-21-79)	*
C-9	Site Clearing Plan	
C-12	Grading, Roadwork and Drainage Plan - Sheet 2	
C-16	Grading, Roadwork and Drainage Plan - Sheet 6	
C-17	Grading, Roadwork and Drainage Plan - Sheet 7 (12-21-79)	*
C-18	Grading, Roadwork and Drainage Plan - Sheet 8	
C-19	Grading, Roadwork and Drainage Plan - Sheet 9	

C-20	Grading, Roadwork and Drainage Plan - Sheet 10	
C-21	Grading, Roadwork and Drainage Plan - Sheet 11 (12-21-79)	*
C-22	Grading, Roadwork and Drainage Plan - Sheet 12	
C-24	Grading, Roadwork and Drainage Plan - Sheet 14	
C-26	Grading, Roadwork and Drainage Plan - Sheet 16	
C-29	Grading, Roadwork and Drainage Plan - Sheet 19 (12-21-79)	*
C-34	Miscellaneous Grading Sections and Details (12-21-79)	*
C-35	Road Profiles - Sheet 1	
C-36	Road Profiles - Sheet 2	
C-37	Road Profiles - Sheet 3	
C-38	Road Sections and Details - Sheet 1	
C-39	Road Profiles - Sheet 4	
C-40	Culvert & Storm Sewer Schedule	
C-41	Metal Cleaning Waste Ponds, Plan, Sections and Details (12-21-79)	*
C-42	Miscellaneous Sections and Details - Sheet 1 (12-21-79)	*
C-43	Miscellaneous Sections and Details - Sheet 2 (12-21-79)	*
C-45	Trackwork - Index Sheet	
C-46	Trackwork Plan & Profile - Sheet 1	
C-47	Trackwork Plan & Profile - Sheet 2	
C-48	Trackwork Plan & Profiles - Sheet 3	
C-52	Trackwork Sections & Details - Sheet 1 (12-21-79)	*
C-53	Trackwork Sections & Details - Sheet 2	
S-89	Miscellaneous Yard Foundations - Sheet 3	
S-90	Miscellaneous Yard Foundations - Sheet 4	
S-387	Standard Reinforcing Details at Openings (12-21-79)	*
S-388	Standard Slab Edge Details Embedded in Concrete (12-21-79)	*

203.2 The following drawings by the Consulting Engineers form a part hereof for reference only:

a. Structural Design Drawings:

C-11	Grading, Roadwork and Drainage Plan - Sheet 1

C-13	Grading, Roadwork and Drainage Plan - Sheet 3
C-14	Grading, Roadwork and Drainage Plan - Sheet 4
C-15	Grading, Roadwork and Drainage Plan - Sheet 5
C-23	Grading, Roadwork and Drainage Plan - Sheet 13
C-25	Grading, Roadwork and Drainage Plan - Sheet 15
S1	Soil Borings
S-383	Standard Slab Details and Typical Slab Reinforcing Schedule (12-21-79) *

*

*

b. Mechanical Design Drawings:

M-1	Site Development
M-2	Property Development
M-3	Plant Development
M-4	Construction Access and Laydown
MS-97	General Arrangement - Waste Water Treatment Building
MS-98	General Arrangement - Bottom Ash Treatment Building

c. Electrical Design Drawings:

E-5	Conduits & Grounding in Substructure - Service Bldg. & Misc. Plans & Sections
E-8	Outdoor Duct Runs - Cooling Tower Area - Plans & Sections
E-10	Manhole Plans and Sections
E-14	Outdoor Duct Runs - Bottom Ash Area - Plans & Sections

203.3 The following Wisconsin Public Service Corporation design drawing forms a part hereof for reference only:

E-151	Plan of Temporary Electrical Service System

203.4 The following Warzyn Engineering Design Drawings form a part hereof:

a. Construction Drawings:

C7790-F5	Site Preparation *

C7790-F10	Drainage Ditch to River	
C7790-F11	Cross Sections (12-21-79)	*
C7790-F12	Details	
C7790-F13	Details	

b. Reference Drawings:

C7790-F2	Regional Topography and Vicinity and Land Ownership Maps
C7790-F3	Existing Site Topography
C7790-F4	Surface Water Drainage
C7790-F15	Soil Boring and Observation Well Locations

203.5 Logs of borings for the areas where the WORK is to be performed are available for inspection at either the offices of Purchaser or the Consulting Engineers.

204. DRAWINGS AND DATA (CONTRACTOR'S)

204.1 Submittal of Shop Drawings and Data shall conform to the applicable requirements of Form 1703, and to the requirements herein specified.

204.2 Submittal Distribution: Contractor shall address and submit all correspondence, shop drawings and data as follows:

a. Correspondence: All correspondence, except as specified in Paragraph 204.2b, shall be addressed and submitted to:

Mr. O. Zaben, Senior Structural Project Engineer
Mail Code: 29D56
Sargent & Lundy
55 East Monroe Street
Chicago, Illinois 60603

b. Shop drawings and data:

b1. Address and submit original copy of transmittal letter to:

Mr. S. Sen, Structural Project Engineer
Mail Code: 29E19
Sargent & Lundy
55 East Monroe Street
Chicago, Illinois 60603

FINAL SITE WORK
WESTON GENERATING STATION - UNIT 3

DIVISION 3 - TECHNICAL REQUIREMENTS

301. GENERAL
Conform to the applicable requirements of the Supplements and Standard Specifications indicated in Division 2 and to the requirements herein specified.

301.1 Services of Testing Laboratory: These services will be provided by Purchaser.

301.2 Soil Data and Topography: As specified in Form 1714, Article 2, and as follows: Logs of borings in the proximity of the areas where the WORK is to be performed are available for inspection at either the offices of Purchaser or the Consulting Engineers.

301.3 Dust Control: During the progress of the WORK, Contractor shall control dust within the work area by watering or any other means acceptable to Purchaser. Contractor shall be responsible for dust control within the work area from commencement of the WORK until the WORK is accepted. Contractor shall conform to all local regulations from governing bodies having jurisdiction in air pollution control.

302. EARTHWORK

302.1 Cleaning and Grubbing: As specified in Form 1714, Article 4.

302.2 Removal of Top Soil and Sod: As specified in Form 1714, Paragraph 4.4. Store on the Project Site as indicated or as directed by Purchaser.

302.3 Diversion and Care of Water:

a. Contractor shall construct, operate, maintain and be responsible for necessary channels, drains, sumps and pumps needed for diversion and care of water from any source so that Contractor's work can be performed in dry conditions.

b. Contractor's plans for diversion and care of water shall be subject to Purchaser's approval and shall be routed to the existing Construction Sedimentation Pond.

c. Contractor shall not place any fill across routes of natural drainage until provisions are made to drain surface runoff into drainage ditches as directed by Purchaser.

d. No surface runoff shall be ponded or restricted to a greater degree than would have occurred naturally before beginning of construction.

e. Should ponding or restriction of surface runoff result in water being backed up onto property not owned by Purchaser or onto Purchaser's property, all damages resulting therefrom shall be the responsibility of Contractor.

f. Dewatering System:

f1. Contractor shall provide a dewatering system as required to complete WORK in dry conditions.

f2. The entire system shall be removed on completion of the WORK unless otherwise requested by Purchaser.

302.4 Excavation:

a. General: Excavation shall conform to the applicable requirements of Form 1714, Article 5, and as follows:

b. Definitions:

b1. "Stripping" is defined as complete removal of sod, topsoil, organic matter and rubbish in areas indicated on Design Drawings and for areas to be used for borrow and stockpiling of fill materials. Stripped materials shall be separated from stumps, roots and other organic materials and such items shall be disposed of or stockpiled as indicated on the Design Drawings or as directed by Purchaser.

b2. Earth and rock excavation shall be as defined in Form 1714.

c. Procedures: Excavation may be accomplished by any method and by use of any excavation and hauling equipment best adapted to the WORK.

d. Limits: Excavation shall be performed to neat lines and grades indicated on the Design Drawings. Any over-excavation or excess excavation, not requested by Purchaser, shall be at Contractor's expense.

e. Over-excavation under areas to be occupied by Construction shall be filled with compacted granular fill, meeting the requirements as specified in Paragraph 302.5g.

f. Finished excavated surfaces shall be protected against damage by movements of construction equipment, rain, frost, or other causes which could impair the bearing capacity of the subgrade. Areas damaged due to such cause shall be repaired at the Contractor's expense.

g. If unsuitable soils are found during excavation, as determined by Purchaser, the Contractor may be requested to carry the excavation deeper to more suitable materials.

h. Granular material excavated by the Contractor, if found suitable by Purchaser, shall be used for fill and backfill.

h1. Such materials shall be stockpiled for future use, by placing in areas designated by the Purchaser or as indicated on the Design Drawings.

h2. Granular material shall be handled and stockpiled in such a manner to insure proper gradation within limits as established by the Consulting Engineers.

h3. Excavated material in excess of fill requirements will be stockpiled within a 1,000 foot scraper haul from point of excavation. *

h4. Areas approved for stockpiling backfill and fill material for future use shall be grubbed, cleared, and stripped of growth, debris and topsoil. *

h5. Contractor shall provide and maintain suitable drainage in the stockpile area to prevent excessive wetting of the fill. Stockpiled material shall be rolled with a plain smooth cylindrical roller to form a smooth surface with sufficient slope to cause rapid runoff of rainwater. *

i. Suitable Materials:

i1. Granular soils shall be considered as suitable for fill and backfill if they contain no organic materials, cobbles, or foreign deleterious materials, and are composed primarily of cohesionless materials.

i2. These materials shall be obtained from Contractor's excavation and grading operations or from approved existing previous excavated stockpile areas on the Project Site.

302.5 Compacted Fill:

a. A Testing Laboratory will be employed by the Purchaser to determine the conformance of compaction to the density requirements as herein specified and as specified in Form 1714.

b. Subgrade to receive compacted fill shall be inspected by the Consulting Engineers to determine if it is suitable and has sufficient bearing capacity for the fill material and loads to be placed on it. If subgrade is not suitable, as determined by the tests, Contractor may be requested to perform additional excavation.

c. Prior to placing compacted fill, strip the areas to be covered of vegetation, topsoil and organic material or other foreign or deleterious materials.

d. Fill all holes, ruts, and similar defects. All unstable areas, projecting stone or rock, and similar defects, shall be cut out and the areas filled.

e. Thoroughly break and turn soil underlying the filled area to depth of six inches before deposition of fill material. Break and turn ground no more than 200 feet in advance of placing fill.

f. Completed subgrade shall be true to alignment, grade and cross-section, including required slopes, indicated.

g. Compacted Densities:

g1. Place granular fill for support of construction of roads, trackwork, parking areas, etc., in loose thicknesses not exceeding six inches maximum thickness, compacted to a minimum relative density of 75 percent, as determined by ASTM D2049, Wet Method Test.

g1.1 Obtain not less than 95 percent of the maximum Modified Proctor density as determined by ASTM D1557, Method A. For cohesive material, compaction shall be performed to within two percent (±) of the optimum moisture content. *

g1.2 The required field dry density shall be the greater of the two values determined by the methods herein specified.

g2. Areas, other than herein specified, shall be treated as specified for RCF1 (Regular Compacted Fill) in Form 1714, with the maximum Modified Proctor density 90 percent, determined as specified in Paragraph 302.5g1.

302.6 Drainage Ditches:

a. Cut and/or fill to form drainage ditches to cross-sections and profiles indicated on the Design Drawings or as required by drainage requirements.

b. All surfaces of both cut and fill shall be well compacted, smooth and uniform.

302.7 Underground Culvert and Piping Backfilling:

a. General:

a1. Conform to Form 1714, Article 7.6 for corrugated culverts and storm drain piping.

b. Normally excavate trenches to match curve of pipe. Flat beds may be used if as economical as curved beds.

b1. Curved Beds: Bed pipe evenly and firmly for width of 100 percent of pipe breadth.

b2. After pipe is in place on flat bed, provide well compacted granular fill under corrugations. Use clean crushed stone, gravel or coarse sand, or other material, approved by the Purchaser, of 1-1/2 inches maximum size.

b3. Provide same granular fill up to center line of pipe. Place in layers not exceeding six inches, before compaction.

c. After pipe is placed on its bed, perform tests as specified in Form 1714. After tests are completed and piping runs have been approved fill around piping by placing granular fill simultaneously on both sides of the pipe in such manner as will not subject pipe to injurious side pressures.

c4.3 Top section shall be eccentric cone type with minimum wall thickness of 5 in. for 48 in. diameter manholes and catchbasins and 6 in. for 60 in. diameter manholes and catchbasins, or shall be flat slab type not less than 8 in. thick, as indicated on drawings or as required by manhole or catchbasin depth. Arrange both types for taking cast iron manhole frame and cover.

c4.4 Rings and top cone shall have precast openings for field installation of cast iron steps, and for all required drain pipes entering manholes.

c5. Joints: Rubber "O-Ring" or flat type rubber compression type, with manufacturer's standard rubber ring. Mortar joints may be used if specifically approved.

d. Corrugated metal pipe manhole and catchbasin, as indicated on the Design Drawings.

e. Installation of Catchbasins:

e1. Subgrade shall be level and free of projecting stones, rocks, etc.

e2. Place a layer of sand, not less than 4 in. thick, over subgrade before installing precast base. Exercise care to install base dead level and with full bearing throughout on sand cushion, to insure that completed catchbasins are plumb.

e3. Installation of sections, using rubber rings, in strict accordance with manufacturer's instructions, as approved.

304. RIPRAP

304.1 General: Provide and place riprap where indicated on the Design Drawings.

304.2 Materials:

a. Bedding for riprap: Two layers of crushed stone with the following gradations:

Sieve Size (inches)	Percent Passing by Weight
a1. Bedding Layer 1:	
2-1/2	100
2	90-100
1	60-90
1/2	35-65
#4	20-40
#16	5-35
#200	4-12

a2. Bedding Layer 2 Thickness of 8 inches:

8	100
6	85-100
4	20-100
3	0-90
2	0-50
1-1/2	0

b. Riprap:

b1. Riprap shall consist of quarried stone, or other stone, free from structural defects and of approved quality. Stone containing shale, unsound sandstone or any other material which will readily disintegrate under handling and placing or weathering, shall not be used. Any stone which is free from incipient fractures and seams and has given evidence of ability to withstand weathering after long exposure to the elements shall be considered suitable for this purpose. This criteria will be the primary factor in determining if the quarry stone is acceptable for riprap.

b2. In the case of quarried stone, the riprap shall be subject to the following tests as an indication of rock quality:

The sodium sulfate soundness test and the freezing and thawing test. The rock shall show a loss of not more than 25% after five cycles during the sodium sulfate and after 50 cycles during freeze and thawing tests.

b3. The ledge rock sections of soundness method AASHTO T-104, "Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate" and AASHTO T-103, "Soundness of Aggregates by Freezing and Thawing Procedure A" shall be used. Results for all samples tested shall be presented. The final determination of the suitability of any questionable stone for riprap material shall be made by Purchaser or the Consulting Engineers.

c. The moist unit weight of riprap shall not be less than 160 pounds per cubic foot.

d. Size and Gradation:

d1. The Riprap shall be reasonably well graded within the following limits for layers of 16 or more inches:

	Approximate Weight Per Piece Lbs.	Approximate Sieve Size (inches)	Percent Passing by Weight
d1.1	259	16	100
d1.2	150	13.5	85-100
d1.3	100	12	50-95
d1.4	73	10.5	15-85
d1.5	46	9	5-50
d1.6	13	6	0-15
d1.7	4	4	0

e. For layers of 8 to 12 inches as indicated on the design drawings the riprap shall have the gradation indicated in Paragraph 304.2a2 with bedding layer 1 only. *

f. The shortest dimension of any stone shall be not less than 1/3 of the longest dimension for at least 60 percent of the riprap. For the balance, the shortest dimension shall be not less than 1/5 of the longest dimensions.

304.3 Placing:

a. Bedding materials: Place by approved means to the minimum thickness indicated on the Design Drawings.

b. Riprap:

b1. Riprap shall be placed by equipment which shall be operated so as to place each load of material in approximately its final position without further reworking, and without excessive height of drop.

b2. Placement operations, including handling, stockpiling and transporting, shall be accomplished in such manner as to produce a reasonably well graded mass of rock with minimum percentage of voids, free from objectionable pockets of small stones and clusters of large stones and having a reasonable regular finished surface.

305. <u>ROADWORK AND PARKING AREA</u>

305.1 General

a. Conform to the applicable requirements of the 1975 Edition of State of Wisconsin Department of Transportation Division of Highways Standard Specifications for Road and Bridge Construction.

b. Finish: Hot-dipped galvanized per ASTM A525, 2.5 ounce coating for guardrail and ASTM A153 for bolts and accessories.

306.2 Installation: As indicated on the design drawings, in conformance with the manufacturer's approved instructions.

307. PARKING BARRIERS AND PAVEMENT MARKINGS

307.1 General: Provide parking barrier of the types herein specified, as indicated on the design drawings or approved by Purchaser.

307.2 Precast Concrete Type: *

a. Precast concrete barriers of dimensions and configurations as indicated on the design drawings.

b. Dowels: If not otherwise indicated, provide erect rods a minimum of 1/2 inch diameter by three foot long with flattened heads.

c. Installation of Precast Concrete Barriers: After dowels have been driven home, cap hole over each dowel with cement grout.

307.3 Treated Timber Type (Construction Parking Only): *

a. Preservative treated timber barriers of dimensions indicated, Douglas Fir or Yellow Pine, drilled at both ends and treated as follows:

a1. Preservative Treatment:

a1.1 Type: Creosote Type, Pressure Method.

a1.2 Preservative: Creosote oil conforming to applicable requirements of AWPA Standard P1.

b. Installation of Timber Barriers: As indicated on the design drawings.

307.4 Pavement Markings (Permanent Parking Area Only): *

a. General: Provide four inch yellow continuous pavement marking as indicated on the drawings.

b. Material and Installation: In strict accordance with the State of Wisconsin Department of Transportation Division of Highways Standard Specification.

308. SEEDING WORK

308.1 General:

a. Contractor shall furnish materials and perform seeding operations to produce a uniform stand of health grass where indicated on the design drawings as "seeded surfaces" or "seeded topsoil".

b. All areas subject to construction clearing and grading, with the exception of areas to be occupied by structures (permanent or temporary) and areas designated as storage, laydown or working areas, will be seeded at the earliest possible moment pending completion of these activities.

c. Seeding shall include seeding of all new ditches, completed slopes and embankments.

d. Conform to the applicable requirements of the 1975 Edition of State of Wisconsin Department of Transportation Division of Highways Standard Specifications for Road and Bridge Construction and to the requirements hereinafter specified.

e. Exceptions: All references in the State Specifications to methods of compensation shall not apply.

308.2 Liming and Fertilizing:

a. General: Contractor shall test the soils to determine the proper amount of pH and nutrient adjustment required. Test results and subsequent application rates of lime and fertilizer are subject to approval of the Purchaser and the Consulting Engineers.

b. Liming: Agricultural ground lime, conforming to requirements of Section 629.3.2 (Agricultural Lime Stone Treatment) of the State Specifications, shall be thoroughly mixed, at the rate of two tons per acre, with surface soil before completion of ground preparations.

c. Fertilizer:

c1. Fertilizer shall consist of Nitrogen, Phosphate and Potassium nutrients.

c2. Fertilizer shall be applied at such rate that each acre will receive the following amounts of available units:

c2.1 Nitrogen 60 pounds.

c2.2 Phosphate (P_2O_5) 100 pounds.

c2.3 Potassium (K_2O) 100 pounds.

c3. Fertilizer can be placed during ground preparation or mixed with, and placed with, seed and mulch during final seeding.

c4. Condition of fertilizer prior to placing shall be approved by Purchaser.

308.3 Seeding and Mulching:

a. Seed used shall conform to the requirements of Section 630 "SEEDS" of the State Specification and shall consist of a mixture of the following seeds in the amounts indicated:

	Type of Seed in Mixture	Pounds Per Acre
a1.	Fescue (Kentucky 31 or Alta)	60
a2.	Red top, Solid	24
a3.	Clover, Alsike (inoculated)	16

b. Seeding shall be performed in accordance with Section 630 of the State Specifications with the maximum depth of planting 1/2 inch.

c. Mulching: Immediately after seeding, cover seeded areas with sprayed asphalt straw mulch in accordance with the State Specifications.

d. Except as otherwise specified above, the methods of preparation of seed beds, fertilizing, mulching, seeding, sprinkling, maintaining, repair, and reseeding as required, will be at the option of Contractor. The WORK shall be considered completed after a uniform and dense stand of healthy perennial grass, free from bare spots and gullies formed by erosion, has been produced.

309. FENCE WORK

309.1 General:

a. Fence work includes the relocation of existing fence to new location, providing new fence, and installation of new fence, with fence materials supplied by Purchaser.

b. Requirements for Relocation of Existing Fence: Carefully remove existing fence fabric and posts and install as indicated. If damaged during removal, replace with new fabric and posts to match existing. Install as specificied in Form 1739.

309.2 Revision to Form 1739: Paragraph 10.7.3: Revise the existing dimension of four inches to read 1-3/4 inches ± 1/8 inch.

309.3 Soil Data and Topography: As specified in Form 1739, Article 5, except soil boring drawings are not included. Contractor may make his own soil investigations.

309.4 Fence Requirements (for new fence only):

	Item	Article No. in Form 1739
a.	Height: As indicated on the design drawings and as supplied by Purchaser.	

313. SEALING OF BASINS AND COAL PILE AREA

313.1 General:

a. The lining is intended to provide a watertight seal against groundwater contamination from the plant wastes stored in the basins indicated on the design drawings.

b. The following plant effluents will be discharged into the basins:

b1. Air Preheater Wash Water (see Table 313-1 for composition)

b2. Miscellaneous Metal Cleaning Wastes

b3. Miscellaneous Chemical Drains

b4. Makeup Demineralizer Regeneration Wastes (see Table 313-2 for composition)

b5. Condensate Polisher Regeneration Wastes (see Table 313-2 for composition)

b6. Precipitator Wash, primarily suspended solids.

b7. Coal Pile Runoff

b8. Bottom Ash and Accompanying Sluice Water

TABLE 313-1

PREDICTED AVERAGE AIR PREHEATER WASH ANALYSIS

Parameter	Concentration (in mg/l except pH)
Calcium, as Ca	175
Magnesium, as Mg	48
Hardness, as $CaCO_3$	637
Sodium, as Na	40
Iron (total), as Fe	2,400
Copper (total), as Cu	4.6
Methyl Orange Alkalinity, as $CaCO_3$	0
Sulfate, as SO_4	8,500
Chloride, as Cl	6
Silica, as SiO_2	59

TABLE 131-1 Cont.

pH	2.81
Total Suspended Solids	320
Total Dissolved Solids	20,400
Oil and grease	Intermittent

TABLE 313-2

PREDICTED AVERAGE MAKE-UP DEMINERALIZER AND
CONDENSATE POLISHER REGENERATION WASTE ANALYSES

Parameter	Make-Up Demineralizer Regeneration Waste Concentration (in mg/l except pH)	Condensate Polisher Regeneration Waste Concentration (in mg/l except pH)
Calcium, as $CaCO_3$	307	112
Magnesium, as $CaCO_3$	213	68
Sodium, as $CaCO_3$	2120	848
Chloride, as $CaCO_3$	67	26
Sulfate, as $CaCO_3$	3160	2460
Alkalinity, as $CaCO_3$	0	0
pH	1-14	1-4
Total Dissolved Solids	4250	2840
Oil and Grease	Variance 100	100

c3. The protective racks and soil cover shall be stable when exposed to the elements.

313.2 Soil Bentonite Lining:

a. Material:

a1. Bentonite:

a1.1 Bentonite shall be free-flowing, high swelling pure, Wyoming-type bentonite, NL Baroid Material Standard 200 mesh or equivalent, as approved.

a1.2 Bentonite used in preparing the liner shall be pulverized natural Wyoming sodium cation bentonite and shall meet API Standard 13A dated February 1974, "API Specifications for Oil-Well Drilling-Fluid Materials." The use of so-called "peptized" or chemically treated bentonite shall not be permitted.

a2. Soil for Bentonite Soil Mixture and Protective Sand Layer:

a2.1 The soil shall be the onsite granular material as excavated from the basins or obtained from approved borrow or stockpile areas.

a2.2 The soil shall be free from all organic matter and shall have less than 10% passing a #200 sieve as determined by ASTM D1140.

a3. Protective Rock Layer (Crushed Stone or Crushed Gravel): *

a3.1 The rock shall be stable under chemical attack from the effluents discharged into the basins as defined in Paragraph 313.1.

a3.2 The rock shall be tested for quality by the sodium sulfate soundness test, AASHTO T104, and the freezing and thawing test, AASHTO T103. The rock shall indicate a loss of not more than 10% after five cycles during the sodium sulfate and 50 cycles during freezing and thawing tests.

a3.3 Results for all samples tested shall be submitted to the Consulting Engineers.

a3.4 The protective rock layer shall have the following gradation or an equivalent approved by Purchaser and the Consulting Engineers:

	Sieve	Percent Passing
a3.4.1	2-1/2 in.	100
a3.4.2	2 in.	90-100
a3.4.3	1 in.	60-90
a3.4.4	1/2 in.	35-65
a3.4.5	#4	20-40
a3.4.6	#16	5-35
a3.4.7	#200	4-12

b. Bentonite Soil Mixture:

b1. Prior to construction of the bentonite soil lining, Contractor shall determine the bentonite percentage by weight of sand needed to achieve a maximum hydraulic conductivity of 1 x 10^{-7} cm/sec.

b2. Contractor shall obtain representative samples of onsite sand to be mixed with bentonite for moisture-density, and permeability testing. Three sieve analysis shall be performed on portions of the sample in accordance with ASTM D 422.

b3. Contractor shall mix and test soil and bentonite batches at the following bentonite content by dry weight of soil; 12%, 15% and 18%. The batches shall be of sufficient size to perform Moisture Density relations in accordance with ASTM D 698 Method B. For each of the three mixtures a maximum density and optimum moisture content shall be determined by ASTM D 698 Method B.

b4. After completion of the moisture density relations, one six-inch diameter sample for each bentonite content shall be prepared in accordance with ASTM D 698 and compacted at approximately the optimum moisture content to approximately 90% of the maximum density. Two samples; two inches in diameter and four inches in length shall be trimmed from each of the six-inch diameter samples. All two-inch diameter samples shall be tested for permeability using the falling head procedure in a triaxial cell with backpressure to assure saturation. The permeability testing shall be done in accordance with the U.S. Army Corp of Engineers Manual, EM 1110-2-1906, "Laboratory Soils Testing".

b5. After completion of the permeability testing, the dry density of each two-inch diameter sample shall be determined.

b6. Based on the dry density determinations, and the permeability testing, Contractor shall recommend a bentonite application rate (as a percentage of dry weight of soil) to achieve a maximum hydraulic conductivity of 1 x 10^{-7} cm/sec. If test results indicate hydraulic conductivities significantly different than 10^{-7} cm/sec, additional testing at different bentonite contents shall be required.

b7. Results from all sieve analyses, moisture-density relations, permeability and density tests shall be submitted to Purchaser and the Consulting Engineer for approval of the bentonite application rate.

c. Basin Preparation:

c1. The excavation for the basins shall be done in accordance with Paragraph 302.4.

c2. Fill for the dikes shall be CCF1 compacted in accordance with Paragraph 302.5

c3. The subgrade for the basin lining shall be compacted to 90% of the maximum Standard Proctor density as determined by ASTM D 698, Method B.

c4. Prior to placing the soil bentonite the basin bottom and sides must be drained and bladed smooth. Deleterious vegetation and boulders shall be removed. Holes resulting from the removal of vegetation or boulders shall be filled with a dry mixture, (by volume) of one part bentonite and four parts sand, blended dry.

c5. A stockpile of granular soil sufficient to form the one foot thick bentonite soil layer shall be made from material taken from the excavation or from other areas approved by Purchaser.

c6. The moisture content and gradation of the stockpiled material shall be determined for mixing quantities.

d. Preparation of Soil Bentonite Mixture:

d1. Mixing Plant:

d1.1 Use either a batch-type or a continuous-mixing-type plant for either weight or volume proportioning. Use a twin-shaft pug-mill type mixer.

d1.2 The plant shall be calibrated at the start of the construction, and the calibration shall be rechecked periodically as often as necessary, or as directed by Purchaser or whenever a change is noted in the soil-bentonite mixture or the stockpile.

d2. Special Requirements for Batch-type Plants: Include means for accurately weighing soil and bentonite, ample in size to hold a full batch without hand racking or running over.

d3. Special Requirements for Continuous-Mixing-Type Plants: Provide positive interlocking control of the flow of soil and bentonite from bins.

d4. Mixing Soil Bentonite:

d4.1 All ingredients shall be mixed for at least 30 seconds or longer as may be necessary to insure a uniform, intimate mix of soil and bentonite, until the resulting mixture is homogeneous and uniform in appearance. The mixing time shall be considered as the interval between the time the bentonite contacts the soil and the time the mixture leaves the mixing unit.

d4.2 The amount of bentonite shall be determined in advance by the methods described in Paragraph 313.2b. Water introduced during mixing shall be the difference between the stockpile moisture content and the optimum moisture content as determined in Paragraph 313.2b.

e. Placing of Soil Bentonite Liner:

e1. The soil-bentonite mixture shall be placed in two six inch compacted layers parallel to the prepared surface.

e2. Each successive layer in a section shall be placed as soon as practicable after the preceding layer is completed. Contractor shall avoid the deposition of untreated soil or foreign materials between layers of soil-bentonite.

e3. Soil-bentonite shall not be mixed and placed when the air temperature is below 40 degrees F, or in the opinion of Purchaser, weather conditions are such that the material being processed cannot be completely compacted and protected before the advent of freezing temperatures. Soil-bentonite shall also not be placed when the subgrade and the soil to be processed is frozen.

e4. Contractor shall take all necessary precautions to avoid damage to completed soil-bentonite by equipment. Equipment shall not be operated on a finished compacted layer of the soil-bentonite except for equipment necessary to lay and compact the succeeding lift. Damage to a finished compacted layer of soil-bentonite resulting from the operation of equipment over these layers shall be repaired at the expense of and by Contractor. Earth ramps crossing completed soil-bentonite shall be at least two feet compacted thickness and then be completely removed prior to placing protective layers.

f. Compaction of Soil Bentonite Liner:

f1. The soil bentonite liner shall be uniformly compacted in two six inch layers to a density not less than 90 percent of the Standard Laboratory Maximum Dry Density (ASTM D698) obtained in the laboratory on representative samples of soil bentonite obtained from behind the spreading equipment. The moisture content shall be maintained uniformly throughout the material being compacted.

f2. Contractor shall use compaction equipment that are suitable for the purpose approved by Purchaser.

f3. Compaction of the soil-bentonite material on the dike slope shall be accomplished by traversing the slope in a direction perpendicular to the center line of the dike.

f4. The second six-inch lift of soil-bentonite mixture shall not be placed until compaction of the first layer is complete.

g. Placement and Compaction of Protective Sand and Rock Layers:

g1. A one-foot protective sand layer compacted in two six-inch lifts shall be placed over the compacted soil bentonite liner.

g2. The sand shall be compacted to 90% of the maximum density as determined by the Standard Proctor Moisture Desity Relations, ASTM D 698 Method B.

g3. The protective rock layer shall be in thickness as indicated on the design drawings and compacted to a density of 90% of the standard Proctor Maximum density. The material shall be noncalcareous and stable under chemical attack as specified in Tables 313-1 and 313-2. *

g4. The protective rock layer shall be placed in a manner to minimize segregation and assure a uniform gradation of the rock on the slopes and bottom of the excavation.

h. Activation of the Soil Bentonite Layer:

h1. After completion of compaction of the protective rock layer, the basins shall be filled with water in order to hydrate the bentonite liner.

h2. The water used to fill the basins shall be clean and free from oil, acid, alkali, organic matter or other deleterious material.

h3. The water in the basins shall remain at a level of a minimum of one foot above the design fluid elevation in the basins for a period of not less than two-weeks.

h4. Steel splash pads covered with crushed rock shall be provided to prevent erosion of the protective rock layer and the protective sand layer during filling of the basins.

h5. The basins shall be drained after completion of the hydration.

i. Mixing Soil Bentonite Liner in Place: *

i1. The first six-inch layer of the soil bentonite liner may be mixed in place by spreading and discing the bentonite into the first six inches above the subgrade. The in-place mixing method may be used only if Contractor can demonstrate to Purchaser's Representative the ability to achieve a homogeneous six-inch layer of soil bentonite liner in a test section separate from ponds or coal pile. The method for spreading and discing shall be proposed in advance to the test section, documented during the placement of the test section and if the test section is acceptable to the Purchaser's Representative adhered to in the production phase.

i2. After an acceptable procedure is established in the test section, spreading and discing the bentonite shall be used to place only the first six-inch layer in the bottom of the ponds or in the first six-inch layer of the coal pile lining. At no time shall the spread-and-disc method be used on an inclined surface or on previously placed soil bentonite lining. Compaction requirements shall be as specified in Paragraph 313.2f.

313.3 Clay Lining:

a. Materials:

a1. Clay:

a1.1 The clay shall have a plasticity index (PI) greater than or equal to 15. More than 50% of the clay particles shall pass a #200 sieve as determined by ASTM D1140.

a1.2 The clay shall be free from roots, sticks, sod tufts and other organic matter. The clay shall be free from cobbles and boulders with less than 5% of the dry weight of soil retained on a #4 sieve.

a1.3 Contractor shall procure all clay material required for the WORK from off-site sources. All sources shall be approved by Purchaser.

a2. Protective Sand Layer: As specified in Paragraph 313.2a2.

a3. Protective Rock Layer: As specified in Paragraph 313.2a3.

b. Preparation of Basin Slopes and Bottom:

b1. The surface of the basin slopes and bottom, upon which the clay liner is to be placed shall be free from vegetative and foreign matter.

b2. The basin slopes and bottom where the clay lining is to be placed shall be compacted to a density not less than 90 percent of the Standard Laboratory Maximum Dry Density (ASTM D698) immediately before placement of the clay lining.

c. Placement of the Clay Lining:

c1. The clay shall be placed on the basin slopes or previously compacted clay, in stair-step horizontal layers, in such a manner that each succeeding layer will be stepped back. Lining in the pond shall be placed in succeeding six inch lifts until the grade elevation is reached.

c2. The equipment for spreading the clay shall be suitable for the purpose and as approved by Purchaser and the Consulting Engineers.

c3. Each successive layer in a section shall be placed as soon as practicable after the preceding layer is completed. Contractor shall avoid the deposition of uncontrolled fill or foreign materials between layers of clay.

c4. Clay shall not be placed when the air temperature is below 40 degrees F. Clay shall not be placed when the subgrade and the soil to be processed is frozen; or, in the opinion of the Consulting Engineers, weather conditions are such that the material cannot be completely compacted and protected before the advent of freezing temperatures.

d. Compaction of Clay Lining:

d1. The clay shall be compacted using kneading action by sheeps foot roller as approved by Purchaser and the Consulting Engineers.

d2. The clay shall be uniformly compacted to 95% of the Modified Laboratory Maximum Dry Density (ASTM D1557) obtained in the laboratory on representative samples from the approved borrow area.

d3. Compaction shall be on stair-step horizontal lifts in a manner that each succeeding layer will be stepped back on the slopes. The bottom lining will be compacted in six-inch layers to a total thickness of three feet.

e. Placement and Compaction of the Protective Sand and Rock Layers: As specified in Paragraph 313.2g.

e1. The protective rock layer shall be in thickness as indicated on the design drawings and compacted to a density of 90% of the standard Proctor Maximum density. The material shall be noncalcareous and stable under chemical attack as specified in Tables 313-1 and 313-2. *

e2. The protective rock layer shall be placed in a manner to minimize segregation and assure a uniform gradation of the rock on the slopes and bottom of the excavation.

~~313.4 Synthetic Liner:~~ *

a. Lining Material:

a1. The flexible membrane lining material shall conform to the requirements of ASTM D751, designed and manufactured specifically for the purpose of this or a similar installation, and which has been satisfactorily demonstrated by prior use to be suitable for this work.

a2. The liner shall be a minimum of 100 mils thick and be capable of withstanding the load from rubber tired cleaning vehicles without any protective cover.

a3. The liner shall be immune to the effects of ultraviolet radiation and resistant to the chemicals contained in the wastes that will be discharged into the ponds.

a4. The liner shall exhibit physical properties conducive to satisfactory performance under stress and over the temperature extremes experienced in Rothschild, Wisconsin.

a5. The liner shall be fabricated into as large sheets as can be conveniently handled to minimize the onsite joints.

a6. The joints shall be made by means of extruder welding, dielectric bonding or other accepted methods. The use of solvents or adhesives for joint sealing will be permitted ONLY if watertightness of the finished joint installation can be proven to the satisfaction of Purchaser by some nondestructive test examination.

a7. Quality and strength tests applicable to the usage as a liner shall be submitted to Purchaser and the Consulting Engineers for review and approval.

b. Installation

b1. The pond subgrade shall be prepared in accordance with Section 313.2c3.

b2. The liner sheets shall be carefully positioned, aligned and joined as quickly as practical to prevent damage and movement of the sheets.

b3. Lap joints shall be utilized for joining factory fabricated sheets. Mating surfaces of the lap joints shall be cleaned of debris.

b4. Sealing around pipe penetrations and other basin protrusions shall be Contractor's watertight design, subject to approval by the ~~Consulting Engineers.~~

b5. ~~Damage to the lining in shipment or during installation shall be repaired using parent material. The patch shall overlap the damaged area by a minimum equal to that used for other onsite joints. Joints shall be executed by the same methods utilized for joining the original base sheets.~~ *

313.5 Testing:

a. Laboratory: A testing laboratory will be furnished by Purchaser to perform quality test indicated. Contractor shall cooperate with the testing laboratory at all times.

b. Frequency:

b1. The Purchaser's testing laboratory will perform the following tests, the indicated frequencies are provided as guidelines to Contractor and the actual frequencies shall be determined by Purchaser in the field:

b1.1 Density Test on Dike Fill (ASTM D1556 or D2922)	200 cy
b1.2 Density Test on Subgrade (ASTM D1556 or D2922)	200 sq ft
b1.3 Moisture Content on Granular Stockpile (ASTM D2216)	200 cy
b1.4 Gradation on Granular Stockpile (ASTM D422)	200 cy
b1.5 Density of Bentonite Liner and Clay Liner (ASTM D1556 or D2922)	200 cy
b1.6 Density of Protective Sand and Rock Layers (ASTM D1556 or D2922)	200 cy

314. BITUMINOUS CONCRETE PAVED DITCHES

314.1 General: Existing ditches shall be cleared, backfilled and dressed to proper grades and cross-sections as indicated on the design drawings, prior to placing bituminous concrete paving.

314.2 Products:

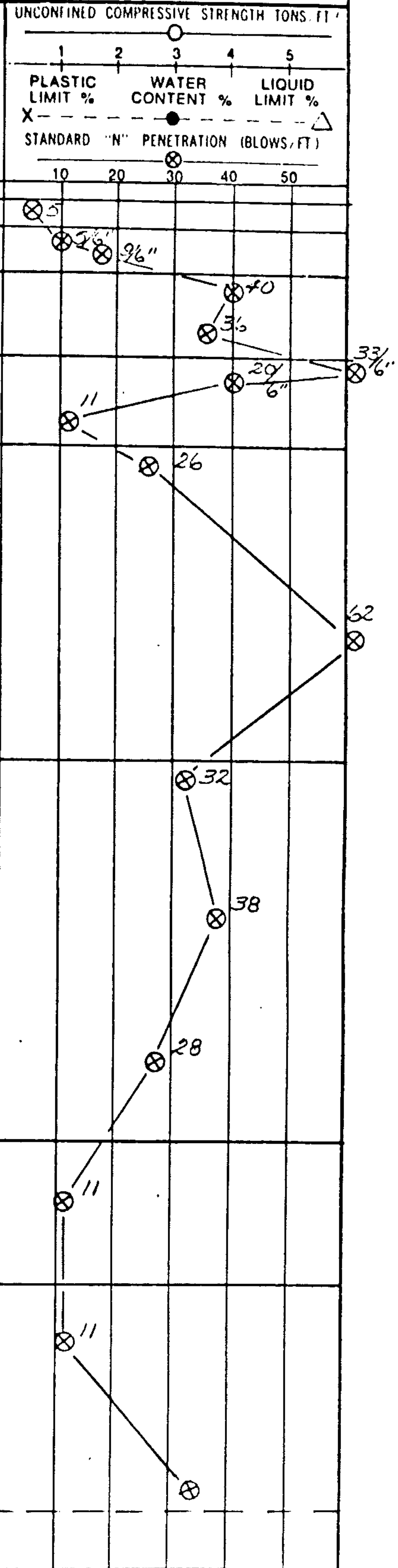
a. Tack Coat: Type CSS-1 or CSS1h emulsified asphalt mixed with equal parts of water.

b. Aggregate: Conform to the Wisconsin State Specification, with the following gradations:

LOG OF BORING NO. 313 (S1615.0 W 450.0)

OWNER Wisconsin Public Service Corporation	ARCHITECT-ENGINEER Sargent and Lundy
SITE Weston Generating Station	PROJECT NAME Weston - Proposed Unit 3

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIA'	UNIT DRY WT. LBS./FT. 3
☒					SURFACE ELEVATION 1177.0	
	1	SS			Silty topsoil-dark brown	
	1A	SS			Silty fine sand-dark brown-loose-(SM)	
	2	SS			Fine to medium sand, trace fine to coarse gravel-brown-medium dense-(SP-SM)	
	3	SS			Fine to medium sand, trace to some gravel-trace silt-brown-dense (SP-GP)occasional cobbles from 4.5'	
5	4	SS				
	5	SS			Silty fine to medium sand, trace gravel-occasional cobbles-very dense to medium dense-(SP-SM)	
	6	SS				
10	7	SS			Fine to medium sand, trace to some gravel-brown medium dense to very dense-(SP) occasional cobbles	
15	8	SS				
20	9	SS			Fine to medium sand, trace gravdl-brown-dense to medium dense-(SP)	
25	10	SS				
30	11	SS				
35	12	SS			Very fine to fine sand-brown-medium dense-(SP)	
40	13	SS			Fine to medium sand, trace gravel-brown-medium dense to dense-(SP)	
45	14	SS				
					Continued	



WATER LEVEL OBSERVATIONS		
W.L.	Dry to 9.0' WD	
W.L.	B.C.R.	A.C.R.
W.L.		

SOIL TESTING SERVICES
OF WIS., INC.
540 LAMBEAU STREET
GREEN BAY, WIS. 54303

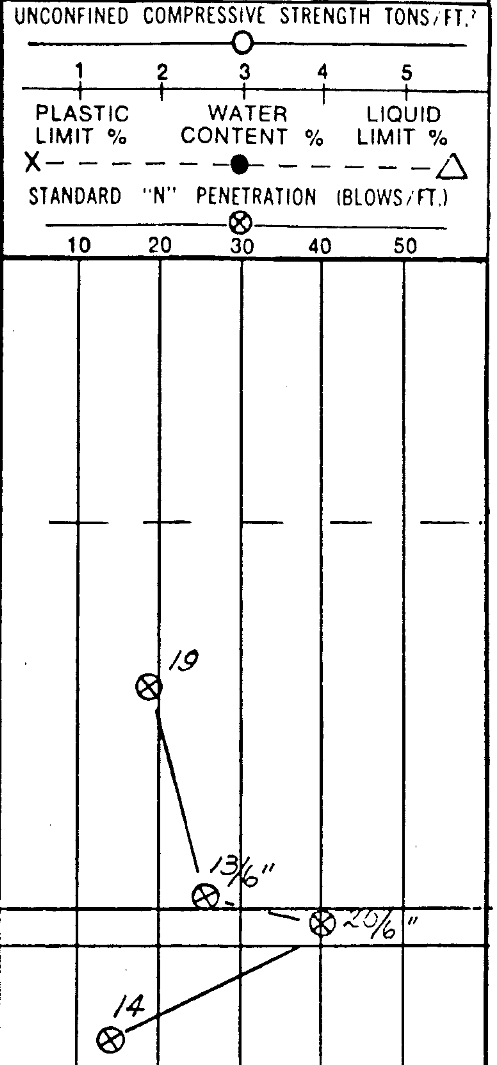
BORING STARTED		5-12-76	
BORING COMPLETED		5-12-76	
RIG	W-8	FOREMAN	EVH
DRAWN	KO	APPROVED	ARP
JOB #	7144	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 313 (continued)

OWNER Wisconsin Public Service Corporation	ARCHITECT-ENGINEER Sargent and Lundy
SITE Weston Generating Station	PROJECT NAME Weston - Proposed Unit 3

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION	UNIT DRY WT. LBS./FT. 3
45					Continued	
46.5						
50	15	SS			Fine to medium sand, trace gravel-brown-medium dense to dense-(SP)	
55	16 16A	SS SS			Silty fine sand-grayish brown-dense-(SM)	
60	17	SS			Fine to coarse sand, trace gravel-brown-medium dense-(SW)	
					End of Boring Boring advanced by power auger to a depth of 9.0 feet Below 9.0 feet cutting bits and Revert drilling fluid used 58.5' of NX casing	



Boring backfilled after completion

WATER LEVEL OBSERVATIONS		
W.L.	Dry to 9.0 WD	
W.L.	B.C.R.	A.C.R.
W.L.		

SOIL TESTING SERVICES
OF WIS., INC.
540 LAMBEAU STREET
GREEN BAY, WIS. 54303

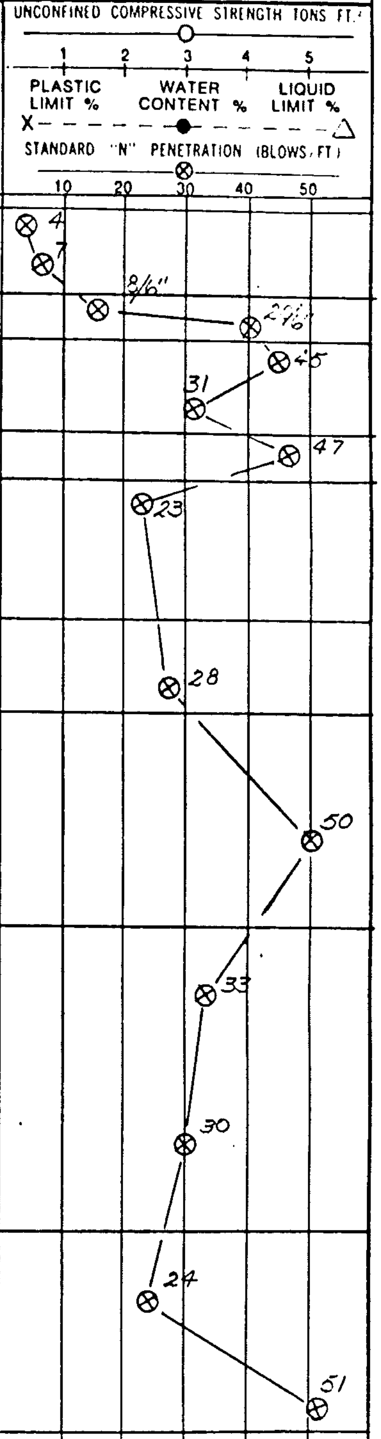
BORING STARTED	5-12-76		
BORING COMPLETED	5-12-76		
RIG	W-8	FOREMAN	EVH
DRAWN	KO	APPROVED	ARP
JOB #	7144	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 316 (S1150.0 W 70.0)

OWNER Wisconsin Public Service Corporation	ARCHITECT-ENGINEER Sargent and Lundy
SITE Weston Generating Station	PROJECT NAME Weston - Proposed Unit 3

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3
☒					SURFACE ELEVATION ↴ 1174.6	
	1	SS			Silty topsoil, dark brown	
	1A	SS			Silty fine sand-brown-loose-(SM)	
	2	SS				
	3	SS			Fine sand, trace gravel-brown-medium dense-(SP)	
5						
	4	SS			Fine to medium sand, trace gravel-brown-dense-(SP)	
	5	SS				
	6	SS			Very fine to fine sand, trace gravel-brown-medium dense-(SP)	
10	7	SS			Fine to medium sand, trace gravel-brown-medium dense	
15					Coarse gravel (2 pieces of gravel in split spoon) red-medium-dense-(GP)	
	8	SS				
					Fine to medium sand, trace gravel-brown-dense-(SP)	
20						
	9	SS				
25	10	SS				
					Very fine to fine sand, trace gravel-brown-dense-(SP)	
30						
	11	SS				
35						
	12	SS			Very fine to medium sand, trace gravel-brown-medium dense to very dense-(SP)	
40	13	SS				
					End of Boring Boring advanced by power auger to a depth of 20 feet Below 20 feet Revert drilling fluid and cutting bits used 20' of NX casing used	



Boring backfilled after completion

WATER LEVEL OBSERVATIONS		
W.L.	Dry to 20' WD	
W.L.	B.C.R.	A.C.R.
W.L.		

SOIL TESTING SERVICES
OF WIS., INC.
540 LAMBEAU STREET
GREEN BAY, WIS. 54303

BORING STARTED		5-13-76	
BORING COMPLETED		5-14-76	
RIG	W-15	FOREMAN	RR
DRAWN	KO	APPROVED	ARP
JOB #	7144	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 317 (S1300.0 E 50.0)

OWNER Wisconsin Public Service Corporation

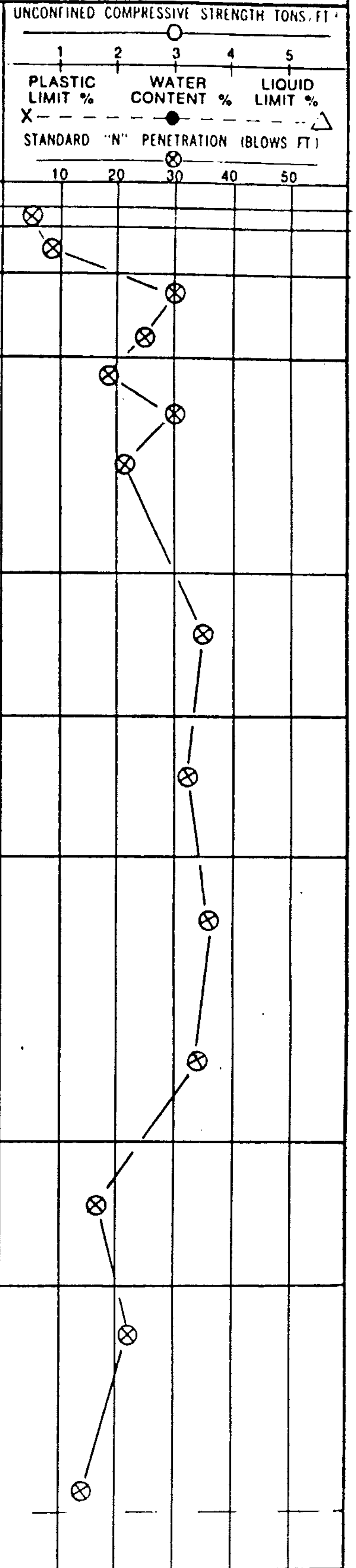
ARCHITECT-ENGINEER Sargent and Lundy

SITE Weston Generating Station

PROJECT NAME Weston-Proposed Unit 3

SURFACE ELEVATION 1178.8

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3
	1	SS			Topsoil	
	1A	SS			Fine sand, trace silt-brown-loose-(SM)	
	2	SS			Fine sand, trace silt-brown-loose-(SP-SM)	
	3	SS			Very fine to fine sand, trace gravel-brown-medium dense-(SP)	
5	4	SS				
	5	SS			Fine to medium sand, trace gravel-brown-medium dense-(SP)	
	6	SS				
10	7	SS				
15	8	SS			Very fine to fine sand, brown-dense-(SP)	
20	9	SS			Fine to coarse sand, trace to somd fine gravel-brown-dense-(SW)	
25	10	SS			Very fine to fine sand-brown-dense-(SP)	
30	11	SS				
35	12	SS			Fine to medium sand, brown medium dense-(SP)	
40	13	SS			Very fine to fine sand-brown-dense to medium dense-(SP)	
45	14	SS				



Continued

WATER LEVEL OBSERVATIONS

W.L. Dry to 10 WD

W.L. B.C.R. A.C.R.

W.L.

SOIL TESTING SERVICES
OF WIS., INC.
540 LAMBEAU STREET
GREEN BAY, WIS. 54303

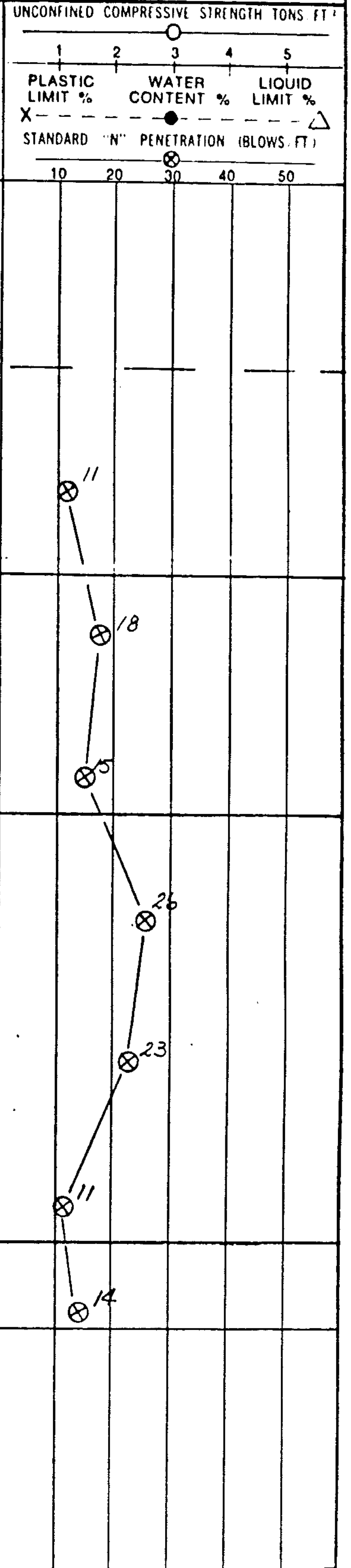
BORING STARTED		5-13-76	
BORING COMPLETED		5-13-76	
RIG	8	FOREMAN	EVH
DRAWN	PH	APPROVED	DBE
JOB #	7144	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 317 (continued)

OWNER Wisconsin Public Service Corporation	ARCHITECT-ENGINEER Sargent and Lundy
SITE Weston Generating Station	PROJECT NAME Weston-Proposed Unit 3

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION	UNIT DRY WT. LBS./FT. 3
45					Continued	
46.5						
50					Very fine to fine sand-brown-dense to medium dense-(SP)	
	15	SS				
55	16	SS			Very fine to medium sand, trace gravel-brown-medium dense-(SP)	
60	17	SS				
65	18	SS		L S	Very fine to coarse sand, occasional cobbles, trace gravel-brown-medium dense-(SW)	
70	19	SS				
75	20	SS				
	21	SS			Very fine to coarse sand, trace gravel-brown-medium dense-(SW)	
80					End of Boring Boring advanced by power auger to a depth of 20 feet Wash boring Revert drilling fluid used below 9 feet 10' of 4" Casing used	



WATER LEVEL OBSERVATIONS		
W L	Dry to 10 WD	
W L	B.C.R.	A.C.R.
W L		

SOIL TESTING SERVICES
OF WIS., INC.
540 LAMBEAU STREET
GREEN BAY, WIS. 54303

BORING STARTED		5-13-76	
BORING COMPLETED		5-14-76	
RIG	W-8	FOREMAN	EVH
DRAWN	PH	APPROVED	DBE
JOB =	7144	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 326 (S 650.0 W 465.0)

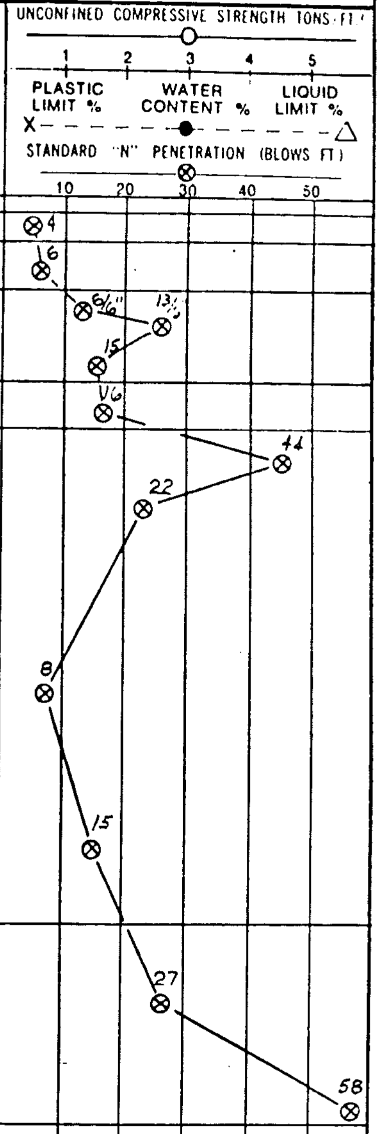
OWNER Wisconsin Public Service Corporation	ARCHITECT-ENGINEER Sargent and Lundy
SITE Weston Generating Station	PROJECT NAME Weston - Proposed Unit 3

SURFACE ELEVATION 1180.1

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	DESCRIPTION OF MATERIAL
	1	SS	Silty topsoil-dark brown
	2	SS	Silty fine sand, brown-loose-(SM)
	3	SS	Fine sand, trace silt-brown-loose-(SP-SM)
5	4	SS	Fine to medium sand, trace gravel-brown-medium dense-(SP)
	5	SS	Fine sand-brown-medium dense-(SP)
	6	SS	Fine to medium sand, trace gravel-brown-loose to dense-(SP)
10	7	SS	
15	8	SS	
20	9	SS	
25	10	SS	Fine to coarse sand, trace gravel-brown-medium dense to very dense-(SW)
30	11	SS	

End of Boring
Boring advanced by power auger to a depth of 9 feet
Below 9 feet wash water and cutting bits were used
28.5' of NX casing used

UNIT DRY WT. LBS./FT. 3



Borehole backfilled after completion

WATER LEVEL OBSERVATIONS			
W.L.	Dry to 10.5' WD		
W.L.	19.7'	B.C.R.	A.C.R.
W.L.	27.2' AB		

SOIL TESTING SERVICES
OF WIS., INC.
540 LAMBEAU STREET
GREEN BAY, WIS. 54303

BORING STARTED			5-12-76
BORING COMPLETED			5-12-76
RIG	W-8	FOREMAN	EVH
DRAWN	PH	APPROVED	ARP
JOB =	7144	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 329 (S2185.0 W1420.0)

OWNER Wisconsin Public Service Corporation

ARCHITECT-ENGINEER Sargent and Lundy

SITE Weston Generating Station

PROJECT NAME Weston-Proposed Unit 3

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² ○ 1 2 3 4 5

PLASTIC LIMIT % X — WATER CONTENT % ● — LIQUID LIMIT % △

STANDARD "N" PENETRATION (BLOWS/FT.) ⊗ 10 20 30 40 50

SURFACE ELEVATION ↴ 1168.6

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3
☒					Topsoil	
	1	PA			Fine sand, trace silt and gravel-brown (SP-SM)	
5	2	PA				
	2A	PA			Fine to coarse sand, trace to some gravel-brown-(SW)	
10	3	PA				
15	4	PA				
	4A	PA			Fine to medium sand, trace gravel-brown-(SP)	
20					End of Boring Boring advanced by power auger No casing or wash water used Borehole backfilled	

WATER LEVEL OBSERVATIONS

W.L.	Dry to 20.0' WD	
W.L.	B.C.R.	A.C.R.
W.L.		

SOIL TESTING SERVICES
OF WIS., INC.
540 LAMBEAU STREET
GREEN BAY, WIS. 54303

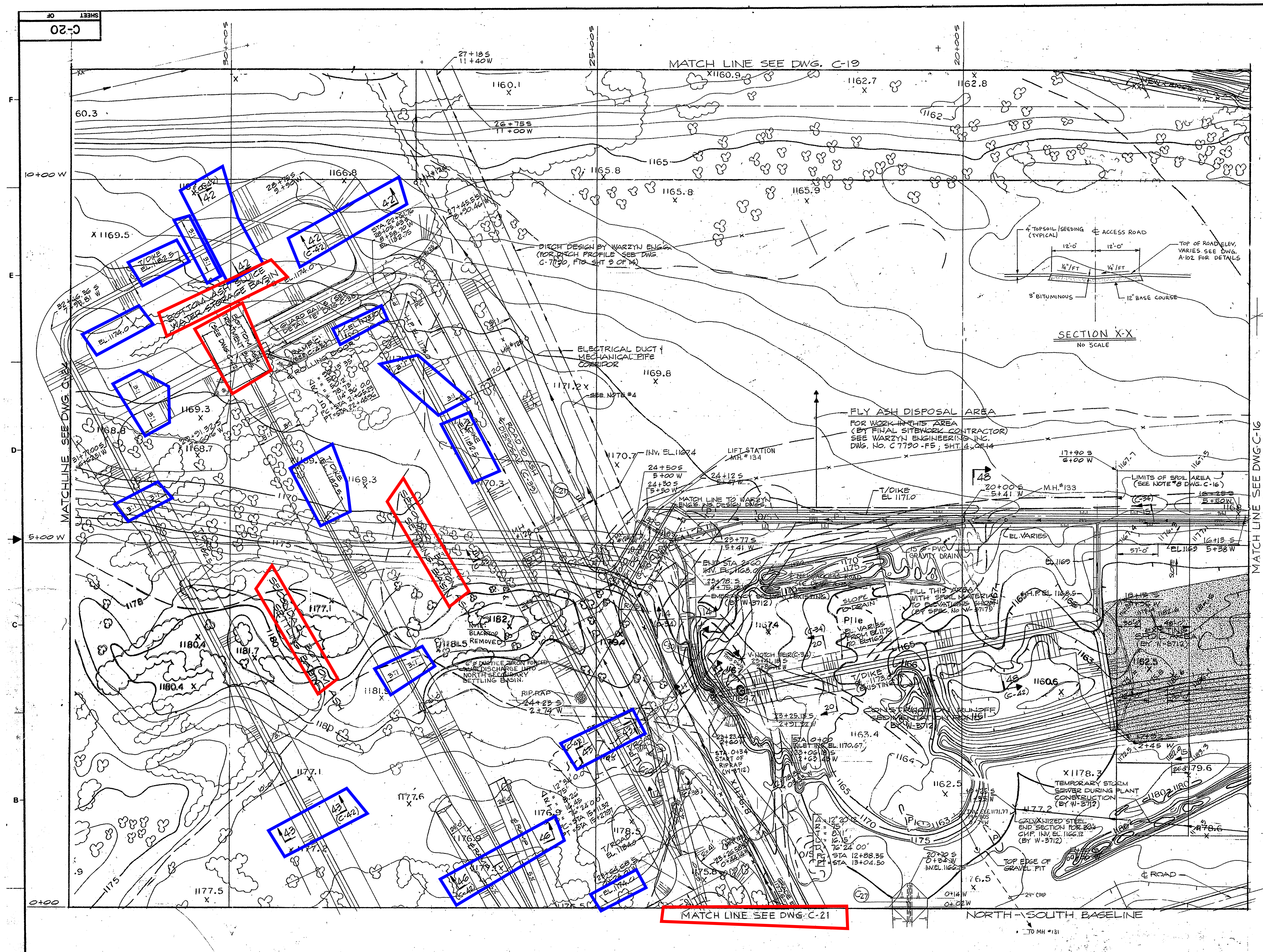
BORING STARTED 5-18-76
BORING COMPLETED 5-18-76
RIG W-15
FOREMAN RR
DRAWN PH
APPROVED DBE
JOB # 7144
SHEET

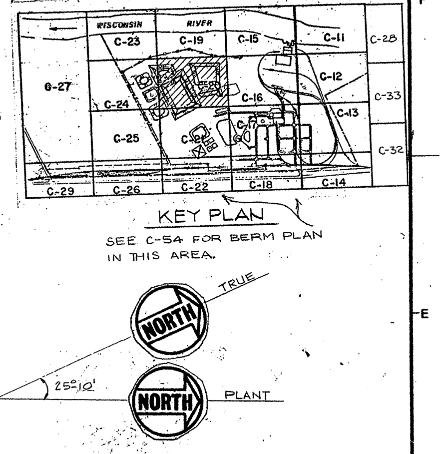
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

APPENDIX A

Document 4

Sargent & Lundy Drawing No. C-20, Grading, Roadwork, and Drainage Plan, Sheet 10





NOTES

1. FOR GENERAL NOTES & LEGEND SEE DWG. NO. C-8
2. ALL WORK SHOWN ON THIS DRAWING SHALL BE DONE BY FINAL SITEWORK CONTRACTOR IN ACCORDANCE WITH PROJECT SPECIFICATION W-3717 UNLESS OTHERWISE NOTED.
3. USE COMPACTED FILL FOR CONSTRUCTION RUNOFF SEDIMENTATION POND BERM IN ACCORDANCE WITH PARAGRAPH 302.8, g 1., SPEC. W- 3712.
4. THIS LINE REPRESENTS THE DESIGN INTERFACE BOUNDARY FOR ON - SITE FLY ASH DISPOSAL AREA. WARZYN ENGINEERING INC. SHALL BE RESPONSIBLE FOR FINAL ENGINEERING DESIGN INSIDE THIS AREA. ALSO SEE DWG. NO. C-16 & C-19.

REFERENCE DRAWINGS

C-8	SITE PLAN - GENERAL ARRANGEMENT
C-16	GRADING, ROADWORK & DRAINAGE PLAN-SHT. 6
C-19	GRADING, ROADWORK & DRAINAGE PLAN-SHT. 9
C-21	GRADING, ROADWORK & DRAINAGE PLAN-SHT. 11
C-24	GRADING, ROADWORK & DRAINAGE PLAN-SHT. 14
C-34	MISCELLANEOUS GRADING SECTIONS
C-42	MISCELLANEOUS SECTIONS & DETAILS ~ SHEET 1
C-43	MISCELLANEOUS SECTIONS & DETAILS ~ SHEET 2
A-102	FLY ASH / BOTTOM ASH GRADING PLAN

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	FILM
G	1-22-80	Wm. L. Volk	Rashidlsey	[illegible]	FOR D.N.R. PERMIT	
G	2-22-80	Wm. L. Volk	Rashidlsey	[illegible]	FOR CONSTRUCTION TO W.P.S.C., SPEC. No. W-3717	X
G	3-10-80	D. Quijano	Rashidlsey	[illegible]	FOR FINAL SITEWORK CONSTRUCTION, SPEC. No. W-3717	
H	4-14-80	D. Quijano			FOR BID SPEC. NO. W-3729	
J	4-29-80	[illegible]	Rashidlsey	[illegible]	RECORD REVISION, ADDED C-27 & REVISED CORRIDOR SPEC. No. W-3717	
K	6-12-80	[illegible]	Rashidlsey	[illegible]	FOR CONSTRUCTION, SPEC. No. W-3729	X
K	7-14-80	Wm. L. Volk	Rashidlsey	[illegible]	REISSUED TO FINAL SITEWORK CONTRACTOR. SPEC. No. W-3717	X
L	7-31-80	[illegible]	Rashidlsey	[illegible]	REMOVED DRAINAGE DITCH & PIPELINES, ADDED RAMP 'C' SPEC NO. W-3717	

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	FILM
M	12-5-80	[illegible]	Rashidlsey	[illegible]	DELETED GUARDRAIL SPEC No. W-3717	X
N	8-13-81	[illegible]	[illegible]	J. M. Martin	RECORD DRAWING	X
N	6-20-82	Wm. L. Volk			SENT TO CLIENT	X
P	6-18-86	S. SCHANEN	J. Spice	JM/KMU	UPDATED KEY PLAN	7/23/86
Q	8-12-86	S. SCHANEN	J. Meell	JM/KMU	REVISED KEY PLAN : C-28 WAS C-34	7-2-86
R	7-23-91	MJR	[illegible]	M Skrzypchak	ADDED 24" CMP TO MH #131 DCF 1509	4-8-92
R	3-3-92	P.G. DeBAUCHE	[illegible]	[illegible]	ADDED LIFT STATION, M.H. #133, #134, 6" IRONPIPE AT CS AND 15" PVC AT D1-D5.	4-8-92
S	12-21-95	B. TROTTER		M Skrzypchak	ADDED ACCESS ROAD, SECTION X-X AND REF. NOTES PER PIP 604 (DCF 2665)	2-7-96

ROBERT J. SMALL
No. E-14342

SCALE
1" = 50'-0'
PROJECT NUMBER
4872-03

GRADING, ROADWORK & DRAINAGE
PLAN - SHEET 10
WESTON GENERATING STATION
UNIT 3
WISCONSIN PUBLIC SERVICE CORPORATION
WAUSAU, WISCONSIN

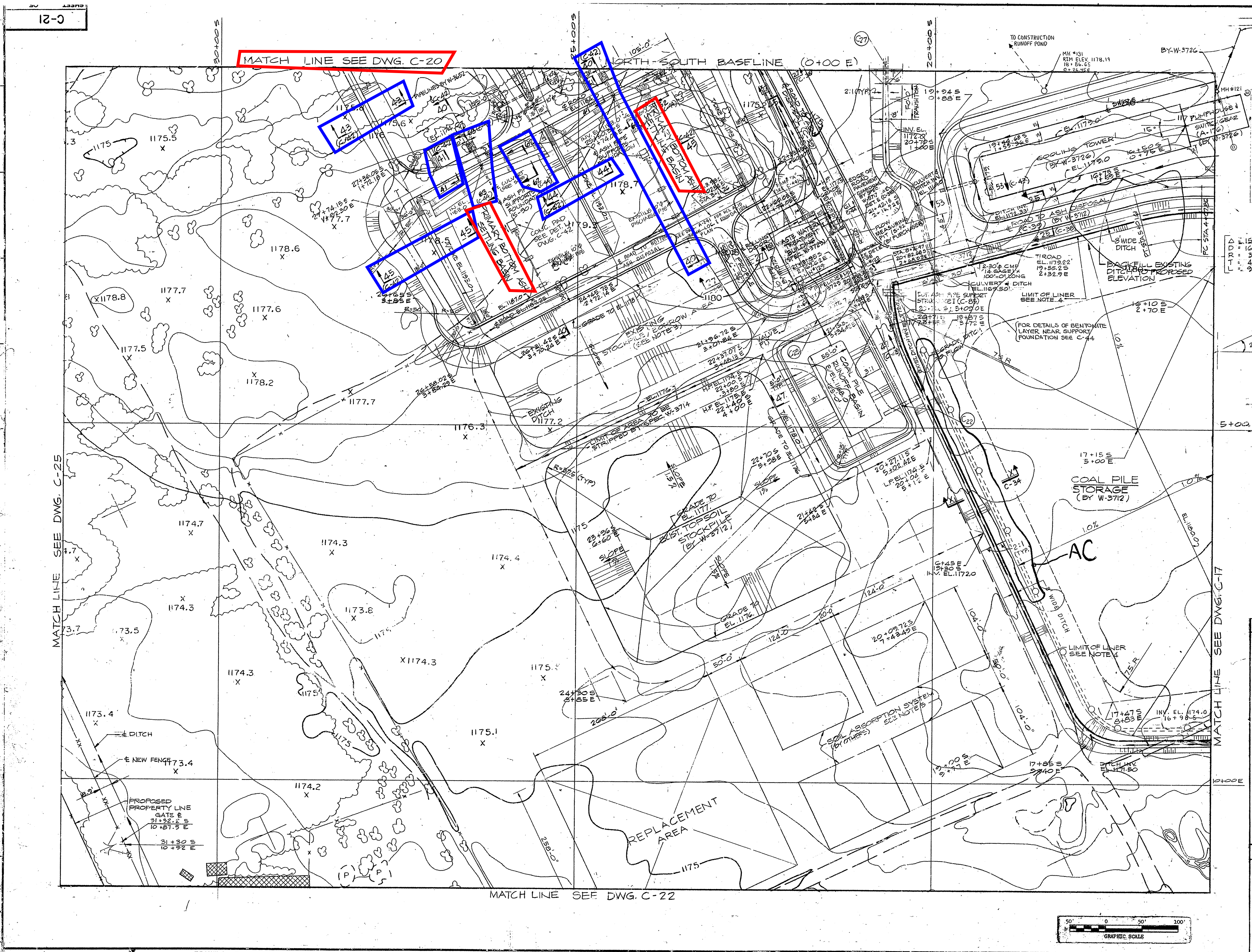
SARGENT & LUNDY
ENGINEERS
CHICAGO

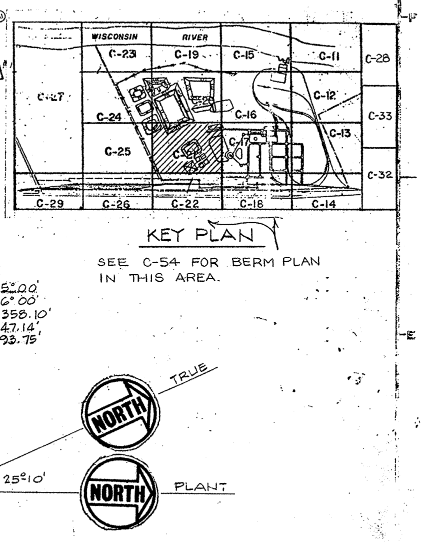
DRAWING NO. C-20
REV S
SHEET OF

APPENDIX A

Document 5

Sargent & Lundy Drawing No. C-21, Grading, Roadwork, and Drainage Plan, Sheet 11





NOTES

1. FOR GENERAL NOTES & LEGEND SEE DWG. NO. C-8.
2. ALL WORK SHOWN ON THIS DRAWING SHALL BE DONE BY THE FINAL SITEWORK CONTRACTOR IN ACCORDANCE WITH PROJECT SPECIFICATION W-3717 UNLESS OTHERWISE NOTED.
3. THE AREA DESIGNATED STOCKPILE/BORROW AREA IS FOR EXCESS MATERIAL REUSABLE AS BACKFILL, OR BORROW MATERIAL AS REQUIRED BY THE SUBSTRUCTURE CONTRACTOR (SPEC. W-3714). IT SHALL BE STRIPPED TO A MINIMUM DEPTH OF 18 INCHES BEFORE EXCESS MATERIAL IS DEPOSITED OR MATERIAL IS BORROWED FOR BACKFILL.
4. ELEVATIONS WITHIN THE LIMIT OF LINER FOR THE COAL PILE AREA ARE FINISHED GRADE ELEVATIONS FOR THE LINER AND COVER MATERIALS. THE SUBGRADE UNDER THE LINER SHALL BE GRADED BY THE SITEWORK CONTRACTOR - LINER AND COVER MATERIALS WILL BE INSTALLED BY FINAL SITEWORK CONTRACTOR.
5. FOR DETAILS OF SOIL ABSORPTION SYSTEM, SEE DWG. NO. ST-1 BY BECHER-HOPPE ENGINEERS, INC., SCHOFIELD, WISCONSIN.
6. THE EXISTING CULVERT SHALL BE EXTENDED DURING PLANT CONSTRUCTION TO ACCOMODATE ELECTRICAL DUCT. AFTER COMPLETION OF CONSTRUCTION THIS PIPE SHALL BE PLUGGED AND ABANDONED.
7. ~~FOR~~ PIPE CONNECTION SEE SECTION "A" DWG C-43

REFERENCE DRAWINGS

C-8	SITE PLAN - GENERAL ARRANGEMENT.
C-17	GRADING, ROADWORK & DRAINAGE PLAN - SHEET 7
C-20	GRADING, ROADWORK & DRAINAGE PLAN - SHEET 10
C-22	GRADING, ROADWORK & DRAINAGE PLAN - SHEET 12
C-25	GRADING, ROADWORK & DRAINAGE PLAN - SHEET 15
C-37	ROAD PROFILES - SHEET 3
C-38	ROAD SECTIONS & DETAILS
C-39	ROAD PROFILES - SHEET 4
C-40	CULVERT & STORM SEWER SCHEDULE
C-35	VALVE PITS, MH A&B AND BOTTOM ASH PIPE SUPPORT STRUCTURES
S-90	MISCELLANEOUS YARD FOUNDATION SHT. 4
A-176	COOLING TOWER PUMPHOUSE
C-42	MISCELLANEOUS SECTIONS & DETAILS ~ SHEET 1
C-43	MISCELLANEOUS SECTIONS & DETAILS ~ SHEET 2

DRAWING RELEASE RECORD

REV.	SPEC. NO.	DATE	DRAWN	CHECKED	ENGR. APPROVAL	DESCRIPTION	FILM
W	—	6-18-86	S.SCHANEN		JM/KMU	UPDATED KEY PLAN	7/23/86
X		8-12-86	S.SCHANEN			REVISED KEY PLAN: C-28 WAS C-34.	9-2-86
Y		1-9-87	S.SCHANEN			ADDED DIKE TO SETTLING BASIN.	2-3-87
Z		2-19-87	R. Seroogy	B Trotter		ADDED REFERENCE NOTE FOR HCL ACID TANK (DCF 567)	4-15-87
AA	DCF 1509	7-23-91	MJR			ADDED MH #131 & CORRESPONDING RUNOFF	4-8-92
AB		1-12-94	P G DeBAUCHE	R J SEROOGY		ADDED DRAIN PIPE & DRAIN TILE DCF 2203	3-11-94
AC		4-5-95	R J SEROOGY	R J SEROOGY		ADDED DRAIN PIPE & DRAIN TILE (PIP 533) DCF 2499	4-17-95

DRAWING RELEASE RECORD

REV.	SPEC. NO.	DATE	DRAWN	CHECKED	ENGR. APPROVAL	DESCRIPTION	FILM
N	W-3729	6-12-80				FOR CONSTRUCTION	X
P	W-3717	7-31-80	Wm. L. Volk			REMOVED DRAINAGE DITCH, REVISED PIPELINES & ADDED RAMP	
R	W-3717	9-15-80	Wm. L. Volk			ADDED NOTE	
S	W-3717	11-14-80				ADDED DIMENSIONS FOR RAMP, REV. DITCH & DELETED CULVERT C-12	
T	W-3717	12-5-80				ADDED RIPRAP AT END OF ASH PIPE & DELETED GUARDRAIL	X
U	W-3717	5-22-81				ADDED FLOW MEASURING PIT & GUARDRAIL	X
V	W-3729	8-13-81				RECORD DRAWING	X
✓	—	6-30-82	Wm. L. Volk			SENT TO CLIENT	X

ROBERT J. SMALL
No. E-14342

DRAWN	SCALE 1"=50'-0"
CHECKED	DATE 03-31-78
	DATE 3-31-78
APPROVED	DATE 3/31/78

PROJECT NUMBER 4872-03

GRADING, ROADWORK & DRAINAGE
PLAN - SHEET 11
WESTON GENERATING STATION
UNIT 3
WISCONSIN PUBLIC SERVICE CORPORATION
WAUSAU, WISCONSIN

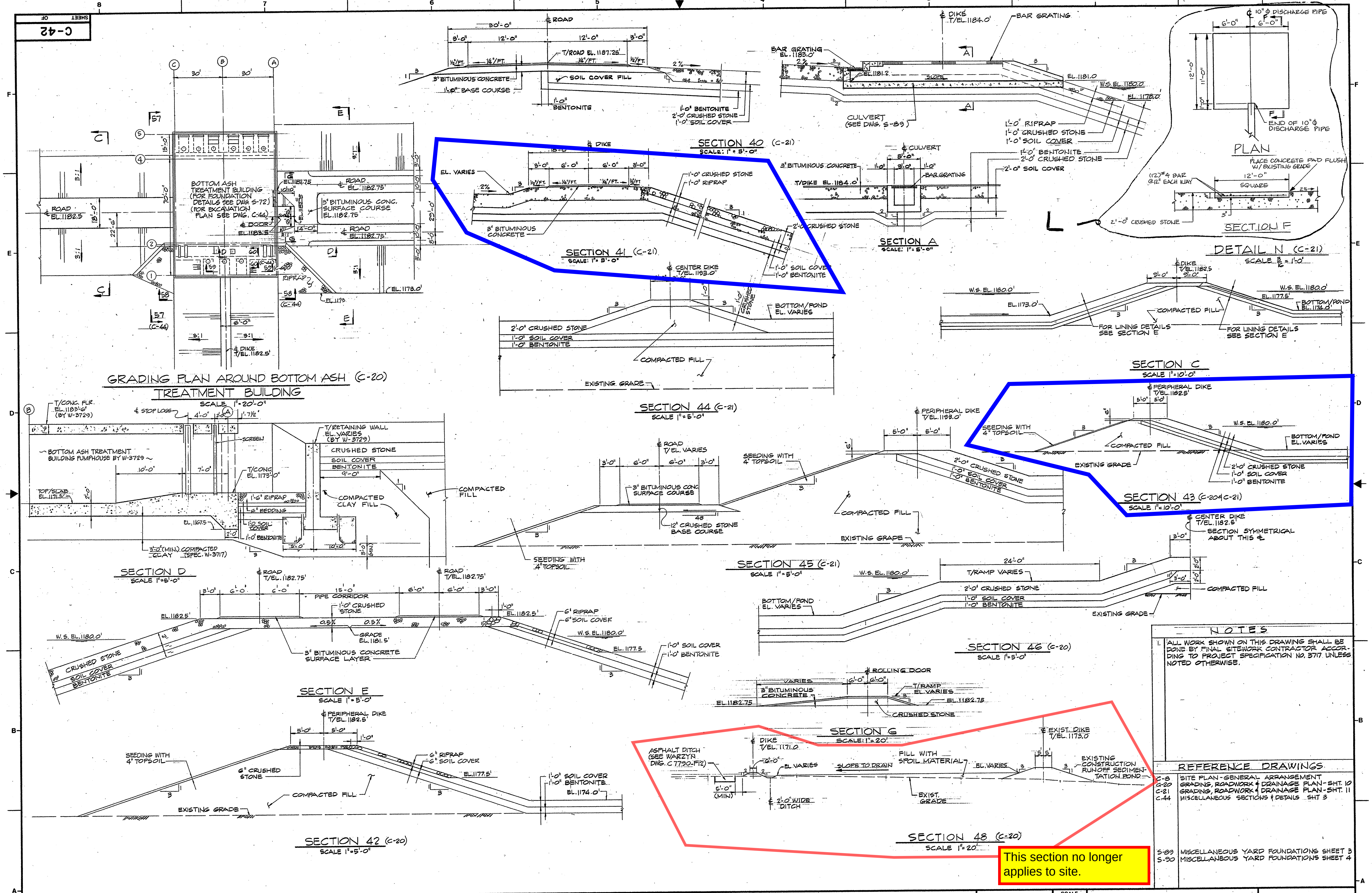
SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO.
C-21
SHEET OF
AC

APPENDIX A

Document 6

Sargent & Lundy Drawing No. C-42, Miscellaneous Sections and Details, Sheet 1



This section no longer applies to site.

NOTES

1. ALL WORK SHOWN ON THIS DRAWING SHALL BE DONE BY FINAL SITEWORK CONTRACTOR ACCORDING TO PROJECT SPECIFICATION NO. 3717 UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS

C-8	SITE PLAN - GENERAL ARRANGEMENT
C-20	GRADING, ROADWORK & DRAINAGE PLAN - SHT. 10
C-21	GRADING, ROADWORK & DRAINAGE PLAN - SHT. 11
C-44	MISCELLANEOUS SECTIONS & DETAILS SHT 3
S-89	MISCELLANEOUS YARD FOUNDATIONS SHEET 3
S-90	MISCELLANEOUS YARD FOUNDATIONS SHEET 4

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	FILM
G	7-14-80	Wm. L. Volk	Rashidbey		REISSUED TO FINAL SITEWORK CONTRACTOR, SPEC. No. W-3717	X
H	7-31-80		Rashidbey		ADDED RAMP 'C' AND SEC. 49, SPEC. NO. W-3717	X
J	12-5-80		Rashidbey		ADDED RIPRAP ON DET. N, DELETED GUARDRAIL, SPEC. No. W-3717	X
K	5-19-81	Donna Pucci	Rashidbey	J. M. Burton	REVISED SECTION D' SPEC W-3717 & W-3729	X
K	6-30-82	Wm. L. Volk			SENT TO CLIENT	X
L	1-9-87	S. SCHANEN	J. Muehl	K. Uffelman	UPDATED DETAIL N	2-3-87

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	FILM
A	12-10-79	D. Quijano			FOR FINAL SITEWORK BIDS, SPEC. NO. W-3717	
B	12-21-79				FOR BID ADDENDUM NO. 1, SPEC. No. W-3717	X
C	1-22-80	D. Quijano	Rashidbey		FOR D.N.R. PERMIT	
C	2-22-80	Wm. L. Volk	Rashidbey		FOR CONSTRUCTION TO W.P.S.C., SPEC. No. W-3717	X
D	3-10-80	D. Quijano	Rashidbey		FOR FINAL SITEWORK CONSTRUCTION, SPEC. NO. W-3717	X
E	4-14-80				FOR BID SPEC. NO. W-3729	
F	6-2-80		Rashidbey		REVISED SECTION 46, ADDED SEC. 57, 58 59 & 60 ON PLAN, SPEC. No W-3717	X
G	6-12-80		Rashidbey		FOR CONSTRUCTION, SPEC. No. W-3729	X

GLEN A. CHAUVIN No. E-14430

SCALE AS NOTED

PROJECT NUMBER 4872-14

MISCELLANEOUS SECTIONS & DETAILS
SHEET 1
WESTON GENERATING STATION
UNIT 3
WISCONSIN PUBLIC SERVICE CORPORATION
WAUSAU, WISCONSIN

SARGENT & LUNDY
ENGINEERS
CHICAGO

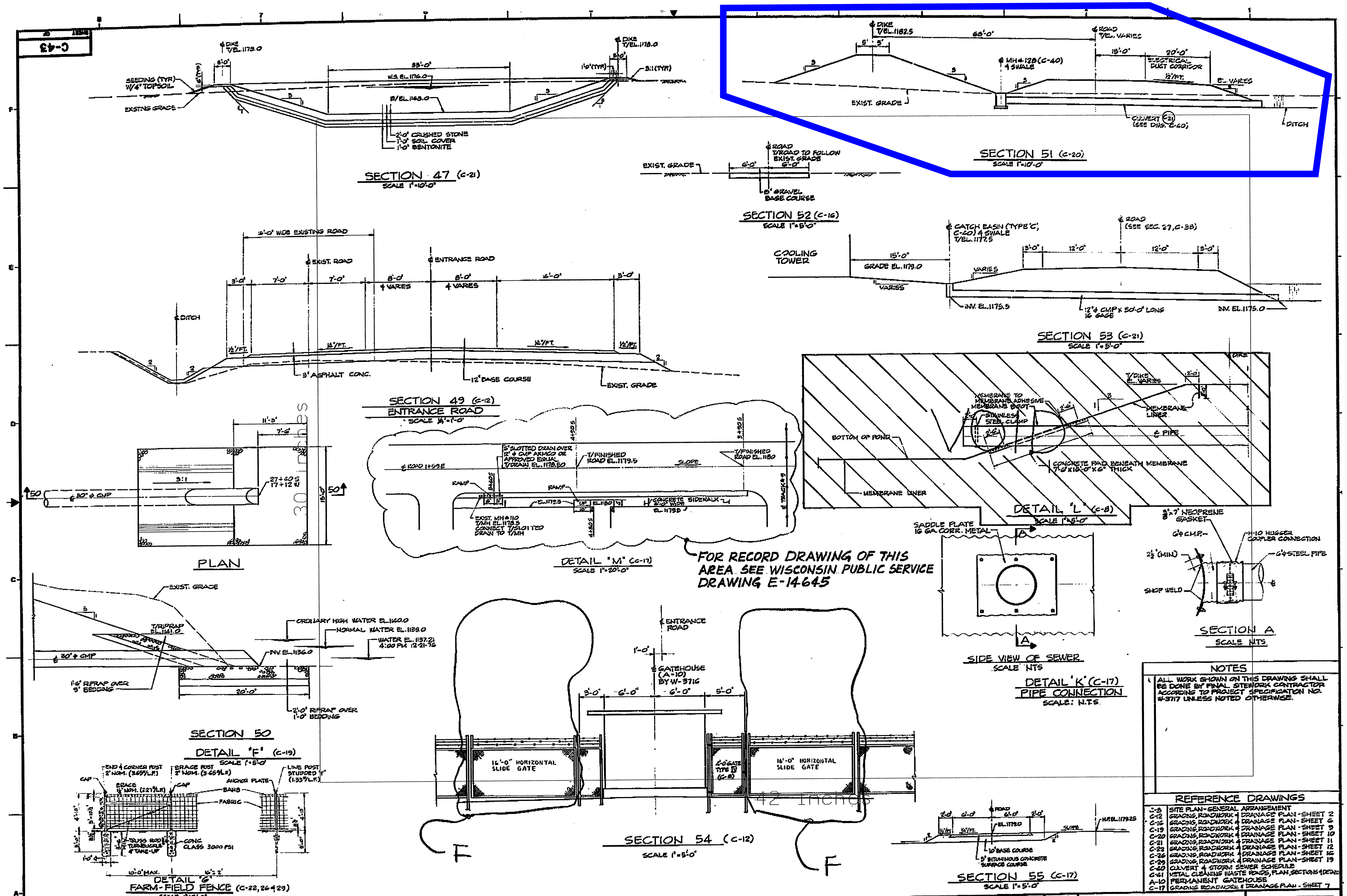
DRAWING NO. C-42
REV. L
SHEET OF

R.C.L.-78

APPENDIX A

Document 7

Sargent & Lundy Drawing No. C-43, Miscellaneous Sections and Details, Sheet 1



FOR RECORD DRAWING OF THIS AREA SEE WISCONSIN PUBLIC SERVICE DRAWING E-14645

NOTES

1. ALL WORK SHOWN ON THIS DRAWING SHALL BE DONE BY FINAL SITEWORK CONTRACTOR ACCORDING TO PROJECT SPECIFICATION NO. W-3717 UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS

C-9	SITE PLAN-GENERAL ARRANGEMENT
C-12	GRADING, ROADWORK & DRAINAGE PLAN-SHEET 2
C-16	GRADING, ROADWORK & DRAINAGE PLAN-SHEET 6
C-19	GRADING, ROADWORK & DRAINAGE PLAN-SHEET 9
C-20	GRADING, ROADWORK & DRAINAGE PLAN-SHEET 10
C-21	GRADING, ROADWORK & DRAINAGE PLAN-SHEET 11
C-22	GRADING, ROADWORK & DRAINAGE PLAN-SHEET 12
C-26	GRADING, ROADWORK & DRAINAGE PLAN-SHEET 16
C-29	GRADING, ROADWORK & DRAINAGE PLAN-SHEET 19
C-40	CULVERT & STORM SEWER SCHEDULE
C-41	METAL CLEANING WASTE PONDS, PLAN, SECTIONS & DETAILS
A-10	PERMANENT GATEHOUSE
C-17	GRADING ROADWORK & DRAINAGE PLAN - SHEET 7

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	FILM
D	5-17-81				VOIDED DETAIL 'L' SPEC. W-3717 & W-3729	X
E	1-15-82				ADDED RECORD DRAWING REFERENCE NOTE	X
E	6-30-82	Wm. L. Volk			SENT TO CLIENT	X
F	3-26-87				REVISED GATE IN SECTION 54 (DCF 552)	

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	FILM
A	12-10-79	D. Quijano			FOR FINAL SITEWORK BIDS	X
A	12-14-79				FOR W.P.S.C. USE	X
B	12-21-79	D. Quijano			FOR BID ADDENDUM NO. 1, SPEC. W-3717	X
B	1-22-80	D. Quijano			FOR D.N.R. PERMIT	
B	2-22-80	Wm. L. Volk			FOR CONSTRUCTION TO W.P.S.C., SPEC. No. W-3717	X
C	3-10-80	D. Quijano			FOR FINAL SITEWORK CONSTRUCTION, SPEC. NO. W-3717	
C	4-14-80	D. Quijano			FOR BID SPEC. NO. W-3729	X
C	6-12-80				FOR CONSTRUCTION, SPEC. No. W-3729	X

GLEN A. CHAUVIN
No. E-14430
PARK RIDGE, ILL.

SCALE AS NOTED
PROJECT NUMBER 4872-14

MISCELLANEOUS SECTIONS & DETAILS
SHEET 2
WESTON GENERATING STATION
UNIT 3
WISCONSIN PUBLIC SERVICE CORPORATION
WAUSAU, WISCONSIN

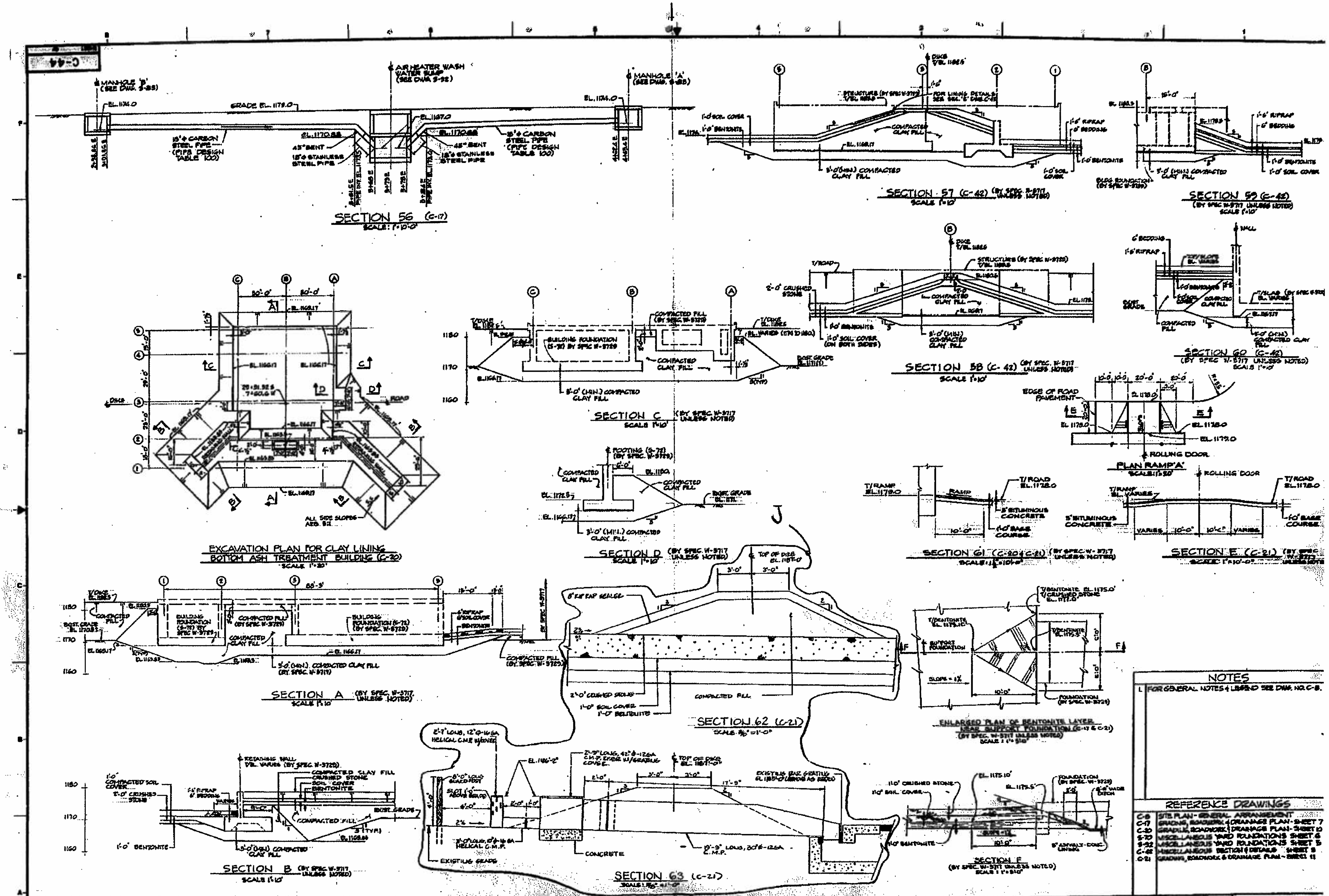
SARGENT & LUNDY
ENGINEERS
CHICAGO

DRAWING NO. C-43
REV. F
SHEET OF

APPENDIX A

Document 8

Sargent & Lundy Drawing No. C-44, Miscellaneous Sections and Details, Sheet 3



NOTES

1. FOR GENERAL NOTES & LEGEND SEE DWG. NO. C-8.

REFERENCE DRAWINGS

C-8	SITE PLAN - GENERAL ARRANGEMENT
C-17	GRADING, ROADWORK & DRAINAGE PLAN - SHEET 7
C-20	GRADING, ROADWORK & DRAINAGE PLAN - SHEET 10
S-70	MISCELLANEOUS YARD FOUNDATIONS SHEET 6
S-92	MISCELLANEOUS YARD FOUNDATIONS SHEET 5
C-42	MISCELLANEOUS SECTION & DETAILS SHEET 8
C-21	GRADING, ROADWORK & DRAINAGE PLAN - SHEET 11

DRAWING RELEASE RECORD

REV.					PURPOSE	
G					REVISED SECT. F SPEC W-5717	
H					REVISED SECT. B & SECT. 57 & 58 SPEC W-5717 & W-3729	
H						
J					ADDED SECTIONS 62 & 63.	

DRAWING RELEASE RECORD

REV.					PURPOSE	
A					FOR BID SPEC. NO. W-5729	
A					FOR FINAL EARTHWORK CONSTRUCTION SPEC. No. W-5717	
B					[illegible]	
C					FOR CONSTRUCTION SPEC. No. W-5717	
C					REVISED TO FINAL EARTHWORK CONTRACTOR SPEC. No. W-5717	
D					[illegible]	
E					[illegible]	
F					[illegible]	

GLEN A. CHAUVIN
No. E-14430
PARK RIDGE, ILL.

SCALE AS NOTED

MISCELLANEOUS SECTIONS & DETAILS
SHEET 3
WESTON GENERATING STATION
UNIT 3
WISCONSIN PUBLIC SERVICE CORPORATION
WAUSAU, WISCONSIN

SARGENT & LUNDY

C-44 J

APPENDIX A

Document 9

Merrill Sand & Gravel Company, Laboratory Test Results, Proposed Soil Bentonite Liner, July 16, 1980

MERRILL GRAVEL & CONSTRUCTION COMPANY

LABORATORY TEST RESULTS

PROPOSED SOIL-BENTONITE LINER

WISCONSIN PUBLIC SERVICE

WESTON UNIT 3 PLANT EXPANSION

WESTON, WISCONSIN

BY

SOIL TESTING SERVICES OF WISCONSIN, INC.

GREEN BAY, WISCONSIN

JULY 16, 1980

SOIL TESTING SERVICES
OF WISCONSIN, INC.
540 LAMBEAU ST. **GREEN BAY, WIS. 54303**

July 14, 1980

Merrill Gravel & Construction Company
Sturtevant Street
Merrill, Wisconsin 54452

Attention: Mr. Dick Schumitsch

STS Job W 10247

RE: Laboratory test results for the proposed soil-bentonite liner at the Wisconsin Public Service, Weston Unit 3 Plant Expansion in Weston, Wisconsin.

Gentlemen:

The laboratory test program for the above referenced project has been completed. This work was authorized by execution of our April 8th proposal. The work plan was described in our April 4th letter to Sargent & Lundy Engineers. An interim report was submitted to you on June 3rd which presented a portion of the results herein. Three copies of this report have been sent to the above address. Report copies have also been forwarded to Dan Bodine and Sid Sen of Sargent & Lundy, and Tom Lynch of Wisconsin Public Service.

TESTING PROCEDURES

The test procedures for this project have been done in general accordance with the U. S. Army Corps of Engineers Manual EM1110-2-1906 "Laboratory Soils Testing". The general laboratory program was also described in our April 4th letter to Sargent & Lundy Engineers. Significant amendments or changes in our test program are described below:

GREEN BAY PHONE (414) 494-9656
WAUSAU, WISCONSIN - 715—845-8386
MARQUETTE, MICHIGAN - 906—225-1417
MILWAUKEE, WISCONSIN - 414—354-1100
SUPERIOR, WISCONSIN - 715—392-9006
OSHKOSH, WISCONSIN - 414—235-0270
KENOSHA, WISCONSIN - 414—657-1211

WILLIAM M. PERPICH, P.E.
JOHN P. GNAEDINGER, P.E.
CLYDE N. BAKER, P.E.
MERLE E. BRANDER, P.E.
DOUGLAS J. HERMANN, P.E.

JAMES J. BOTZ, P.E.
JAMES A. SENGER
JON D. MUELLER
THOMAS W. WOLF
JACK J. AMAR, P.E.

1. The application rates for dry benonite were revised to 5, 7, and 10 percent on a dry soil basis. Mr. Sen (Sargent & Lundy) suggested in an April 8th letter that application rates less than 7 percent be considered (Item 3).

2. All bentonite percentages are based on dry bentonite to dry soil weights.

3. The natural water content of the Barroid 200 bentonite received ranged from 12 to 13 percent.

4. Hydration periods following compaction ranged from 4 to 6 days.

5. The permeability of the soil-bentonite samples was quite low which extended the period of saturation prior to permeability testing.

6. Originally it was planned to limit the hydraulic pressures to less than 10 psi or to hydraulic gradients less than 70. In the interest of scheduling, it was necessary to increase gradients above this level, however, this was done in an incremental fashion by adding no more than 2 psi additional pressure on a daily basis if saturation was incomplete. This procedure was intended to minimize the potential for hydraulic fracturing of the sample.

7. High permeameter flows were observed for the 7 percent soil bentonite samples for both the coarse and fine sand materials tested. Two additional samples were prepared and tested for the coarse sand, since this was likely the most permeable material.

8. The samples were prepared with potable water from the Green Bay water system.

TEST RESULTS

Gradations

Seven sand samples were collected by Mr. Dick Kirchner of Soil Testing Services under the direction of Mr. Dick Schumitsch of Merrill Gravel & Construction. These samples have been considered representative of the range of gradations that may be encountered during construction. The results of the gradation tests are presented in Table 1 and the individual gradation curves are attached. In order to bound the range of gradations, the coarsest and finest materials were selected for testing. A soil sample taken from the east face and north end of the existing sand stockpile was considered to be the finest material and the secondary ash pond elevation 1170-1171 was considered to be the coarsest material. This selection was based primarily on the P200 content of the sample, and the D_{10} and D_{30} particle size. The natural water content of the samples taken in March, 1980 generally ranged from 3 to 7 percent (see Table 1).

Proctor Curves

The moisture-density relationships determined in general accordance with ASTM D 698 for the soil-bentonite mixtures were similar for the same sand borrow material. The maximum dry density for the secondary ash pond material ranged from 116.7 to 117.8 pounds per cubic foot (pcf) for 5 percent through 10 percent bentonite. For the stockpile material, the densities ranged from 119.2 to 119.9 pcf for the range of 5 to 10 percent bentonite. The optimum water content for all soil-bentonite samples ranged from 11.0 to 13.0 percent. These water contents represent a partially hydrated bentonite fraction. Fully hydrated bentonite will likely yield a lower density and higher water content, but these conditions are not likely unless the liner areas are inundated during construction.

Hydration Records

Following moisture-density (Proctor curves) testing, permeameters were prepared to simulate the specified compaction density (90 percent of the maximum dry density determined from ASTM D 698) and inundated to simulate pond saturation. The volumetric swell was measured on a daily basis up to 4 to 6 days. The plotted curves are attached. The hydration records illustrated the volumetric swell and decrease in dry density of the soil-bentonite samples as full hydration was achieved.

The higher bentonite fractions exhibited more swell as was expected. The finer sand material also exhibited more swell than expected. It also appears that this swell may progress several days beyond the 4 to 6 day hydration period. Generally the observed swell ranged from 2 percent upwards to 5 or 6 percent after 4 to 6 days. The actual swell in the field may be greater than measured since side friction restricts vertical swell in the permeameters. This side friction is caused by the swell pressure (normal force) on the permeameter wall and the ϕ friction developed from the sand. This side friction may be determined but it was not deemed necessary for this study.

Permeability Testing

The measured permeability for each permeameter is presented on Table 2. Relatively high flows were observed for the secondary ash pond 7B sample and the stockpile 7A sample. We anticipate that these flows were the result of poor mixing of the soil-bentonite prior to hydration. Two additional samples of secondary ash pond sand were prepared and tested which proved successful. Results of the different materials and bentonite percents are plotted in Figures 1 and 2. Although the limited number of data points are scattered, a trend of decreasing permeability with a higher bentonite fraction is indicated. This corroborated the hydration records presented early.

In interpreting the results, it is also important to consider the threshhold gradient phenomona the soil-bentonite may exhibit. Samples tested at high gradients may exhibit a lower permeability at a lower gradient. This effect may be significant especially for the secondary ash pond sand results.

RECOMMENDATIONS

Based on the test results available, we recommend a minimum 7 to 8 percent dry bentonite similar to the quality submitted for testing be added to all sands bounded by the fine and coarse gradation which were tested for permeability. These mixtures should be determined by the dry weight of both sand and bentonite. Any sands coarser than the secondary ash pond elevation 1170-1171 sample should be tested and reviewed before mixing with bentonite.

Although the construction specification a 2.2 limits the fine material passing the No. 200 sieve to 10 percent, we suggest that you pursue a waiver and utilize any silty materials available for the bentonite liner. The presence of the silt in the soil will enhance the effectiveness of the bentonite percent to give a more uniform product.

In order for the 7 to 8 percent bentonite mixture to be effective, the bentonite must be thoroughly mixed with the soil, on the subgrade or in a pug mill-type mixer. Even under laboratory conditions, thorough mixing was difficult. For subgrade mixing, we recommend a power driven rotary tiller be used for mixing both water and bentonite.

Before adding bentonite to sand, we recommend that the water content be raised to approximately 8 to 10 percent to wet all sand particle surfaces. For the pug mill, this water should be a added in advance of the bentonite and sprayed as a uniform fine mist or thoroughly mixed in a pug mill. For the subgrade, the moisture should be added and mixed thoroughly with the tiller immediately before applying and mixing bentonite. Proper overlap should be provided for both water and bentonite applications. Tilling should be performed in alternate orthogonal directions.

Specifications for the pug mill were not available for this report, but we anticipate that some experimentation may be necessary to determine a suitable mixing procedure. We anticipate that careful control and adjustment of water content for both bentonite and sand during construction will be necessary. Wet bentonite will not be conducive to pug mill or subgrade mixing. After pug mill mixing, the materials should be immediately placed and compacted in as thin a lift as practical (probably 4 inches), or protected from weather. During construction, we advise placing several lifts in as thin a compacted lift as possible in as small an area as possible. Thin lifts decrease the possibility of a window occurring and small work areas reduce exposure to changing weather conditions. If work areas become wet before complete placement of the liner, it may be necessary to remove the wet soil-bentonite material before placing or mixing additional lifts.

Any roots greater than 1/4-inch diameter present in the sand materials should be removed as they will affect the mixing procedure and compacted permeability. Materials with fine roots should also be rejected as this will affect the water content of the materials for bentonite proportioning.

Prior to beginning liner construction, we suggest the placement of a test pit to evaluate the field construction procedures and pug mill operation. This pad should be tested in the field at numerous locations for permeability after it is soaked or inundated. We request an opportunity to observe the mixing and placing techniques to have a better understanding of your equipment and pug mill operation.

GENERAL QUALIFICATIONS

The analyses and recommendations submitted in this report were based on the bentonite sand samples submitted for testing. The sand materials not bounded by the coarse and fine fractions should be submitted for review before mixing is performed. Careful control of sand gradations and water content for both bentonite and sand are extremely important during construction so any variations in the overall product are immediately identified. We recommend that a test pad be placed prior to initiating earthwork to understand your equipment and pug mill operation. It may also be necessary to make additional on-site observations and tests during construction, determine the characteristics of these variations and make a re-evaluation of the recommendations of this report. This report was prepared based on our understanding of the construction specifications and procedures described in the U. S. Army Corps of Engineers Manual EM1110-2-1906. It was necessary to make a number of assumptions regarding proposed hydraulic gradients, moisture contents, and densities of the compacted materials. It is recommended that we be provided an opportunity to briefly review all field operations on an interim basis to confirm that these procedures are consistent with the test results contained herein.

The long term performance of the soil-bentonite has not been assessed in this study. Soil-bentonite materials are known to deteriorate in an adverse chemical environment. Low or high pH conditions may affect bentonite performance. Brine solutions are also known to cause bentonite deterioration. Knowledge of the long term environmental exposure of the soil-bentonite was not available for this report, however, we recommend that these conditions be characterized by the consulting engineer.

We have appreciated the opportunity to provide testing and engineering services for you. If we may be of further assistance in discussing this report or in providing testing or inspection services during construction, please do not hesitate to contact us.

Yours very truly,

SOIL TESTING SERVICES OF WISCONSIN, INC.

Douglas J. Herm

Douglas J. Hermann, P. E.
Senior Project Engineer

William M. Perpich, P. E.
President

DJH/cs

Encl:

1. Table 1: Sand Borrow Material Gradation Summary
2. Table 2: Soil-Bentonite Permeameter Test Results
3. Figure 1: Permeability vs. Bentonite %, Secondary Ash Pond
4. Figure 2: Permeability vs. Bentonite %, East Face, North End Storage Pond
5. Hydration Records
6. Gradation Curves
7. Proctor Curves
8. Permeability Test Results

cc: Sargent & Lundy Engineers
55 East Monroe Street
Chicago, Illinois 60603
Attn: Mr. Dan Bodine
Location 28F02

Sargent & Lundy Engineers
55 East Monroe Street
Chicago, Illinois 60603
Attn: Mr. Sid Sen
Location 29H16

Wisconsin Public Service Corporation
Weston Site No. 3
Weston, Wisconsin 54471
Attn: Mr. Tom Lynch

Richard Kirchner
Soil Testing Services of Wisconsin, Inc.

TABLE 1

SAND BORROW MATERIAL GRADATION SUMMARY

Sample	P gravel	P200	D_{60}	D_{50}	D_{30}	D_{10}	Cu	Cc	Natural Water Content 3-80
Coal Storage Area (NW Area) Elev. 1175	17	2.3	0.71	0.49	0.39	0.25	2.84	0.86	-
Coal Storage Area (East Area) Elev. 1175-1176	8	0.4	0.52	0.48	0.42	0.28	1.86	1.21	-
Coal Storage Area (South Center) Approx. Elev. 1177	14	1.8	0.80	0.55	0.40	0.25	3.20	0.80	-
Existing Stockpile East Face (north end)	15	3.9	0.67	0.49	0.40 (finest)	0.20	3.25	1.19	6.6
Secondary Ash Pond Elev. 1170-1171	13	0	0.81	0.66	0.52 (coarsest)	0.35	2.31	0.95	3.2
Existing Stockpile East Face (center)	10	1.4	0.58	0.51	0.37	0.20	2.90	0.90	5.4
Secondary Ash Pond Elev. 1176-1173	17	3.2	0.75	0.55	0.42	0.26	2.88	0.90	5.3

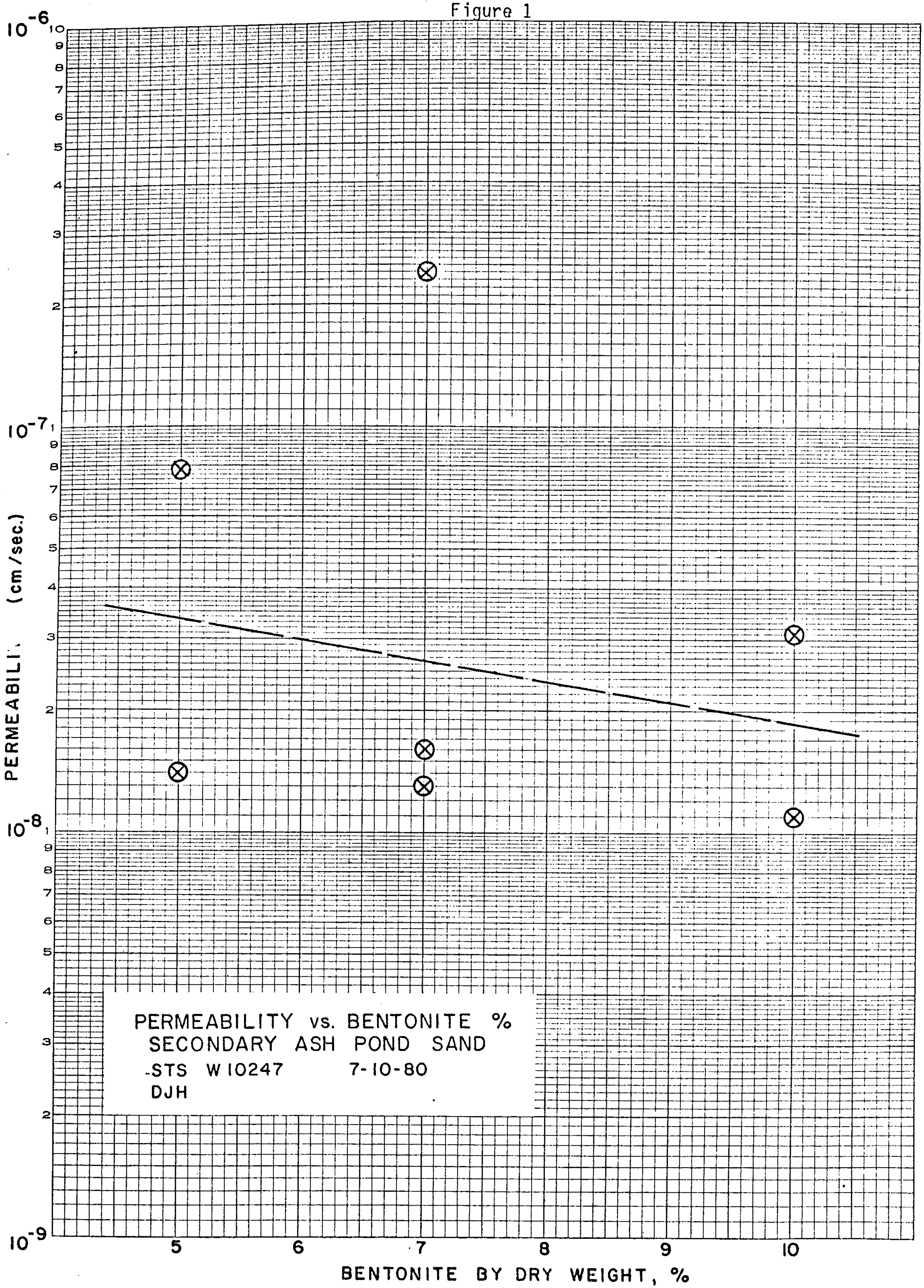
STS Job 10247

Table 2

SOIL-BENTONITE PERMEAMETER TEST RESULTS

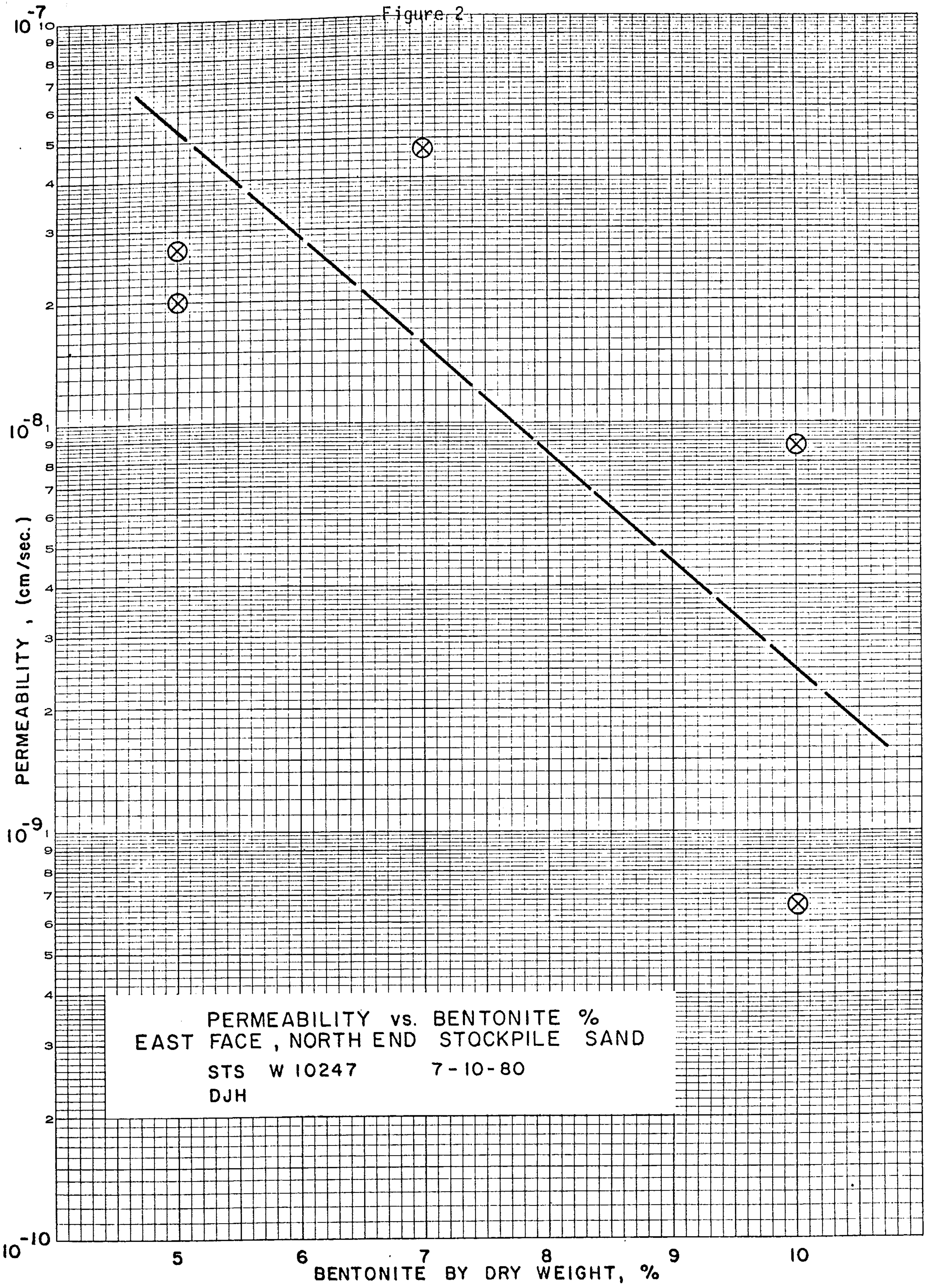
Sample	Percent Bentonite	ASTM D 698 d max.PCF	ASTM D 698 Opt.WC,%	Permeameter density before hydration,PCF	Projected Permeameter Density After Hydration,PCF	Average Hydraulic Gradient	Average Permeability cm/sec.	Remarks
Secondary	5A	117.8	11.9	106.4(90%)	104.0	17	$1.4x10^{-8}$	
Ash Pond	5B	117.8	11.9	106.4(90%)	103.5	17	$7.8x10^{-8}$	
Sand	7A	116.7	13.0	106.5(91%)	103.2	17	$2.4x10^{-7}$	
	7B	116.7	13.0	104.4(89%)	100.0	17	$2.9x10^{-4}$	Developed small leak
	7C	116.7	13.0	107.0(92%)	103.0	85	$1.3x10^{-8}$	
	7D	116.7	13.0	106.1(91%)	102.0	85	$1.6x10^{-8}$	
	10A	117.2	11.0	104.7(89%)	99.3	47	$3.1x10^{-8}$	
	10B	117.2	11.0	105.5(90%)	100.6	112	$1.1x10^{-8}$	
East Face	5A	119.2	11.5	107.9(91%)	105.0	17	$2.7x10^{-8}$	
North End	5B	119.2	11.5	108.9(91%)	105.3	17	$2.0x10^{-8}$	
Stockpile	7A	119.4	11.0	107.3(90%)	103.0	16	Sample developed leak	
Sand	7B	119.4	11.0	107.5(90%)	103.0	46	$4.7x10^{-8}$	
	10A	119.9	11.5	107.1(89%)	102.0	46	$8.8x10^{-9}$	
	10B	119.9	11.5	107.8(90%)	103.0	47	$6.6x10^{-10}$	

Figure 1

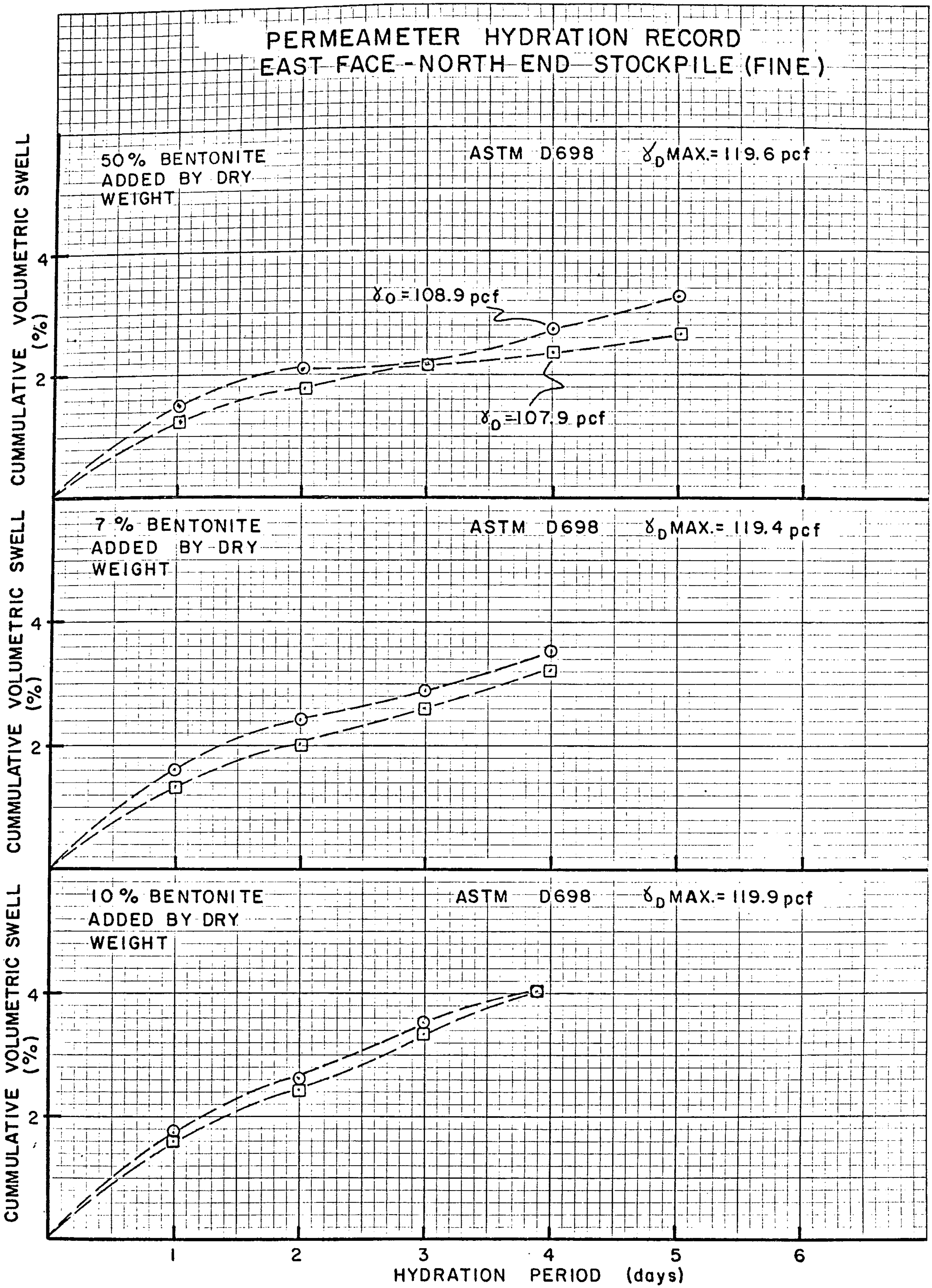


10^{-6}
10^{-7}
10^{-8}
10^{-9}
PERMEABILI
(cm/sec.)
5
6
7
8
9
10
BENTONITE BY DRY WEIGHT, %
PERMEABILITY vs. BENTONITE %
SECONDARY ASH POND SAND
-STS W10247 7-10-80
DJH

Figure 2

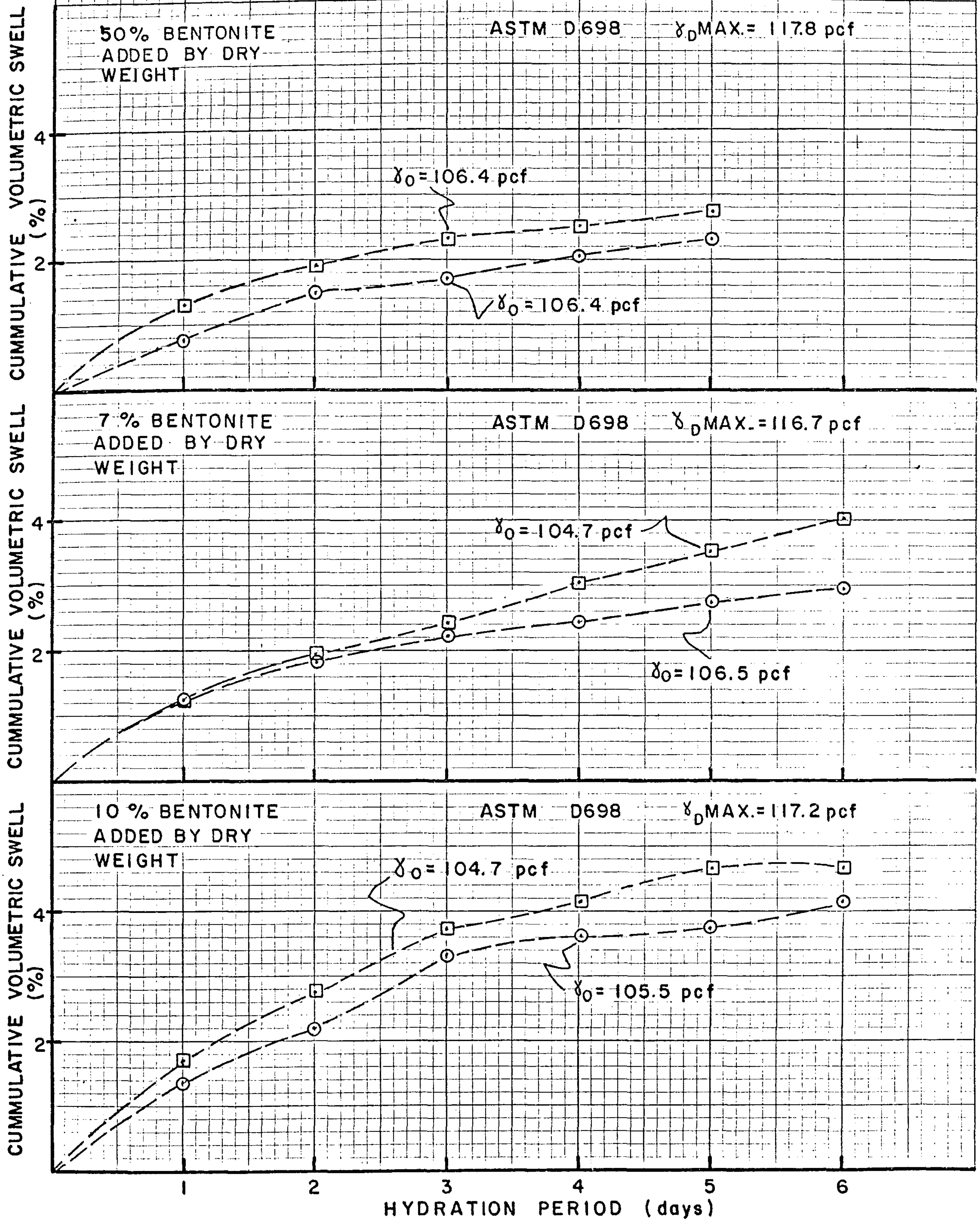


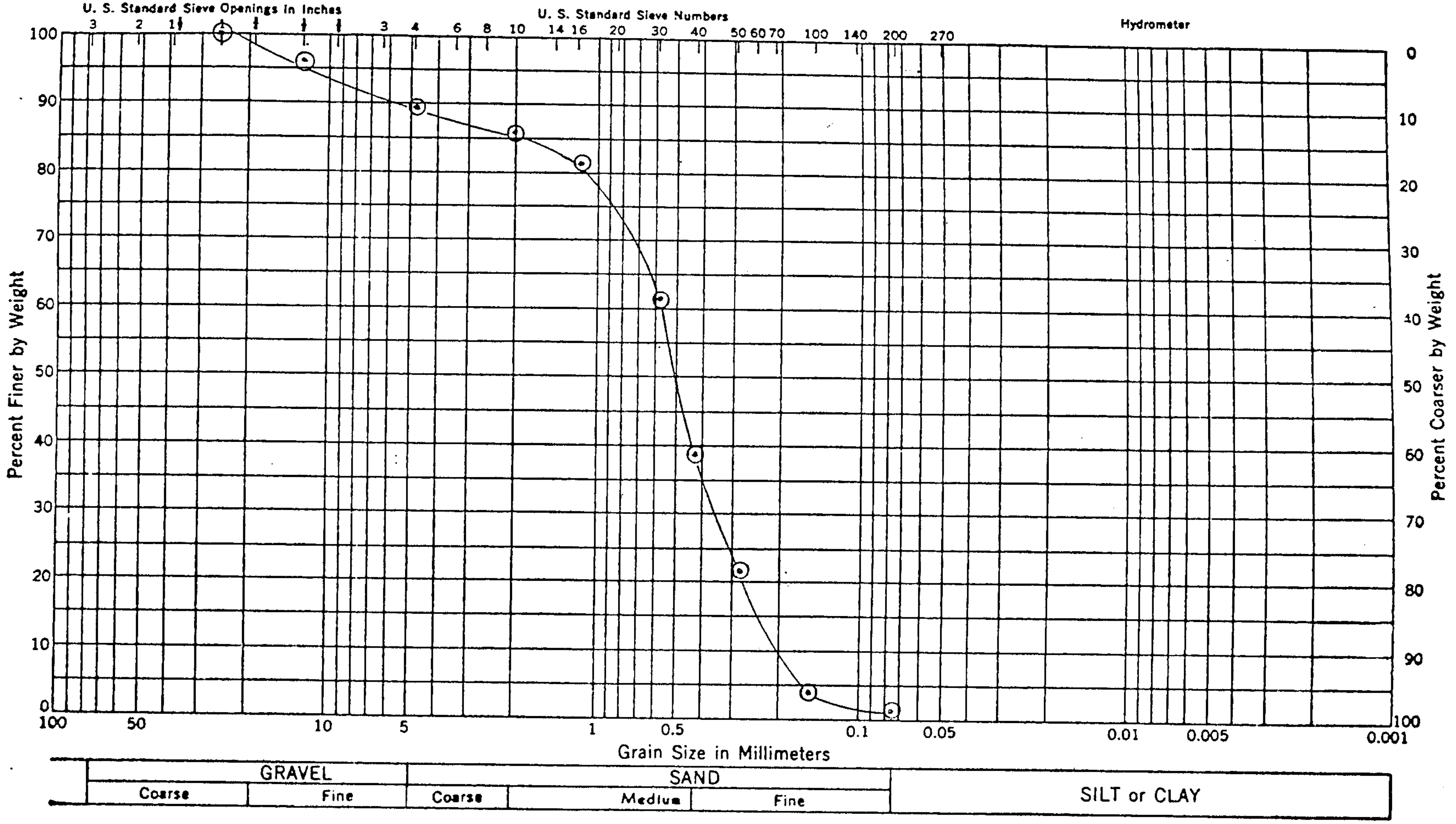
PERMEABILITY vs. BENTONITE %
EAST FACE , NORTH END STOCKPILE SAND
STS W 10247 7-10-80
DJH



PERMEAMETER HYDRATION RECORD
EAST FACE - NORTH END STOCKPILE (FINE)

PERMEAMETER HYDRATION RECORD
SECONDARY ASH POND (COARSE)



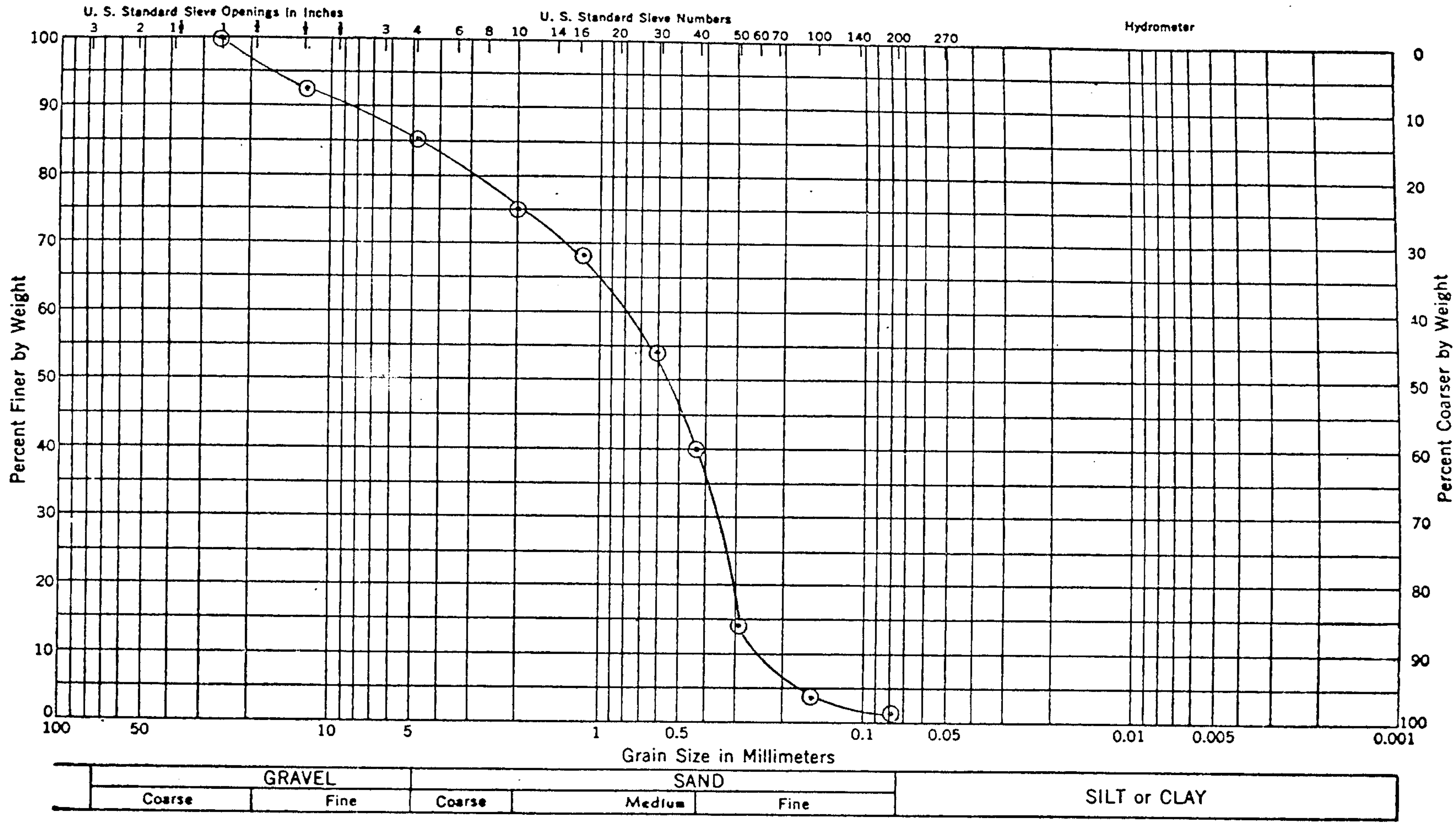


BORING	SAMPLE	DEPTH	SYMBOL	D_{10}	D_{30}	D_{60}	C_u	C_c	CLASSIFICATION
				0.20	0.36	0.58	2.9	1.12	
				FINE	TO	MEDIUM	SAND,		TRACE
				FINE	GRAVEL		, TRACE		SILT
				1.4 %	PASSING		No.	200	SIEVE

SOIL BENTONITE LINING
WESTON UNIT-3
SAMPLE FROM EXISTING
STOCKPILE EAST-FACE
CENTER

SOIL TESTING SERVICES
OF WISCONSIN, INC.

DRAWN	APPROVED	DATE	JOB No.
		4-14-86	10247



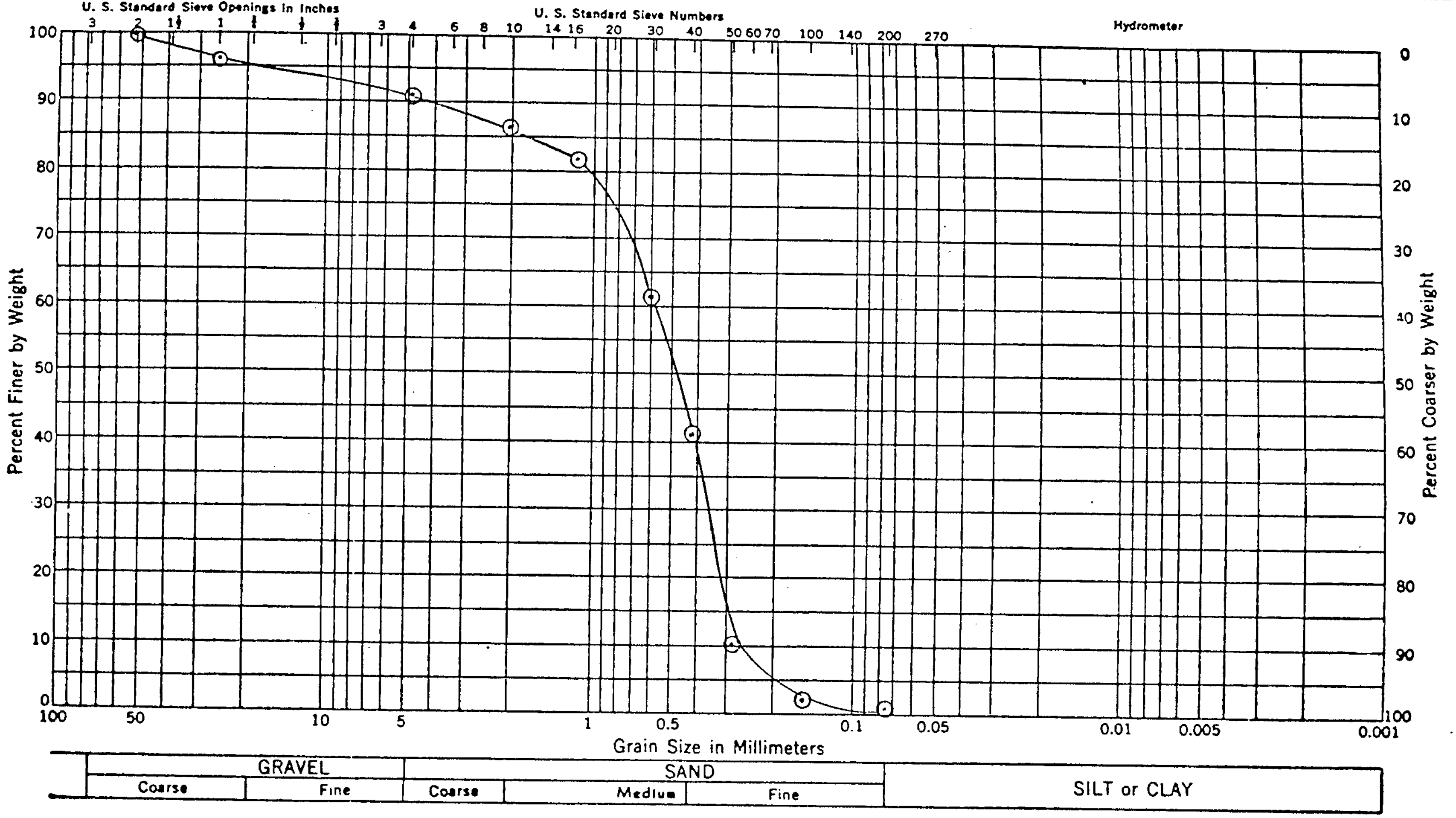
BORING	SAMPLE	DEPTH	SYMBOL	D_{10}	D_{30}	D_{60}	C_u	C_c	CLASSIFICATION
				0.25	0.40	0.80	3.20	0.80	SP

FINE TO MEDIUM SAND, LITTLE
FINE GRAVEL, TRACE SILT,
BROWN (SP)
1.8% PASSING No. 200 SIEVE

SOIL BENTONITE LINING
WESTON UNIT-3
SAMPLE FROM COAL STORAGE
AREA (SOUTH CENTER)
APPROX. EL. +1177

SOIL TESTING SERVICES
OF WISCONSIN, INC.

DRAWN	APPROVED	DATE	JOB No.
		4-8-80	10247



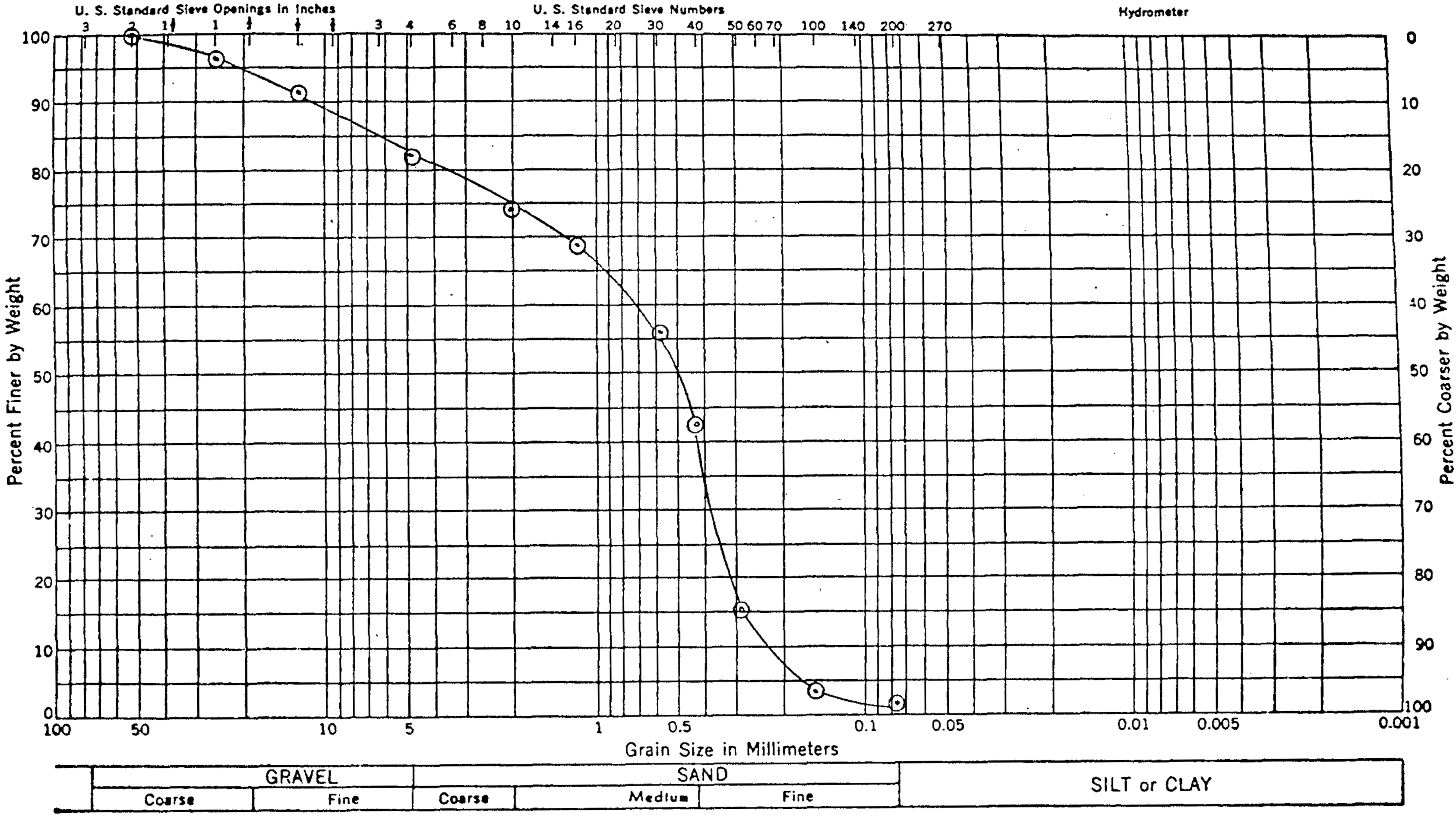
BORING	SAMPLE	DEPTH	SYMBOL	D_{10}	D_{30}	D_{60}	C_u	C_c	CLASSIFICATION
				0.28	0.42	0.52	1.86	1.21	SP

FINE TO MEDIUM SAND, LITTLE FINE
TO MEDIUM GRAVEL, TRACE SILT,
BROWN (SP) 2.3% PASSING No.200
SIEVE

SOIL BENTONITE LINING
WESTON UNIT-3
SAMPLE FROM COAL
STORAGE AREA (EAST AREA)
APPROX. EL+1175 to 1176

SOIL TESTING SERVICES
OF WISCONSIN, INC

DRAWN	APPROVED	DATE	JOB No.
		4-8-80	



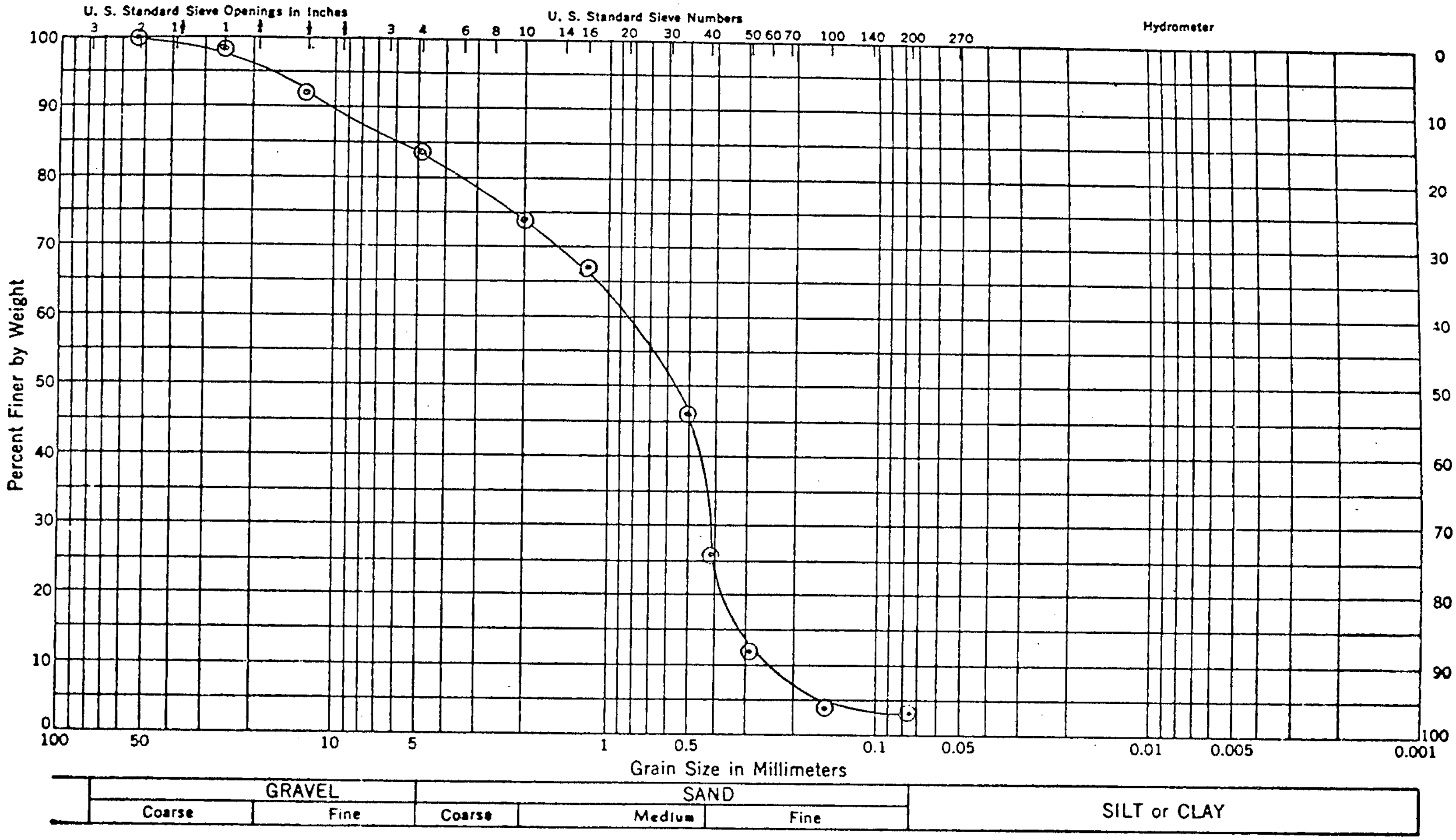
BORING	SAMPLE	DEPTH	SYMBOL	D_{10}	D_{30}	D_{60}	C_u	C_c	CLASSIFICATION
				0.25	0.39	0.71	2.84	0.86	SP

FINE TO MEDIUM SAND, LITTLE
FINE TO MEDIUM GRAVEL,
TRACE SILT, BROWN (SP)
2.3 % PASSING No. 200 SIEVE

SOIL BENTONITE LINING
WESTON UNIT-3
SAMPLE FROM COAL
STORAGE AREA (NW AREA)
APPROX. EL. +1175

SOIL TESTING SERVICES
OF WISCONSIN, INC.

DRAWN	APPROVED	DATE	JOB No.
		4-8-80	10247

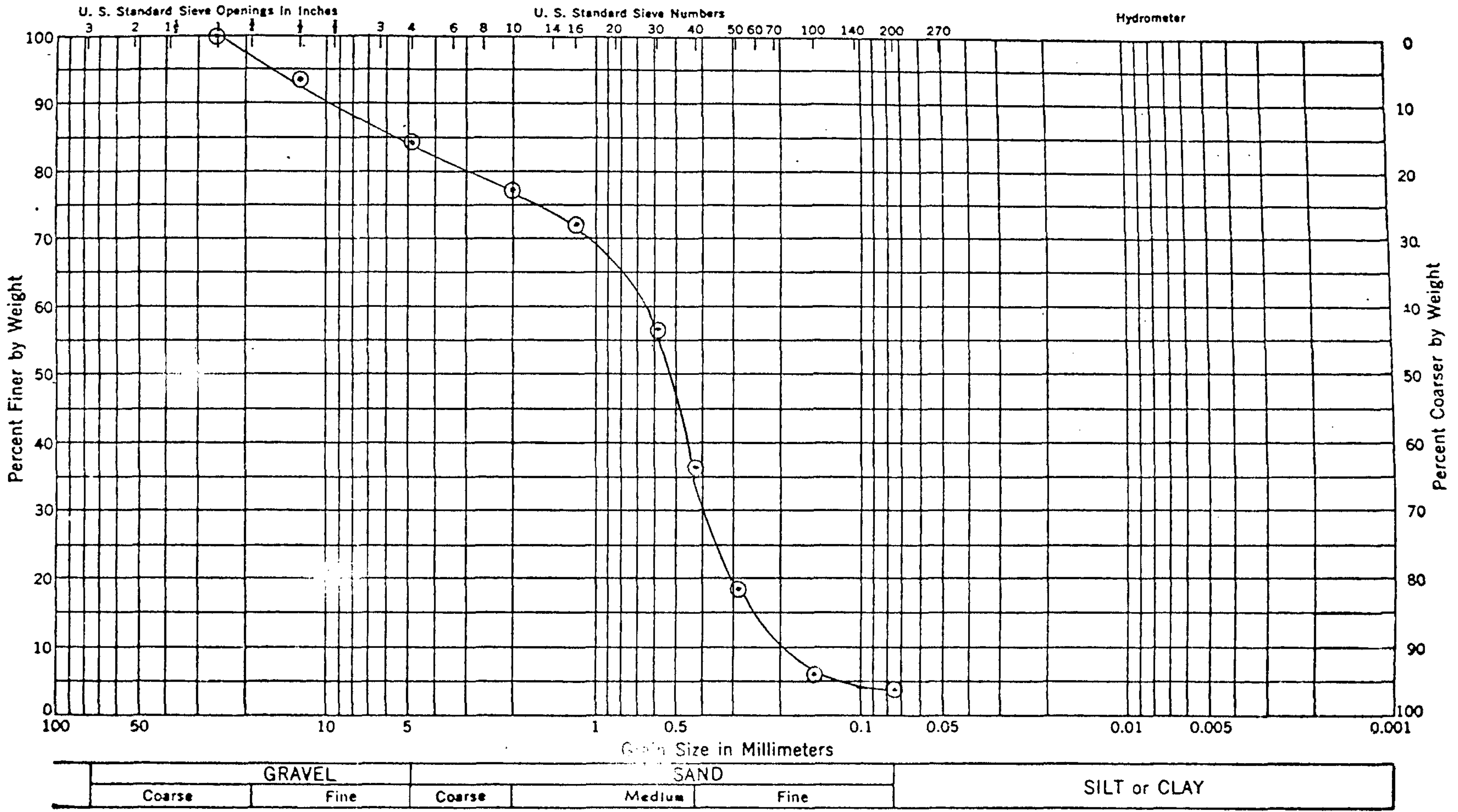


BORING	SAMPLE	DEPTH	SYMBOL	D_{10}	D_{30}	D_{60}	C_u	C_c	CLASSIFICATION
				0.26	0.41	0.76	2.92	0.85	
				FINE TO MEDIUM SAND, LITTLE					
				FINE TO MEDIUM GRAVEL - TRACE					
				SILT					
				3.2% PASSING No. 200 SIEVE					

SOIL BENTONITE LINING
WESTON UNIT-3
SAMPLE FROM COAL
STORAGE AREA
ELEV. +1176 - 1173

SOIL TESTING SERVICES
OF WISCONSIN, INC.

DRAWN	APPROVED	DATE	JOB No.
		4-4-80	10247



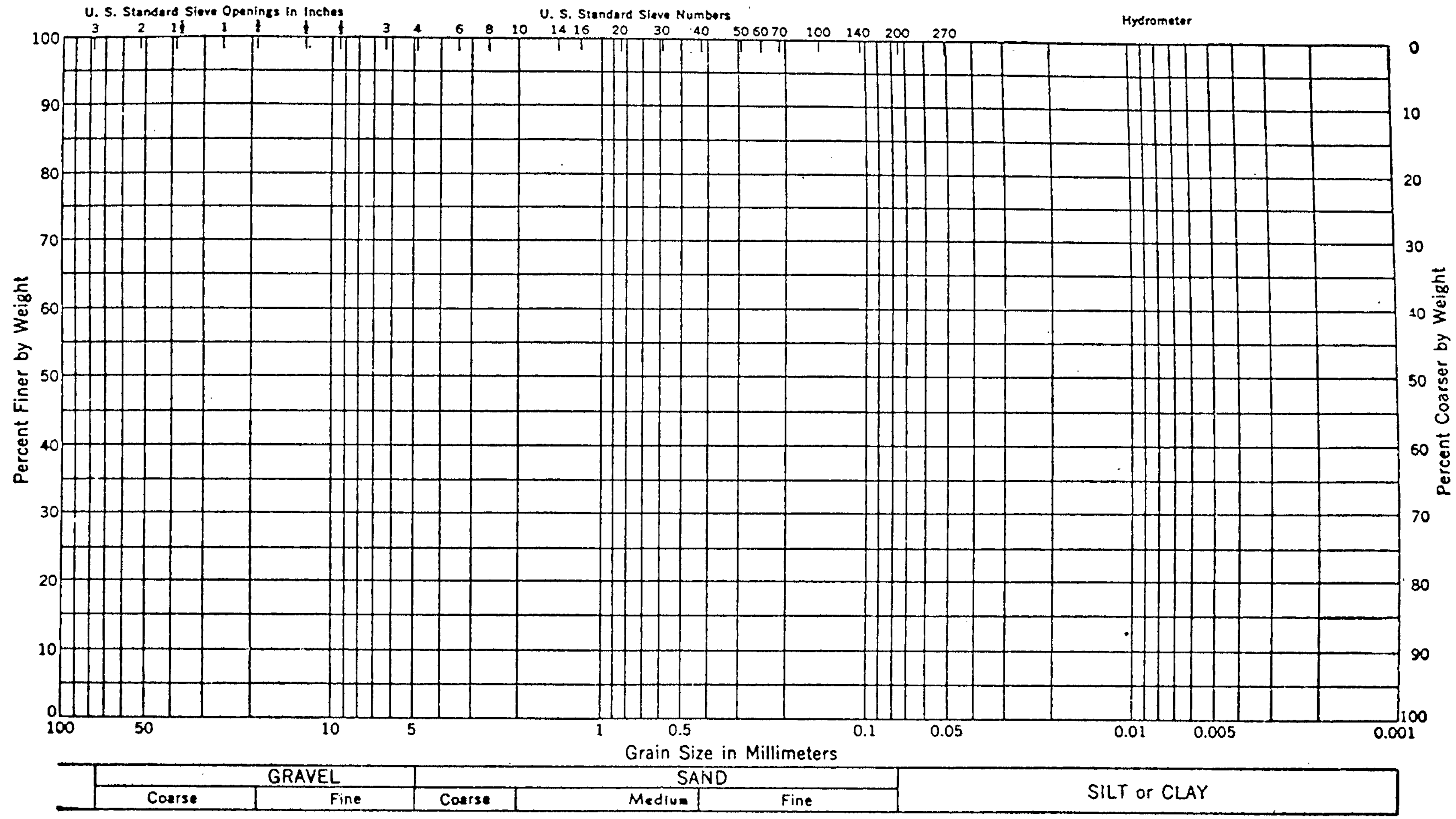
BORING	SAMPLE	DEPTH	SYMBOL	D_{10}	D_{30}	D_{60}	C_u	C_c	CLASSIFICATION
				0.20	0.40	0.66	3.3	1.21	SP

FINE TO MEDIUM SAND (SP)
LITTLE FINE TO MEDIUM
GRAVEL, TRACE SILT
3.9 % PASSING No. 200
SIEVE

SOIL BENTONITE LINING
WESTON UNIT-3
SAMPLE FROM EXISTING
STOCKPILE - EAST FACE
NORTH END

SOIL TESTING SERVICES
OF WISCONSIN, INC.

DRAWN	APPROVED	DATE	JOB No.
		4-14-80	10247



BORING	SAMPLE	DEPTH	SYMBOL	D_{10}	D_{30}	D_{60}	C_u	C_c	CLASSIFICATION
				0.33	0.51	0.80	2.42	.99	SP
				FINE TO MEDIUM SAND (SP)					
				LITTLE FINE TO MEDIUM					
				GRAVEL					
				0% PASSING No. 200 SIEVE					

SOIL BENTONITE LINING
WESTON UNIT-3
SAMPLE FROM
SECONDARY ASH POND
ELEV. 1170-1171

SOIL TESTING SERVICES
OF WISCONSIN, INC

DRAWN	APPROVED	DATE	JOB No.
		4-14-80	10247

SOIL TESTING SERVICES OF WISCONSIN, INC.
540 LAMBEAU ST., GREEN BAY, WIS. 54303
PHONE (414) 494-9656

Date 5-2-80

Job No. W-10247

COMPACTION CONTROL REPORT

1. Laboratory Compaction Test Data

A. Description of Soil: BROWN FINE - MEDIUM SAND (SP) LITTLE FINE GRAVEL - TRACE SILT WITH 5% BENTONITE ADDED

Material Mark ______ Classification SP AASHO BPR

Source of Material EAST FACE - NORTH END STOCKPILE SAND AND BENTONITE

Natural Water Content ____ % Natural Dry Density ____ PCF Specific Gravity ____

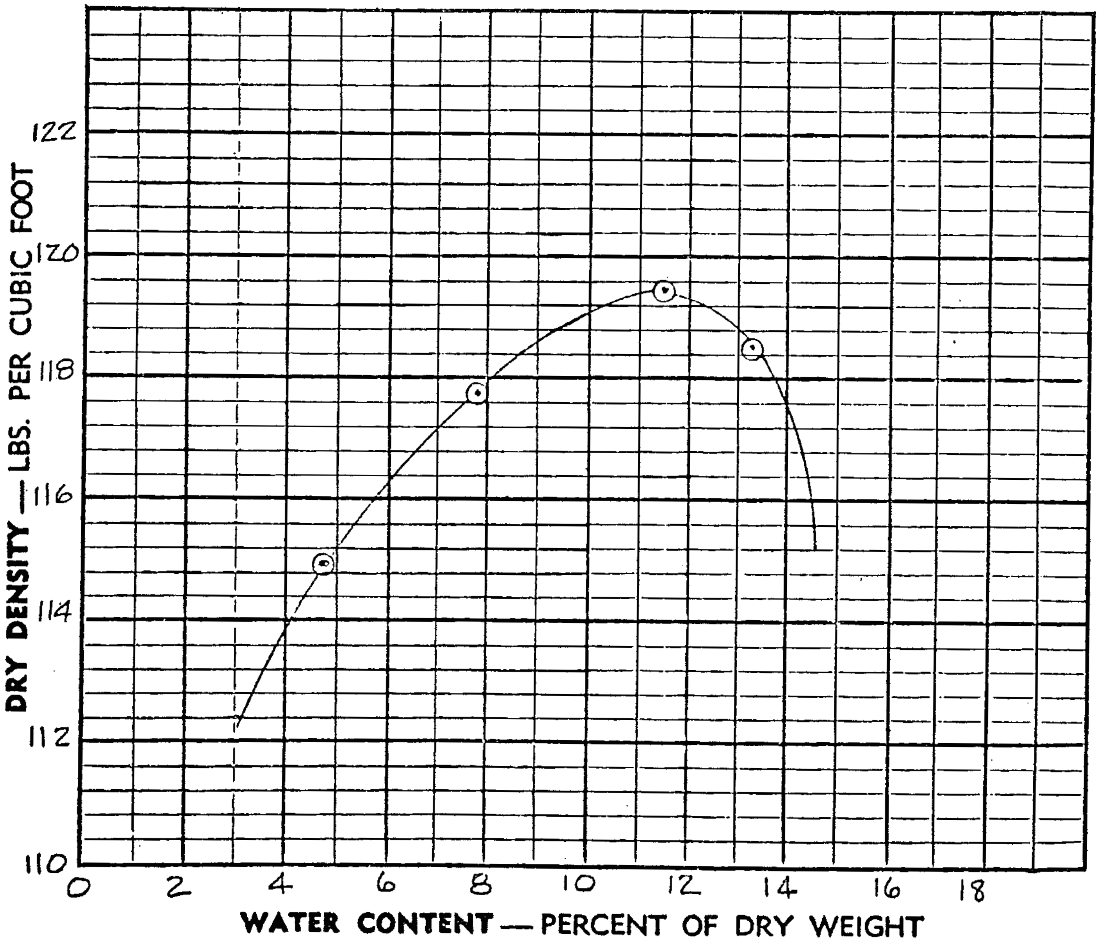
Liquid Limit ____ % Plastic Limit ____ % Plasticity Index ____

B. Test Procedure Used: ASTM D-698 METHOD "B"

C. Test Results:

Optimum Water Content 11.5 %

Maximum Dry Density 119.6 PCF (at a Wet Density of 133.4 PCF)



SOIL TESTING SERVICES OF WISCONSIN, INC.
540 LAMBEAU ST., GREEN BAY, WIS. 54303
PHONE (414) 494-9656

Date 5-2-80 Job No. W 10247

COMPACTION CONTROL REPORT

1. Laboratory Compaction Test Data

A. Description of Soil: BROWN FINE-MEDIUM SAND (SP) LITTLE FINE GRAVEL - TRACE SILT WITH 7% BENTONITE ADDED

Material Mark ________ Classification ________ AASHO BPR

Source of Material EAST FACE - NORTH END STOCKPILE SAND-BENTONITE

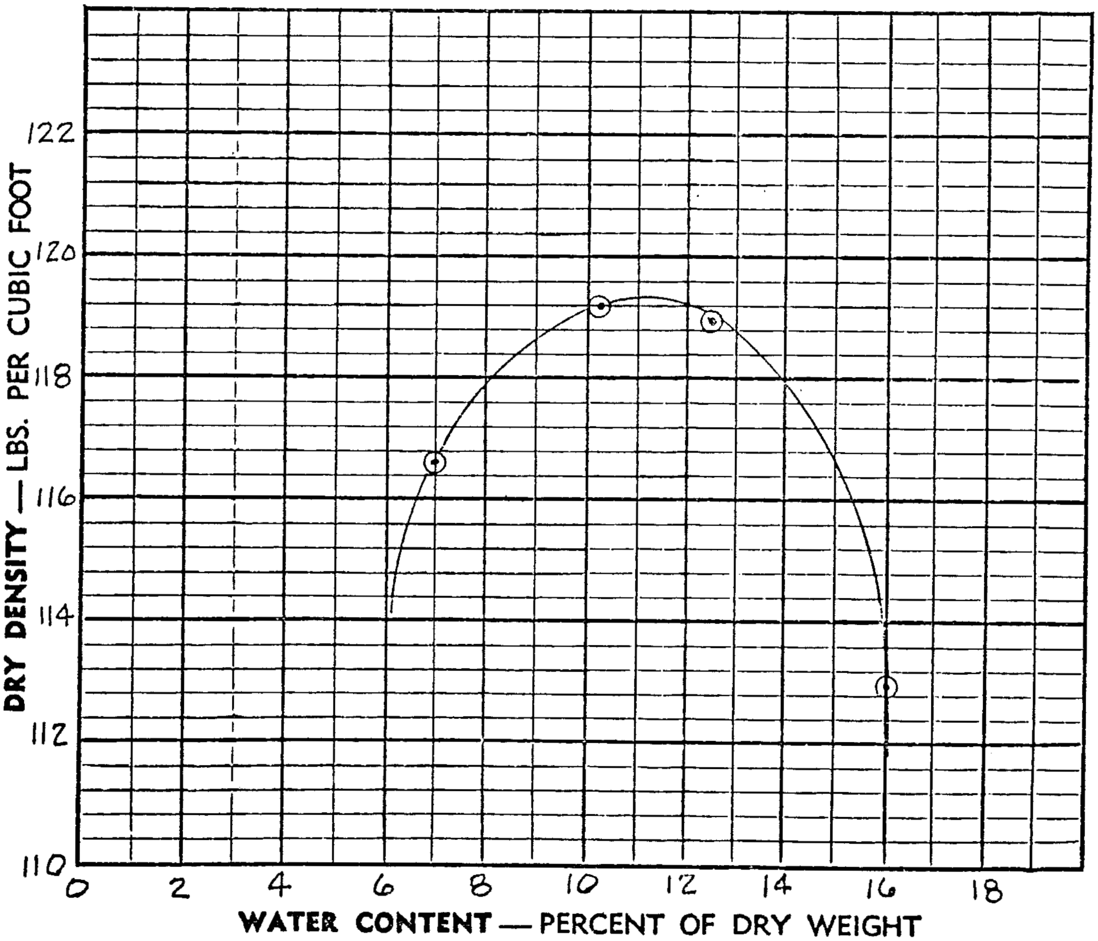
Natural Water Content ____ % Natural Dry Density ____ PCF Specific Gravity ____

Liquid Limit ____ % Plastic Limit ____ % Plasticity Index ____

B. Test Procedure Used: ASTM D-698 METHOD "B"

C. Test Results: Optimum Water Content 11.0 %

Maximum Dry Density 119.4 PCF (at a Wet Density of 132.5 PCF)



SOIL TESTING SERVICES OF WISCONSIN, INC.
540 LAMBEAU ST., GREEN BAY, WIS. 54303
PHONE (414) 494-9656

Date 5-3-80

Job No. W 10247

COMPACTION CONTROL REPORT

1. Laboratory Compaction Test Data

A. Description of Soil: BROWN FINE TO MEDIUM SAND (SP) LITTLE FINE GRAVEL - TRACE SILT WITH 10% BENTONITE ADDED

Material Mark ______ Classification ______ AASHO BPR

Source of Material EAST FACE - NORTH END - STOCKPILE SAND-BENTONITE

Natural Water Content ______% Natural Dry Density ______PCF Specific Gravity ______

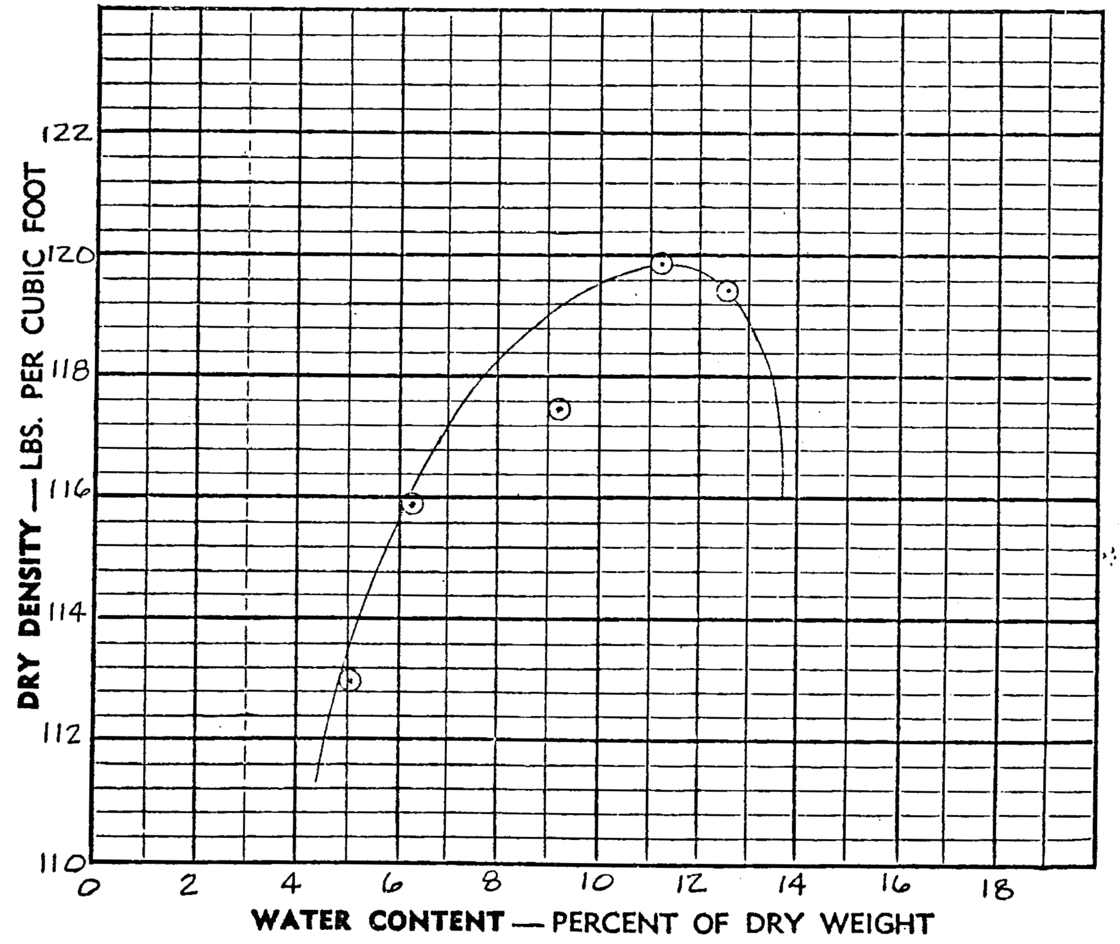
Liquid Limit ______% Plastic Limit ______% Plasticity Index ______

B. Test Procedure Used: ASTM D-698 METHOD "B"

C. Test Results:

Optimum Water Content 11.5 %

Maximum Dry Density 119.9 PCF (at a Wet Density of 133.7 PCF)



SOIL TESTING SERVICES OF WISCONSIN, INC.
540 LAMBEAU ST., GREEN BAY, WIS. 54303
PHONE (414) 494-9656

Date 5-7-80

Job No. W 10247

COMPACTION CONTROL REPORT

1. Laboratory Compaction Test Data

A. Description of Soil: BROWN FINE TO MEDIUM SAND (SP) LITTLE FINE GRAVEL WITH 5% BENTONITE ADDED

Material Mark

Classification SP AASHO BPR

Source of Material SECONDARY ASH POND SAND - BENTONITE

Natural Water Content % Natural Dry Density PCF Specific Gravity

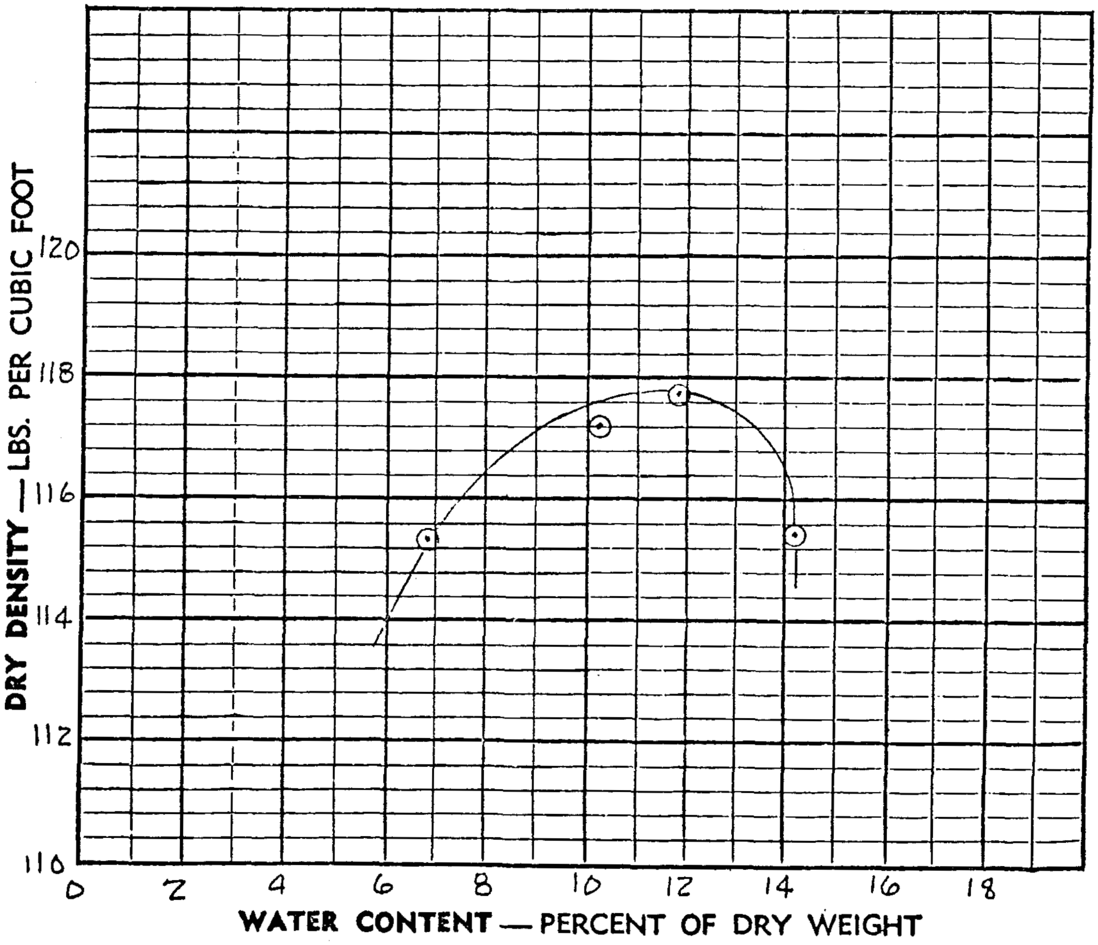
Liquid Limit % Plastic Limit % Plasticity Index

B. Test Procedure Used: ASTM D-698 METHOD "B"

C. Test Results:

Optimum Water Content 11.9 %

Maximum Dry Density 117.8 PCF (at a Wet Density of 131.8 PCF)



SOIL TESTING SERVICES OF WISCONSIN, INC.
540 LAMBEAU ST., GREEN BAY, WIS. 54303
PHONE (414) 494-9656

Date 5-7-80

Job No. W-10247

COMPACTION CONTROL REPORT

1. Laboratory Compaction Test Data

A. Description of Soil: BROWN FINE TO MEDIUM SAND (SP) LITTLE FINE GRAVEL WITH 7% BENTONITE ADDED

Material Mark ______ Classification ______ AASHO BPR

Source of Material SECONDARY ASH POND SAND-BENTONITE

Natural Water Content ______% Natural Dry Density ______PCF Specific Gravity ______

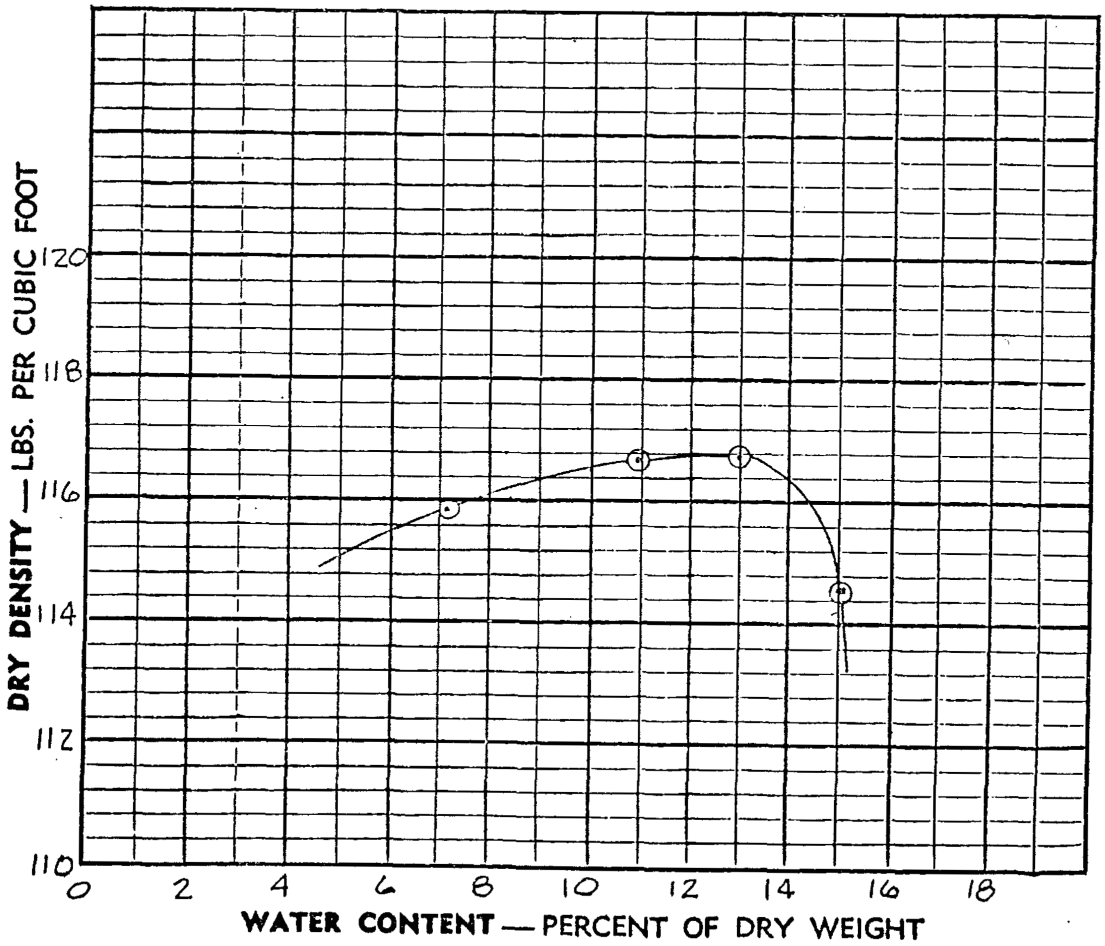
Liquid Limit ______ % Plastic Limit ______ % Plasticity Index ______

B. Test Procedure Used: ASTM D-698
METHOD "B"

C. Test Results:

Optimum Water Content 13.0 %

Maximum Dry Density 116.7 PCF (at a Wet Density of 131.9 PCF)



SOIL TESTING SERVICES OF WISCONSIN, INC.
540 LAMBEAU ST., GREEN BAY, WIS. 54303
PHONE (414) 494-9656

Date 5-7-80

Job No. W 10247

COMPACTION CONTROL REPORT

1. Laboratory Compaction Test Data

A. Description of Soil: BROWN FINE TO MEDIUM SAND (SP) LITTLE FINE GRAVEL WITH 10% BENTONITE ADDED

Material Mark ______ Classification (SP) AASHO BPR

Source of Material SECONDARY ASH POND SAND- BENTONITE

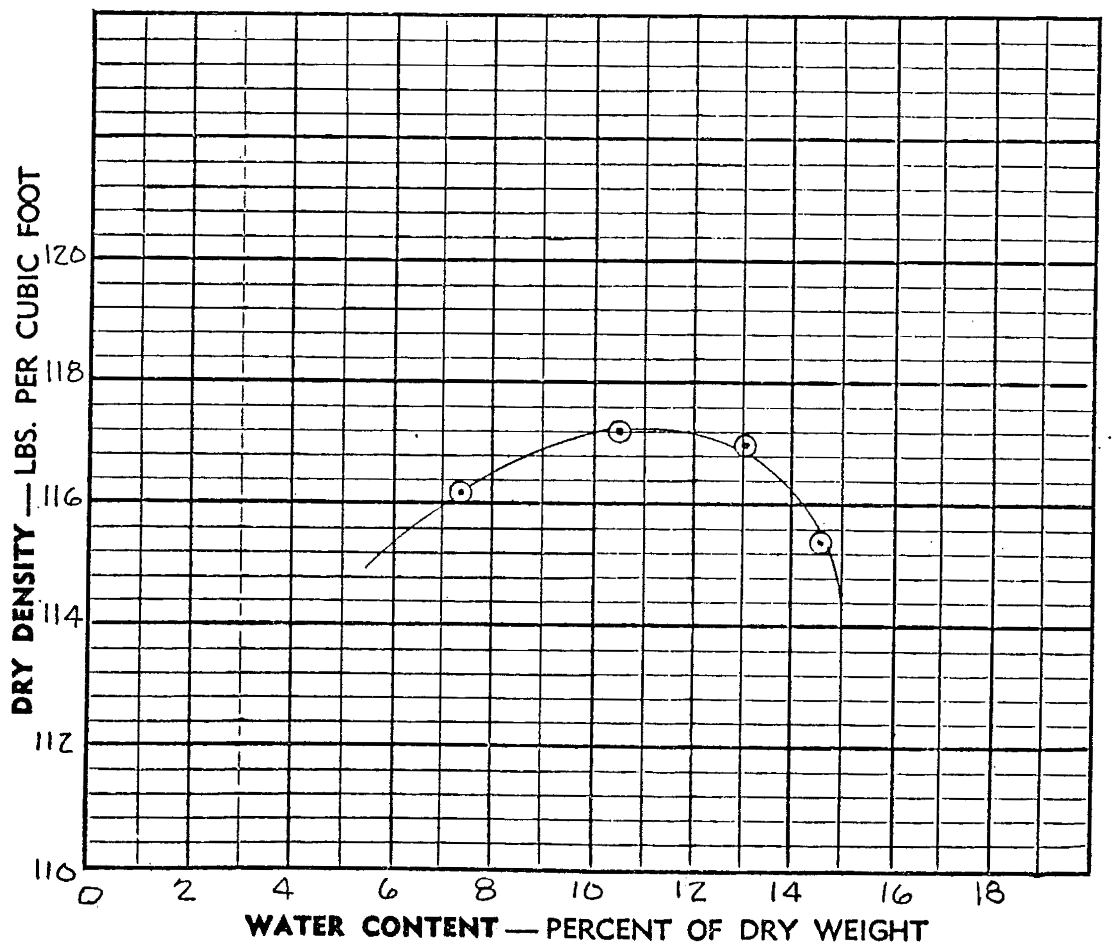
Natural Water Content ______% Natural Dry Density ______PCF Specific Gravity ______

Liquid Limit ______ % Plastic Limit ______ % Plasticity Index ______

B. Test Procedure Used: ASTM D-698 METHOD "B"

C. Test Results: Optimum Water Content 11.0 %

Maximum Dry Density 117.2 PCF (at a Wet Density of 130.1 PCF)



SOIL TESTING SERVICES, OF WIS., INC.

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

PERMEABILITY TEST

Constant Head

Sample A-7% bentonite mixed with secondary ash pond sand

Soil Description Brown fine to medium sand (SP) little fine gravel w/7% P200 bentonite

Mark No. 7%A, Secondary Ash Pond

Compacted Dry Density = 106.5 PCF Six day hydrated dry density = 103.2 PCF

Moisture 6.6% "During Compaction"

Sample Diameter = 4.0" Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability cm/sec	Remarks
1	74	1305	3.3×10^{-7}	
2	72	1460	2.0×10^{-7}	
3	71	1440	1.8×10^{-7}	
		Average =	2.4×10^{-7} cm/sec	Possible small wall leak.

SOIL TESTING SERVICES, OF WIS., INC.

PERMEABILITY TEST

Constant Head

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

Sample B-5% bentonite mixed with secondary ash pond sand

Soil Description Brown fine to medium sand (SP) little fine gravel w/5% P200 bentonite

Mark No. 5% B, Secondary ash pond

Compacted Dry Density = 106.4 PCF Five day hydrated dry density=103.5 PCF

Moisture 7.0% "During compaction"

Sample Diameter = 4.0 Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability $^{cm}/_{sec}$	Remarks
1	72	1350	1.8×10^{-7}	
2	71	1470	3.9×10^{-8}	
3	71	1440	1.7×10^{-8}	

Average = 7.8×10^{-8} $^{cm}/_{sec}$

SOIL TESTING SERVICES, OF WIS., INC.

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

PERMEABILITY TEST

Constant Head

Sample A-, 5 % bentonite mixed with secondary ash pond sand

Soil Description Brown fine to med. sand (SP) little fine gravel with 5% P200 bentonite

Mark No. 5% A, Secondary Ash Pond

Compacted Dry Density = 106.4 PCF

Five Day hydrated dry density=104.0PCF

Moisture 7.0 % "During compaction"

Sample Diameter = 4.0"

Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability cm/sec	Remarks
1	72	1350	1.4×10^{-8}	
2	71	1470	1.9×10^{-8}	
3	71	1440	1.0×10^{-8}	
		Average =	1.4×10^{-8} cm/sec	

SOIL TESTING SERVICES, OF WIS., INC.

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

PERMEABILITY TEST

Constant Head

Sample B-7% bentonite mixed with secondary ash pond sand

Soil Description Brown fine to medium sand (SP) little fine gravel w/7% P200 bentonite

Mark No. 7% B, secondary ash pond

Compacted Dry Density = 104.4 Six day hydrated dry density=100.0 PCF

Moisture 6.6% "During Compaction"

Sample Diameter = 4.0" Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability cm/sec	Remarks
1	75	5	2.1×10^{-4}	
2	72	3	2.8×10^{-4}	
3	71	8	2.9×10^{-4}	
4	68	3	3.6×10^{-4}	
		Average =	2.9×10^{-4} cm/sec	

Another sample remixed hydrated and compacted.

SOIL TESTING SERVICES, OF WIS., INC.

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

PERMEABILITY TEST

Constant Head

Sample C-7% bentonite mixed with secondary ash pond sand

Soil Description Brown fine to medium sand (SP) little fine gravel w/7% P200 bentonite

Mark No. 7% C, Secondary Ash pond

Compacted Dry Density = 107.0 PCF Five day hydrated dry density= 103 PCF

Moisture 7.9% "During Compaction"

Sample Diameter = 4.0" Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability cm/sec	Remarks
1	362" (Bilpsi)	106	2.1×10^{-8}	
2	362"	278	1.7×10^{-8}	
3	362"	1219	1.3×10^{-8}	
4	361"	4224	1.1×10^{-8}	
5	361"	173	1.1×10^{-8}	
6	361"	326	1.1×10^{-8}	
7	361"	833	9.0×10^{-9}	
8	360"	325	9.7×10^{-9}	
9	360"	283	1.0×10^{-8}	
		Average =	1.3×10^{-8} cm/sec	

SOIL TESTING SERVICES, OF WIS., INC.

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

PERMEABILITY TEST

Constant Head

Sample D-7% bentonite mixed with secondary ash pond sand

Soil Description Brown fine to medium sand (SP) little fine gravel w/7% P200 bentonite

Mark No. 7% D, secondary ash pond

Compacted Dry Density = 106.1 PCF

Five day hydrated dry density approximately 102.0 PCF

Moisture 6.1% "During Compaction"

Sample Diameter = 4.0"

Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability cm/sec	Remarks
1	362	110	2.6×10^{-8}	
2	362	275	2.1×10^{-8}	
3	362	1220	1.8×10^{-8}	
4	361	4225	1.6×10^{-8}	
5	361	173	1.4×10^{-8}	
6	361	326	1.6×10^{-8}	
7	361	834	1.1×10^{-8}	
8	360	324	1.3×10^{-8}	
9	360	283	1.3×10^{-8}	

Average = 1.6×10^{-8} cm/sec

SOIL TESTING SERVICES, OF WIS., INC.

PERMEABILITY TEST

Constant Head

Project No. ______________

STS Job No. W10247

Date 7-10-80

Report No. ______________

Sample A-10% bentonite mixed with secondary ash pond sand

Soil Description Brown fine to medium sand (SP) little fine gravel w/10% P200 bentonite

Mark No. 10% A, secondary ash pond

Compacted Dry Density = 104.7 PCF Six day hydrated dry density = 99.3 PCF

Moisture 7.4 % "During Compaction"

Sample Diameter = 4.0" Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability cm/sec	Remarks
	180	315	$1.3x\ 10^{-7}$	
1	180	1005	4.5×10^{-8}	Saturation Complete
2	180	515	3.1×10^{-8}	
3	235	970	3.9×10^{-8}	
4	235	425	2.9×10^{-8}	

Average = 3.6×10^{-8} cm/sec

SOIL TESTING SERVICES, OF WIS., INC.

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

PERMEABILITY TEST

Constant Head

Sample B-10% bentonite mixed with secondary ash pond sand

Soil Description Brown fine to medium sand (SP) little fine gravel w/10% P200 bentonite

Mark No. 10% -B, secondary ash pond

Compacted Dry Density = 105.5 PCF Six day hydrated dry density = 100.6 PCF

Moisture 7.4% "During Compaction"

Sample Diameter = 4.0"

Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability $^{cm}/sec$	Remarks
1	478	88	2.2×10^{-8}	
2	478	261	1.1×10^{-8}	
3	478	1244	8.8×10^{-9}	
4	423	4228	8.5×10^{-9}	
5	421	164	7.5×10^{-9}	
6	477	324	9.6×10^{-9}	
7	476	831	7.5×10^{-9}	
8	476	327	1.3×10^{-8}	
9	476	285	1.3×10^{-8}	
10	476	770	1.1×10^{-8}	

Average = 1.1×10^{-8} cm/sec

SOIL TESTING SERVICES, OF WIS., INC.

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

PERMEABILITY TEST

Constant Head

Sample A-5% bentonite mixed with east face, north end stock pile

Soil Description Brown fine to medium sand (SP) little fine gravel with trace of silt with 5% P-200 bentonite

Mark No. 5% A, East face, North end

Compacted Dry Density = 107.9 PCF Five day hydrated dry density = 105.0 PCF

Moisture 7.0 % "During Compaction"

Sample Diameter = 4" Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability cm/sec	Remarks
1	72.0	1110	4.6×10^{-8}	
2	71.0	1470	1.8×10^{-8}	
3	71.0	1440	1.8×10^{-8}	
		Average=	2.7×10^{-8} cm/sec	

SOIL TESTING SERVICES, OF WIS., INC.

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

PERMEABILITY TEST

Constant Head

Sample B-5% bentonite mixed with east face, north end stockpile

Soil Description Brown fine to medium sand (SP) little fine gravel trace silt with 5% P-200 bentonite

Mark No. 5% B, East face, North end

Compacted Dry Density = 108.9 PCF

Five day hydrated dry density= 105.3PCF

Moisture 7.0 % "During Compaction"

Sample Diameter = 4.0"

Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability cm/sec	Remarks
1	1110	72	3.0×10^{-8}	
2	1470	71	1.8×10^{-8}	
3	1440	71	1.3×10^{-8}	

Average = 2.0×10^{-8} cm/sec

SOIL TESTING SERVICES, OF WIS., INC.

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

PERMEABILITY TEST

Constant Head

Sample A-7% bentonite mixed with East face, North end stockpile sand

Soil Description Brown fine to medium sand (SP) little fine gravel with trace silt with 7% P200 bentonite

Mark No. 7% A, East face, north end

Compacted Dry Density = 107.3 PCF Five day hydrated dry density-approximately 103. PCF

Moisture 6.3% "During Compaction"

Sample Diameter = 4.0"

Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability cm/sec	Remarks

Sample leaked through small void in internal part of sample.

SOIL TESTING SERVICES, OF WIS., INC.

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

PERMEABILITY TEST

Constant Head

Sample B-7% bentonite mixed with east face, north end stockpile sand

Soil Description Brown fine to medium sand (SP) little fine gravel trace silt with 7% P200 bentonite

Mark No. 7% B, east face north end

Compacted Dry Density = 107.5 PCF Five day hydrated dry density-approximately 103. PCF

Moisture 6.3% "During Compaction"

Sample Diameter = 4.0"

Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability cm/sec	Remarks
1	187	190	8.4×10^{-8}	
2	187	695	8.4×10^{-8}	
3	201	4224	2.7×10^{-8}	
4	199	162	1.4×10^{-8}	
5	199	325	3.0×10^{-8}	
6	199	833	5.3×10^{-8}	
7	192	325	4.8×10^{-8}	
8	192	284	4.8×10^{-8}	
9	192	771	3.6×10^{-8}	

Average = 4.7×10^{-8} cm/sec

SOIL TESTING SERVICES, OF WIS., INC.

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

PERMEABILITY TEST

Constant Head

Sample A=10% bentonite mixed with east face, north end stockpile sand

Soil Description Brown fine to medium sand (SP) little fine gravel-trace silt w/10% P-200 bentonite

Mark No. 10% A, east face,north end

Compacted Dry Density = 107.1 PCF Five day hydrated dry density approximately 102 PCF

Moisture 6.3% "During Compaction"

Sample Diameter = 4.0"

Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability cm/sec	Remarks
	187	92	2.2×10^{-7}	
1	187	263	2.1×10^{-8}	Saturation complete
2	201	1244	1.1×10^{-8}	
3	199	4244	6.0×10^{-9}	
4	199	487	6.3×10^{-9}	
5	192	832	6.4×10^{-9}	
6	192	326	7.0×10^{-9}	
7	192	285	9.6×10^{-9}	
8	192	770	3.6×10^{-9}	

Average = 8.8. $\times 10^{-9}$ cm/sec

SOIL TESTING SERVICES, OF WIS., INC.

Project No.

STS Job No. W10247

Date 7-10-80

Report No.

PERMEABILITY TEST

Constant Head

Sample B-10% bentonite mixed with east face, north end stockpile sand

Soil Description Brown fine to medium sand (SP) little fine gravel-trace silt with 10% P200 bentonite

Mark No. 10% B, east face, north end

Compacted Dry Density = 107.8 PCF

Five day hydrated dry density-approximately 103 PCF

Moisture 6.3% "During Compaction"

Sample Diameter = 4.0"

Sample Height = 4¼"

Run No.	Head, inches	Duration, minutes	Permeability cm/sec	Remarks
1	187	1604	8.8×10^{-10}	
2	201	4225	8.2×10^{-10}	
3	199	486	2.7×10^{-10}	
		Average	6.6×10^{-10} cm/sec	

APPENDIX A

Document 10

WPSC Correspondence to WDNR, regarding Modification of Bottom Ash Storage Lagoons, Dated February 21, 2005

Public Service

Wisconsin Public Service Corporation
(a subsidiary of WPS Resources Corporation)
700 North Adams Street
P.O. Box 19002
Green Bay, WI 54307-9002

February 21, 2005

Mr. Jeffrey W. Brauer
Bureau of Watershed Management
Wisconsin Department of Natural Resources
101 South Webster Street
Madison, WI 53707

Dear Mr. Brauer:

RE: Plan Approval Application under NR 213
Modification of Bottom Ash Treatment Storage Lagoons

As part of the Weston Power Plant Unit 4 addition, a letter dated September 7, 2004 was submitted that indicated that the existing bottom ash wastewater storage lagoons at the site would be modified due to the construction of a railroad loop track on the site. Although the overall capacity of these lagoons will decrease, by letter dated September 8, 2003, information was provided to demonstrate that the settling capacity of the bottom ash lagoons would remain adequate following the size reduction resulting from this modification. Approval is requested to proceed with the work as described in this document and attached in duplicate for the modification of the bottom ash wastewater storage lagoons to accommodate bisection resulting from the railroad track installation.

To demonstrate compliance with NR 213.09 General submittal requirements, additional information is attached. An Engineering Report is included which details the project and includes information on subsurface site conditions, waste sources, waste analysis and waste volumes. Also included in this approval request are the specifications on the bentonite liner to be used (in a manner similar and compatible with the existing bentonite liner), confirmation from the supplier of the liner compatibility for this application, and the Geotechnical Report containing the results of the subsurface investigation conducted at the site. Finally, a series of site and construction drawings are included for your review.

Please do not hesitate to contact me with any questions that may arise during your review of this information. It is our hope that this is a comprehensive Plan Approval request so that the Department has the information needed to complete the necessary review and approval. Pease contact me at (920) 433-1395 with any questions or comments.

Sincerely,

Randal G. Oswald

Randal G. Oswald
Manager Environmental Programs

cc - Mr. Eric J. Donaldson
State of Wisconsin
Department of Natural Resources
5301 Rib Mountain Drive
Wausau, WI 54401

ENGINEERING REPORT

Engineering Report
For
Bottom Ash Ponds Modification

1. Purpose

This report and referenced information are intended to fulfill the requirements of the Wisconsin Department of Natural Resources Chapter NR 213, Section 213.09. The engineering report covers the proposed modifications intended to the existing bottom ash ponds at the Weston Power Plant, Rothschild, Marathon County, Wisconsin.

2. Description of Lagoons

The two existing bottom ash ponds act as separate but redundant collection lagoons for various plant wastestreams resulting from the operation of the Weston Power Plant. Pressurized drainlines from various facilities throughout the plant, both existing Unit 3 facilities and new Unit 4 facilities, are routed to one or the other bottom ash pond as a common collector. The collected byproducts and waste are then treated for suspended solids reduction and disposed of in accordance with existing permits and applicable regulations.

Location and general size of the bottom ash ponds are detailed as Item R on Drawing 133116-4SR-S1000 (Reference 1). The two ponds, as existing, are located side by side and are designed to allow use of one pond for wastewater collection while the other is being cleaned. The major physical modification intended to both ponds is the addition of a railway crossing to allow crossing of coal trains through the area. The modification will divide each of the two ponds into two sub-ponds. Flow from the east sub-pond to its corresponding western component will be through redundant concrete pipes routed beneath the railway crossing. The berms added on either side of the railway crossing will be lined with the same soil-bentonite liner design as currently exists in the remainder of the ponds. The intent is to replace like-for-like with regard to berm and liner construction.

The full surface area of each bisected pond (measured at the top of berm) after completion of the crossing is approximately 3.2 acres. The terrain surrounding the ponds varies in elevation, resulting in the top of berm being approximately three feet above natural grade on the south side of the ponds and seven feet above grade along the north side. The bottom of each pond is located approximately eight feet below the top of the berm.

Water from the west end of either pond enters the Bottom Ash Treatment Facility to receive additional solids settling and pH control as needed. After treatment water is discharged to a tertiary pond from where it is either discharged to the Wisconsin River via existing Outfall 002 after combination with other facility wastewater or reused for additional bottom ash sluicing.

3. Waste Sources and Waste Volumes

The effluent being directed to the bottom ash ponds consists of wastestreams from several operations, both existing and planned, at the Weston Power Plant. The sources and a description of the wastestreams are as follows.

- Precipitation runoff from the temporary ash storage area (existing input).
- Effluent water from the Unit 3 oil/water separator (existing input).
- Process water from the Unit 3 bottom ash sluicing (existing input).
- Reverse osmosis (RO) concentrate from the Unit 3 Cycle Makeup Treatment System (existing input).

- Filter backwash water from the Unit 4 River Water Treatment System (new input).
- Effluent water from the Unit 4 oil/water separator sump (new input).
- Filter backwash water and reverse osmosis (RO) concentrate from the Unit 4 Cycle Makeup Treatment System (new input).
- Overflow from clarifiers during startup (new input).
- Filtrate water from the Unit 4 filter press (new input).
- Lime and recycle wastewaters and lime preparation area drains from the Unit 4 Air Quality Control System (new input).

The two ponds were originally designed to treat the effluent from two plants the size of Unit 3. Unit 4 bottom ash handling will not be by a sluice system, as is used for Unit 3, therefore the relatively large amount of effluent generated by such a system will thus never be directed to the pond system. The volumes and lengths of the pond remaining after installation of the railway crossing have been checked and confirmed as adequate to allow sufficient time for treatment of suspended solids for the effluent volumes expected (Reference 2). In addition, an existing sand filter, currently unused, located in the Bottom Ash Treatment Facility is available for additional treatment should that be necessary.

4. Waste Analysis

The expected quality of the combined wastewaters in the Bottom Ash Ponds based on expected existing and new flows and concentrations is as follows:

Calcium, mg/l as $CaCO_3$	157
Magnesium, mg/l as $CaCO_3$	105
Sodium, mg/l as $CaCO_3$	56
Potassium, mg/l as $CaCO_3$	3
M-alkalinity, mg/l as $CaCO_3$	168
Sulfate, mg/l as $CaCO_3$	50
Chloride, mg/l as $CaCO_3$	102
Nitrate, mg/l as $CaCO_3$	3
Silica, mg/l as SiO_2	36
pH	6.0 – 9.0
Total Dissolved Solids, mg/l	488
Total Suspended Solids, mg/l	30
Aluminum, mg/l as Al	0.0695
Arsenic, mg/l as As	0.00028
Cadmium, mg/l as Cd	0.00002
Chromium, mg/l as Cr	0.00011
Copper, mg/l as Cu	0.00209
Cyanide, mg/l	0.00035
Iron, mg/l as Fe	0.6624
Lead, mg/l as Pb	0.00011
Manganese, mg/l as Mn	0.00465
Zinc, mg/l as Zn	0.00327

5. Subsurface Site Conditions

An extensive geotechnical investigation was completed in 2003 for the Weston Unit 4 Project (Reference 3) under the direction of Black & Veatch. This investigation consisted of 50 soil borings, 4 test pits, and other test locations within the general area of new construction at Unit 4. As part of this investigation, a soil boring was completed on either side of the existing bottom ash ponds (BV-3 and BV-4), with several other borings completed in the general surrounding area. Copies of Boring Logs BV-3, BV-4, BV-07, BV-8, and BV-9 are attached to this report.

The subsurface conditions beneath the ponds consist of alluvial sands and gravels. Grain size varied from gravels to fine sands, with a gradation ranging from well- to poorly-graded with little or no fines present. Although minor variations in the alluvium with depth were observed, overall the alluvial deposit is relatively homogeneous. N-counts in the soil in the area of the ponds varied from a minimum of 6 to a maximum of 40.

Based on other borings completed as part of this study, the depth to bedrock is expected to be approximately 85 feet below grade in this area. The bedrock is granite with a weathered surface. Soils and bedrock engineering properties were developed in the investigation and the results summarized in the attached Table 6-1 from Reference 3.

Groundwater was not encountered on any of the borings completed in the immediate area of the proposed pond. Other borings indicate that ground water elevation will be at approximately Elevation 1,146 or 28 feet below the bottom of the ponds.

6. Proposed Method of Lagoon Construction and Components

Modifications to the pond for the railway crossing will be completed one pond at a time to allow one pond to always remain in service. The areas to receive the crossing will be cleaned and excavated to a subgrade with a tested minimum field density of 90% of maximum dry density. Roadbed fills and the pond berms on either side of the railway will be constructed of onsite material compacted to at least 90% of maximum dry density. The top six inches of surfaces to receive the liner will be compacted to 95% of maximum dry density. The pond side of each new berm will then be lined with 12 inches of a soil-bentonite liner that will be protected with 12 inches of compacted native material and 24 inches of compacted crushed rock. Properties and installation requirements for the various subgrades, soil-bentonite liner, and crushed rock surfacing are contained in Specification 133116.71.0201, Section 02220 (Reference 4).

The soil-bentonite mix upon which the design of the liner has been based has been confirmed to consist of 9% (by weight) Envirogel 200 sealant and 91% (by weight) native soil. The native soil is an onsite sand screened to 3/8 inch minus. Details of construction and geometry of the pond construction itself are detailed on the construction drawings (References 5-9).

The general sequence of construction will be as follows.

a. The first pond will be isolated and drained. Particulate in the area to receive the crossing will be removed and disposed of in a manner required by existing permits and as indicated in WPSC submittal dated September 7, 2004 (Attachment 2).
b. The area of the crossing in the first pond will be excavated to acceptable subgrade and as required to install the RCP pipe for under-railway connection between the divided portions of the pond. The concrete inlet/outfall structures at either end of the pipes will also be constructed.
c. Compacted fill will then be placed over the pipe as a base for the track roadbed and the berm located on either side of the railway. In-place density testing in accordance with ASTM D1557 will be completed on the compacted fill to confirm compaction to 90% of maximum dry density with water content at -3% to +2% of optimum. A minimum of one compaction test per 1,000 sqyd of surface area and no less than three tests will be required. Compacted fill will be used to construct the remainder of the berms to the level detailed on the drawings.

d. The top six inches of subgrade to receive the liner will be compacted to 95% of maximum dry density (ASTM D1557) with water content at -0% to +2% of optimum. A minimum of one compaction test per 1,000 sqyd of surface area and no less than three tests will be required.

e. A 12-inch thick soil-bentonite liner will then be placed on the pond side of each berm. The bentonite liner will consist of a mix of 9% (by weight) Envirogel 200 sealant and 91% (by weight) native soil. Native soil will consist of onsite sand screened to 3/8 inch minus. The new liner will be thoroughly mixed and tied into the existing liner at the ends and the toe of the new berms. In-place density testing in accordance with ASTM D698 will be completed on the soil-bentonite to confirm compaction to 85% of maximum dry density with water content at -0% to +3% of optimum. A minimum of one test per 1,000 sqyd of surface area and no less than three tests will be required. In addition, a minimum of five samples will be taken for testing in accordance with NR 213.12(2)(b).

f. After confirmation of the acceptability of the soil-bentonite liner, a 12-inch layer of compacted native material will be placed over the liner as protection. Material will be deposited in layers with each layer compacted to 95% of maximum dry density (ASTM D1557) with water content at -3% to +2% of optimum. A minimum of one test per 500 cuyd of fill and no less than three tests will be required.

g. The pond-side surface of the new berms will then be provided with a protective layer of 24 inches of compacted crushed rock. In-place density testing in accordance with ASTM D4253 and D4254 will be completed on the rock surfacing to confirm compaction to 70% of relative density with water content at -3% to +2% of optimum. A minimum of one test per 200 cuyd of material placed and no less than three tests will be required.

h. The first pond will then be placed in service and the second pond drained. The above process will be completed again for the second pond.

7. Liner and Waste Compatibility

As specified in Section 02220 of the attached specification, the liner at the modifications to the existing ponds will be a soil-bentonite mixture containing at least 5 percent bentonite by dry weight. Testing has been completed to optimize the mix and confirm the permeability properties required. The testing resulted in a design mix of 9% (by weight) Envirogel 200 sealant and 91% (by weight) native soil.

The permeability of the design mix was tested by Maxim Technologies with the results reviewed by an expert retained by Wyo-Ben, Inc., supplier of the bentonite sealant (see attached letter, Reference 10). The testing was completed with actual effluent samples taken from the existing bottom ash ponds, which are comparable in constituents and concentrations to the effluent streams expected upon addition of Unit 4 wastestreams. The tested permeability of the sample mix varied between 2.0 x 10^{-8} centimeters per second (cm/sec) and 6.7 x 10^{-9} cm/sec, with an average of 1.8 x 10^{-8} cm/sec. In all cases the tests values were less than the limit of 1.0 x 10^{-7} cm/sec set by NR 213.10.7.b. Therefore, the required permeability of the design mix has been confirmed by test.

The design liner mix was also reviewed for compatibility with the expected effluent. As noted in Item 1 of the attached Wyo-Ben letter, the permeability testing confirmed that the proposed "bentonite sealant is compatible with the... pond water sample used in the testing."

The Wyo-Ben letter goes on to say that, assuming the design mix is installed and maintained correctly and the effluent being retained matches that expected, the life of the liner is essentially indefinite; i.e. the properties of the liner will not degrade over time.

This would indicate that the life of the lagoon would be as long as or longer than the design life of the power plant (40 years) for which it is being modified.

References

1. Drawing 133116-4SR-S1000, Rev. 2 – Site Plot Plan (copy attached)
2. E-mail, "(Unit) 3 Ash Pond Capacity", O'Brien to Hayes, dated April 9, 2003 (partial copy attached)
3. WPSC Weston North Unit 4, Geotechnical Report, Rev. 0 (with copies of the following information therein attached)
    - Drawing 133116-SS-0001, Rev. 1 – Subsurface Investigation Location Plan
    - Boring Log BV-3
    - Boring Log BV-4
    - Boring Log BV-7
    - Boring Log BV-8
    - Boring Log BV-9
    - Table 6-1, Soils and Bedrock Engineering Properties
4. Specification 133116.71.0201, Section 02220 – Earthwork (copy attached with pertinent sections noted)
5. Drawing 133116-4SD-S3000, Rev. 2 – Grading and Drainage – Site, Key Plan, General Notes & Legend (copy attached)
6. Drawing 133116-4SD-S3002, Rev. 1 – Grading and Drainage – Site, Area 2 - Plan (copy attached)
7. Drawing 133116-4SD-S3050, Rev. 1 – Grading and Drainage – Site, Typical Sections (copy attached)
8. Drawing 133116-4SD-S3051, Rev. 1 – Grading and Drainage – Site, Typical Sections and Details (copy attached)
9. Drawing 133116-4SD-S3902, Rev. 3 – Grading and Drainage – Site, Typical Containment Details (copy attached)
10. Wyo-Ben, Inc., letter dated February 17, 2005 (copy attached.)

MODIFICATION SUBMITTAL REQUEST

SEPTEMBER 7, 2004

Public Service

Wisconsin Public Service Corporation
(a subsidiary of WPS Resources Corporation)
700 North Adams Street
P.O. Box 19001
Green Bay, WI 54307-9001

September 7, 2004

Mr. Jeffrey W. Brauer
Bureau of Watershed Management
Wisconsin Department of Natural Resources
101 South Webster Street
Madison, WI 53707

Dear Mr. Brauer:

RE: Abandonment/modification of Wastewater Storage Lagoons
Abandonment Plan Approval Application under NR 213.07

As part of the Weston Power Plant Unit 4 addition, a letter dated September 8, 2003 was submitted that indicated that existing wastewater storage lagoons at the site would be abandoned. This action is necessary due to the enlargement of the coal storage yard requiring that both the metal cleaning waste basins and the coal pile runoff basin be removed and replaced with new wastewater storage lagoons. The two existing metal cleaning waste basins will be replaced with a single lagoon sized for the effluent from both Unit 3 and Unit 4. The existing coal pile runoff basin will be replaced with a lagoon sized to capture and hold the runoff from the enlarged coal yard. In addition to the abandonment of these lagoons, the existing Bottom Ash Treatment wastewater storage lagoons will need to be modified to accommodate bisection resulting from the construction of a railroad loop track on the site. This plan identifies the actions that will be taken for the abandonment of three wastewater lagoons and the modification of two additional lagoons. Approval is requested to proceed with the work as described in this document.

Due to the use of each lagoon and the conditions that will exist following the completion of construction at the site, the methods for abandoning each lagoon, including the disposition of excavated materials, does vary. Abandonment will be carried out as follows:

Metal Cleaning Waste Basins

The combined surface area of the two existing metal cleaning waste basins is approximately 56,000 square feet. The lagoons are lined with six inches of crushed stone protecting three feet of compacted bentonite clay on a prepared subgrade. The expanded coal pile will utilize approximately forty percent of the surface area currently occupied by these lagoons. A bentonite liner to prevent infiltration of coal pile runoff underlies the existing coal pile. The expansion of the coal storage area includes extending the coal pile liner by expanding the bentonite liner or installing an HDPE liner beneath the area that will be occupied by the coal pile.

Two alternatives are under consideration for the disposition of the residual materials at the bottom of the existing metal cleaning waste basins. The following actions will be taken during the abandonment process:

1. Following construction of an approved replacement lagoon, the metal cleaning waste basins will be drained to the maximum extent possible using the existing pumping system.
2. Six soil samples will be composited from the residual materials remaining in the lagoon bottoms. Analysis results will be compared against the residual contaminant levels in Table 2 of s. NR 720.11(5).
3. Should the sample results confirm that any residual contamination is below the criteria identified in this table, the sediment characterization data will be submitted to the Department to obtain approval to leave this sediment in place.
4. Should sample results exceed the criteria in Table 2 of s. NR 720.11(5) the residual material will be excavated along with the crushed stone plus a nominal amount of the liner material (approximately 3-6 inches) to ensure that no waste material remains behind.
5. The excavated material would be stored for dewatering and stabilization either within the coal storage area or the onsite temporary ash storage area.
6. This material would be disposed at the Marathon County Landfill. If necessary, additional analysis of the excavated material would be conducted to satisfy disposal requirements of the landfill.
7. Whichever alternative is used for the disposition of this material, once a course of action is determined, the area not otherwise occupied by the expanded coal pile would be filled to grade, graded to provide proper drainage, and seeded or otherwise protected to prevent erosion.
8. As noted, the expanded coal storage area will cover approximately forty percent of the current surface area of the existing lagoons. In those areas where the expanded coal pile will cover portions of the abandoned lagoons, the new liner for the coal pile will be installed on the compacted fill in accordance with the design of the coal pile.

<u>Coal Pile Runoff Lagoon</u>

The existing coal pile runoff lagoon has a surface area of approximately 17,000 square feet. The lagoon is lined with three feet of crushed rock and soil protecting a twelve-inch layer of compacted bentonite clay. The expanded coal pile and runoff collection ditch will utilize approximately ninety-five percent of the surface area currently occupied by this lagoon. A bentonite liner to prevent infiltration of coal pile runoff underlies the existing coal pile. The expansion of the coal storage area includes extending the coal pile liner by expanding the bentonite liner or installing an HDPE liner beneath the area that will be occupied by the coal pile.

The following actions will be taken during the abandonment process for this lagoon:

1. Following construction of an approved replacement lagoon, the coal pile runoff lagoon will be drained to the maximum extent possible using the existing pumping system.
2. Since this basin primarily contains fine coal material, the excavated material would be stored for dewatering in the coal storage area prior to being conveyed into the plant for combustion.
3. The very small area outside the expanded coal liner and runoff collection lagoon would be filled to grade, graded to provide proper drainage, and seeded or otherwise protected to prevent erosion.
4. As noted, the expanded coal storage area and runoff collection ditch will cover approximately ninety-five percent of the current surface area of this lagoon. In those areas where the expanded coal pile will cover portions of the abandoned lagoons, the new liner for the coal pile will be installed on the compacted fill in accordance with the design of the coal pile.

Bottom Ash Lagoons

The existing Bottom Ash Treatment wastewater settling lagoons will need to be modified to accommodate bisection resulting from the construction of a railroad loop track on the site. The loop-track intended to be installed for this project will improve site operations by minimizing the blockage of area roads by rail cars and reduce the noise caused by coupling and uncoupling rail cars from the ladder tracks utilized under the current site configuration. By letter of September 8, 2003, information was submitted that provided the engineering basis for concluding that the reduction in the size of these settling basins would not have a significant affect on the ability of the settling lagoon/treatment system to adequately manage the solids generated by the bottom ash sluicing process at this facility.

The existing Bottom Ash Treatment settling lagoons consist of two parallel and redundant primary ash settling basins each decanting to a dedicated secondary ash settling basin. Water from the secondary settling basin is recovered through a pump structure located at the end of the ponds. A 0.45 mm anthracite/sand filter arrangement exists at the pump structure but is currently not used because the existing settling basins deliver effluent of acceptable quality without its use. The coal delivery rail loop will be routed to cross through both secondary settling lagoons. The rail bed will be below the lagoon operating level requiring a watertight berm be installed across the basins on both sides of the track crossing. Each secondary settling basin will therefore be divided into two components, one component each side of the tracks.

Although these lagoons will be modified rather than abandoned, the following describes the actions to be taken during the process to install the railroad loop track through this area:

1. One Bottom Ash Lagoon will be taken out of service at a time to allow continued plant operation. The out of service lagoon will be drained to the maximum extent possible using the existing pumping system.
2. Any residual bottom ash in the basin, crushed stone used as protection for the bentonite liner, and the bentonite liner itself will be removed to enable proper subbase compaction in preparation for the installation of the railroad bed. All excavated material would be stored for dewatering and stabilization within the temporary ash storage area that is onsite.
3. This material would be disposed at the Marathon County Landfill. If necessary, additional analysis of the excavated material would be conducted to satisfy disposal requirements of the landfill.
4. Installation/restoration of lagoon sidewalls along the railroad loop track slope will be done in conformance with the requirements of s. NR 213. Should any area currently used for the Bottom Ash settling basins not be used for the installation of the loop track or modified lagoon perimeter, this area will be graded to provide proper drainage, seeded or otherwise protected to prevent erosion.

Under separate cover, an application requesting approval for the construction of new wastewater lagoons will be submitted.

If you have any questions about this information, please contact me at (920) 433-1395.

Sincerely,

Randal G. Oswald

Randal G. Oswald
Manager Environmental Programs

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BENTONITE LINER SPECIFICATION

02220 - Earthwork

02220.1 General

02220.1.1 Scope of Work

Scope of Work shall include completing earthwork and shall include other services as specified under these technical specifications.

02220.1.2 Items Furnished by Others and Interfaces

Items furnished by others and not in this Scope of Work include the following:

Excavations and backfill for foundations and underground utilities will be performed under specification 71.0402.

02220.1.3 Performance and Design Requirements

Performance and design requirements for earthwork are indicated in the following table and Article 02220.3.

Component	**Design Parameter**	**Design**
Fly ash stabilized (FAS) material	7 day unconfined compressive strength	400 psi
Soil or Soil-Bentonite Liner	Coefficient of Permeability	1 x 10^{-7} cm/sec

02220.1.4 Codes and Standards

Work performed under these specifications shall be done in accordance with the following codes and standards. Unless otherwise specified, the applicable governing edition and addenda to be used for all references to codes or standards specified herein shall be interpreted to be the jurisdictionally approved edition and addenda. If a code or standard is not jurisdictionally mandated, then the current edition and addenda in effect at the date of this document shall apply. These references shall govern the work except where they conflict with the Company's specifications. In case of conflict, the latter shall govern to the extent of such difference:

Work	**In Accordance With**
Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)	ASTM D2487
Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)	ASTM D2488
Placement of Fly Ash Stabilized Soil	Wisconsin Administrative Code Chapter NR 538 *Beneficial Use of Industrial Byproducts*
Placement and Testing of Soil or Soil-Bentonite Liner	Wisconsin Administrative Code Chapter NR 213 *Lining of Industrial Lagoons and Design of Storage Structures*

02220.1.5 Materials

The following materials shall be used:

General	
Component	**Material**
Standard Specification for Concrete Aggregates	ASTM C33
Compacted Sand Fill	Grade 1 per Section 209 of Wisconsin DOT Construction and Materials Manual
Controlled low strength material (CLSM) cement	Portland cement conforming to the provisions of Section 03311 - Cast-in-Place Concrete
CLSM water	Water free from oil, salts, and other impurities which would have an adverse effect on the quality of the CLSM
CLSM aggregate shall meet the following grading as defined by ASTM C-30 for fine aggregate (sieve size)	Percentage passing
3/8	100
No. 4	95 to 100
No. 8	80 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	5 to 30
No. 100	0 to 10
Bentonite	Wisconsin Administrative Code Chapter NR 213 *Lining of Industrial Lagoons and Design of Storage Structures*

02220.1.6 Approved Manufacturers of Components

For the following components, only the listed manufacturers are recognized as maintaining the level of quality of workmanship required by these specifications. If the Subcontractor wants to propose a nonlisted manufacturer that is considered to provide an equivalent level of quality, this manufacturer must be identified and supporting testimony provided. Acceptance of the manufacturer as a substitute is at the discretion of the Company:

Component	**Manufacturer**
None specified	

02220.1.7 Test Requirements

The following testing shall be conducted in accordance with the specified source. Material, compaction, and testing requirements are found on Table 1.

Tests	In Accordance With	Conducted By
Test Methods for Moisture Density Relations of Soils and Soil Aggregate Mixtures Using 5.5 lb (2.5 kg) Rammer and 12 in. (305 mm) Drop	ASTM D698 (Standard Proctor)	Company
Test Methods for Moisture Density Relations of Soils and Soil Aggregate Mixtures Using 10 lb (4.5 kg) Rammer and 18 in. (457 mm) Drop	ASTM D1557 (Modified Proctor)	Company
Standard Test Methods for Maximum Index Density Using a Vibratory Table	ASTM D4253	Company
Standard Test Methods for Minimum Index Density of Soils and Calculation of Relative Density	ASTM D4254	Company
Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method	ASTM D1556	Company
Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Method (Shallow Depth)	ASTM D2922	Company
Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method	ASTM D2167	Company
Standard Test Method for Field Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)	ASTM D3017	Company
Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes	ASTM D1587	Company
Standard Test Method for Particle Size Analysis of Soils	ASTM D422	Company
Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils	ASTM D4318	Company
Standard Practice for Characterizing Fly Ash for Use in Soil Stabilization	ASTM D5239	Company

Tests	In Accordance With	Conducted By
Standard Specification for Fly Ash and Other Pozzolans for Use with Lime	ASTM C593	Company
Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders	ASTM D1633	Company
Standard Guide for Coring and Logging Cement – or Lime-Stabilized Soil	ASTM D6236	Company
Test Methods for Unconfined Compressive Strength of Cohesive Soil	ASTM D2166	Company
Standard Test Method for Lime Content of Uncured Soil-Lime Mixtures	ASTM D3155	Company

02220.1.8 Technical Attachments

The following attachments accompany these specifications in either paper or electronic format. The information contained in these documents constitutes requirements under the defined Scope of Work:

Document Number/Description	Title	Revision
None specified		

02220.1.9 Supplemental Specifications

The following technical supplemental specifications, included in Section 01400, contain additional requirements applicable to the work covered under this section:

Number	Title
D100	Site Meteorological and Seismic Data
D200	Design Ambients

02220.2 Products

Not used.

02220.3 Execution

02220.3.1 General

This article covers general earthwork; removal and disposal of debris; excavation; the handling, storage, transportation, and disposal of excavated material; sheeting, shoring, and protection work; preparation of subgrades; dewatering; protection of adjacent construction; backfill; construction of fills, compacted liners, and embankments; surfacing and grading; and other appurtenant work.

All excavations, sheeting, shoring, and temporary excavation support shall be performed in accordance with OSHA 29CFR Part 1926, Subpart P, "Excavations."

02220.3.2 Sheeting and Shoring

The stability of previously constructed structures and facilities shall not be impaired or endangered by excavation work. Previously constructed structures and facilities include both structures and facilities existing when this construction began and structures and facilities already provided under these specifications.

Adequate sheeting and shoring shall be provided to protect and maintain the stability of previously constructed structures and facilities and the sides of excavations until they are backfilled. Sheeting, bracing, and shoring shall be designed and built to withstand all loads and restrain all settlement caused by earth movement or pressure, and shall maintain the shape of the excavation.

02220.3.3 Removal of Water

Dewatering due to groundwater is not anticipated during the work performed under this specification. Adequate dewatering equipment shall be provided to remove and dispose of all surface water entering excavations and other parts of the work. Each excavation shall be kept dry. Dewatering shall continue until the construction is no longer affected by surface water. The dewatering system shall only pump water that is clear and free of fines, with a sand content less than 20 ppm. The discharge shall be arranged so that samples can be collected.

Surface water shall be diverted and prevented from entering excavations.

Pipe or conduit used for drainage purposes shall be kept clean and free of sediment. Temporary drainage piping that is not a part of the permanent construction shall be removed at the completion of the work.

When the work is completed, all parts of the permanent plant drainage system used for water disposal shall be returned to the original condition. Dewatering work shall not overload the plant drainage system. Dewatering discharge shall be routed to a location specified by the Company.

Header systems may be laid on top of the ground provided they do not obstruct plant operations, construction activity, or traffic.

Proposed dewatering systems shall be submitted to the Company for review.

02220.3.4 Blasting

Blasting or other use of explosives for excavation will not be permitted.

02220.3.5 Classification of Excavated Materials

Classification of excavated materials shall be made as follows:

> Rock. Rock shall be defined as limestone, hard shale, or similar material in masses more than 1/2 cubic yard (0.38 m^3) in volume, or in ledges 4 inches (102 mm) or more in thickness that require percussive methods for excavation.
>
> Earth. All material not classified as rock.

Boulders over 12 inches in diameter shall be kept separate from other excavated materials. Disposal of boulders shall be as directed by the Company.

Rock that cannot be handled and compacted as earth shall be kept separate from other excavated materials and shall not be mixed with backfill, fill, or embankment materials.

Soil identification shall be in accordance with ASTM D2487, Table 1, Soil Classification Chart. Identification and classification shall be based upon visual examination and simple manual tests performed by qualified personnel in accordance with ASTM D2488. Classification of material shall be acceptable to the Company.

02220.3.6 Freezing Weather Restrictions

Backfill and fill shall not be placed during freezing weather unless acceptable to the Company. Earth material shall not be placed on frozen surfaces, and frozen materials, snow, or ice shall not be placed in any fill or backfill. Placement of Fly Ash Stabilized material shall not be mixed or placed when the air temperature is below 40°F, unless the temperature is at least 35°F and rising.

02220.3.7 Preservation of Trees

Trees shall be preserved and protected as much as possible. Unless specifically authorized by the Company, trees shall be removed only from areas within the construction limits. Removal of additional trees may be permitted by the Company when necessary for the effective execution of the work.

Trees left standing shall be protected from permanent damage. Construction equipment and vehicles shall be parked outside the dripline of trees designated to remain. Trimming of standing trees shall be as directed by the Company.

02220.3.8 Maintenance of Traffic

The Contractor shall conduct his work with as little interference as possible with the work of other suppliers. Whenever it is necessary to cross, obstruct, or close roads, driveways, parking areas, and walks, the Contractor shall provide and maintain suitable and safe bridges, detours, or other temporary expedients at his own expense.

02220.3.9 Unauthorized Excavation

Material excavated below the bottom of concrete structures to be supported on the subgrade shall be replaced with concrete placed monolithically with the concrete above. Rock fill or lean concrete may be used, if acceptable to the Company. Material excavated below structures supported on piles or piers shall be replaced with crushed rock or gravel. The crushed rock or gravel shall be compacted to a density equal to or greater than the density of the adjacent undisturbed soil.

02220.3.10 Testing

Field and laboratory testing required to determine compliance with the compaction requirements will be provided by the Company. Assistance shall be provided to the Company's field testing representative upon request. The Contractor will be furnished one copy of the test results.

All test holes in the soil-bentonite liner shall be backfilled using material identical to the liner design materials and compaction.

The terms "maximum density" and "optimum moisture content" shall be as defined in ASTM D1557.

Relative density for compacted crushed rock materials shall be determined in accordance with ASTM D4253 and D4254. The term "relative density" shall be as defined in ASTM D4254.

02220.3.11 Site Preparation

Subgrades for permanent construction, including subgrades for liners, fills and embankments, shall be stripped of surface vegetation, sod, debris, and organic topsoil. Surface vegetation shall be removed complete with roots to a depth of not less than 4 inches (102 mm) below the ground surface.

All combustible and other waste materials shall be removed from the construction areas. Disposal shall be as specified in Section 02223, Clearing and Grubbing. Open burning is not permitted at the site.

Organic topsoil that is free of trash, vegetation, rocks, and roots shall be stockpiled for later use under separate specifications.

02220.3.12 Overexcavation and Fly Ash Stabilization

Overexcavation and soil improvement shall include mix design preparation, excavation, subgrade preparation, mixing, placement, and testing of fly ash stabilized (FAS) mat beneath the generating building foundation. Additional soil improvement shall also include FAS subgrade for the ponds. The extent of the overexcavation and soil improvement shall be as indicated on the drawings.

Use of the fly ash shall be in accordance with Wisconsin Administrative Code Chapter NR 538 *Beneficial Use of Industrial Byproducts*. It will be the responsibility of the Contractor to fulfill the requirements of the code.

02220.3.12.1 Materials. Fly ash to be used shall be obtained from the onsite Unit 3 fly ash storage silo provided by the Company. All fly ash used for soil improvement shall be initially approved based in the requirements of ASTM D 5239, Standard Practice for Characterizing Fly Ash for Use in Soil Stabilization. Fly ash provided by the Company shall be considered "prequalified" by ASTM D5239. If fly ash other than that supplied by the Company is required, the Contractor shall be responsible for providing initial fly ash characterization.

02220.3.12.2 Design Proportion Testing. Prior to placement of FAS material, a mix design shall be prepared by the Contractor. The mix design shall be subject to approval by the Company. The mix design shall fulfill the design requirements in Article 02220.1.3. The mix design shall include the following:

> Optimum moisture content and maximum dry density for the FAS material as determined by ASTM D 1557. The test shall be performed on sampled compacted 2 hours after mixing with water. The delayed compaction is meant to simulate the delay between mixing and compaction in the field.
>
> Fly ash, water, and base material proportions by weight required to meet the design requirement in Article 02220.1.3. The design strength requirements shall be determined by ASTM D 1633 Standard Test Method for Compressive Strength of Molded Soil-Cement Cylinders. The samples for testing shall be prepared using the same 2 hour delay time as the compaction samples.
>
> Lime content of the design mixture shall be determined in accordance with ASTM D3155. A calibration curve shall be prepared for field verification.
>
> As part of the mix design, the Contractor shall provide description of the proposed mixing and placement methods.

If retarders are used to increase the delay time between mixing and compaction, testing shall be performed to verify that the strength requirements are met.

02220.3.12.3 Overexcavation. Overexcavation beneath the generating building foundation shall be completed in accordance with Articles 02220.3.2 and 02220.3.14 and as shown on drawings.

02220.3.12.4 Weather Restrictions. Unless otherwise approved by the Company, placement shall not be permitted when the subgrade or surface on which the base is to be placed is frozen.

02220.3.12.5 Subgrade Preparation. The subgrade shall be leveled and compacted. The subgrade surface shall be well bonded to the previous layers of fill.

The subgrade shall be kept moist until the next lift is placed. If the subgrade surface becomes dry, prior to the placement of additional lifts, the subgrade shall be moistened to allow proper bonding.

02220.3.12.6 Mixing. The aggregate shall be mixed with the proper amount of fly ash until a thorough and uniform mixture is obtained. Retarders shall only be used upon approval by the Company. The aggregate and FAS material shall be handled in a manner in which will prevent contamination and segregation. The mix equipment will be capable of discharging the mixture without undue segregation.

If mixing plants are used, the mixing equipment shall be equipped so as to permit the Company to verify the component percentages at any time. Mixing plants shall be equipped with batching devices and scales for proportioning the individual components by weight and shall be of such accuracy that the percentages based on the total dry weight will be maintained with the following tolerances:

Fly ash ± 0.25 percent
Water ± 2.0 percent

An approved method of checking and calibrating the weighing system shall be located within easy access on the plant or mixing area. If water is added during mixing, the flow of water in to the mixer shall be controlled by a meter or other approved regulating device to positively maintain uniform moisture content in the mixture.

If mixing is completed in-place, aggregate and fly ash shall be placed in uniform layers with proper thickness to produce the design mixture. The fly ash shall be applied with such accuracy that the percentage based on the total dry weight will be maintained with the following tolerances:

Fly ash ± 1.0 percent

The depth of the mixing shall be sufficient to provide uniform mixing of each lift. Unless otherwise approved by the company, the thickness of each mixed, uncompacted lift shall be limited to the maximum thickness of the lift allowed in Table 1. The depth of the mixing shall also not exceed the maximum allowed lift thickness. Water shall be uniformly applied to ensure sufficient moisture content in accordance with Table 1.

The amount of lime in the mixture shall be verified by ASTM D3155 using the calibration curve determined for the design mix. The frequency of the testing shall be every 2,000 cubic yards for the first 10,000 cubic yards then every 5,000 cubic yards thereafter. The lime content of the mixture shall not be less than 2 percent of the design optimum lime percentage.

02220.3.12.7 Placement and Compaction. FAS shall be placed in approximately horizontal layers. Material deposited in piles or windrows shall be spread and leveled before compaction. If the material fails to meet the specified density, compaction methods shall be altered.

The compaction shall be completed and tested within two hours of mixing the FAS material. If for any reason construction operations are delayed or suspended and the Company orders any loose or uncompacted material removed or disposed of, the Contractor shall perform this work at his own expense. No FAS material may be salvaged or recycled into new FAS material.

02220.3.12.8 Testing. Field and laboratory testing required to determine compliance with the compaction requirements will be provided by the Company. Assistance shall be provided to the Company's field testing representative upon request. Field testing of the FAS material shall include in-place density and moisture content. Laboratory testing shall include unconfined compression testing to verify the FAS material strength requirements. The Contractor will be furnished one copy of the test results.

Upon completion of every two feet of compacted FAS material, cores shall be collected and logged from at least two separate locations within the fill. The frequency of the testing may adjusted by the Company depending on the progress of the FAS placement. The intent of the sampling is to field verify the compacted FAS material strength. Core samples will not be required when the FAS material is specified less than 12 inches in thickness. The core shall be collected in accordance with ASTM D6236 Standard Guide for Coring and Logging Cement- or Lime-Stabilized Soil. The purpose of the testing is to determine the quality, curing progress, bonding, and total thickness of the FAS material lifts. At least one section of the each core shall be tested by ASTM D2166 to verify the design requirements.

02220.3.12.9 Finishing. After compaction is completed to the required grade, the cement-stabilized soil surface shall be shaped to the required lines, grades, and cross section. The subgrade shall be checked by the use of elevation stakes or other means acceptable to the Company. The resulting surface shall be compacted to the specified density. Rolling shall continue until the entire grade conforms to the specified density requirements.

During the finishing operation, the moisture content of the surface material shall be maintained at not less than two percentage points below its specified optimum moisture content. Surface compaction and finishing shall produce a smooth, dense surface, free of compaction planes, cracks, ridges, and loose material.

02220.3.13 Roadway and Railroad Roadbeds

Roadway and railroad roadbed construction shall include excavation, subgrade preparation, and construction of fills and embankments. In excavated roadbed areas, overburden shall be removed and the subgrade shaped to line, grade, and cross section. Soft, organic, and other unacceptable material shall be removed from the subgrade and replaced. The replacement material shall meet the requirements of Article 02220.3.17, Structural Fill.

The subgrade shall be compacted and finished to a uniform surface without depressions that hold water or prevent proper drainage. The subgrade shall be finished to within 0.1 foot (0.03 m) of the elevation indicated on the drawings. Deviations of the subgrade surface in excess of 0.1 foot (0.03 m) as indicated by a 16 foot (5 m) straightedge, or template cut to typical section, shall be corrected.

Ditches and drains along the subgrade shall be maintained for effective drainage. When ruts of 2 inches (51 mm) or more in depth are formed, the subgrade shall be reshaped and recompacted.

Materials shall not be stored or stockpiled on subgrades.

02220.3.14 Fills and Embankments

Fills and embankments shall be constructed to lines and grades indicated on the drawings.

02220.3.14.1 Materials. To the maximum extent available, earth materials obtained from excavation shall be used for the construction of fills and embankments. Additional material shall be obtained from borrow areas.

Fill and embankment material shall be earth only and shall be free from brush, stumps, logs, roots, debris, and organic or other deleterious materials. Fill and embankment material obtained from off-site sources shall be free of contamination. The fill/embankment material supplier shall provide documentation that the material is free of contamination.

02220.3.14.2 Subgrade Preparation. The subgrade shall be leveled and compacted. The subgrade surface shall be well bonded to the previous layers of fill.

02220.3.14.3 Placement and Compaction. Fill and embankment materials shall be placed in approximately horizontal layers. Material deposited in piles or windrows shall be spread and leveled before compaction.

Water shall be added and worked into each layer using harrow, disk, blade, or other acceptable equipment to provide a uniform moisture content. If the material fails to meet the specified density, compaction methods shall be altered.

02220.3.14.4 Borrow Areas. Material necessary to complete fills and embankments shall be excavated from borrow areas and hauled to the fill or embankment site.

02220.3.15 Structure Excavation

Excavation for structures shall be completed to the designated lines and elevations. Machine excavation shall be controlled to prevent undercutting the subgrade elevations indicated on the drawings.

Construction areas shall be kept as free as possible from obstructions. Work shall not interfere with the transportation, storage, or handling of materials. Excavated materials that meet the specified requirements may be used for the fills, embankments, and backfills.

Vertical faces of excavations shall not be undercut to provide for extended footings.

02220.3.16 Structure Subgrades

Subgrades for structures shall be firm, dense, free from mud, thoroughly compacted to the specified density, and sufficiently stable to remain firm and intact.

Structure subgrades that can not achieve the required density shall be over-excavated to 2 feet below the structure, and replaced with structural fill.

Subgrades that are otherwise solid, but become mucky on top due to construction operations, shall be stabilized by reinforcing them with one or more layers of crushed rock or gravel.

The finished elevation of stabilized structure subgrades shall not be above the subgrade elevations indicated on the drawings.

02220.3.17 Structural Fill

Structural fill is fill placed beneath roads and structures. Structural fill shall be mechanically compacted. Structural fill requirements are provided in Table 1.

Particular care shall be taken to compact structural fill beneath pipes, drives, roads, or other surface construction. When a trench passes through structural fill, the fill shall be placed and compacted to at least 12 inches (305 mm) above the top of the pipe elevation before the trench is excavated.

02220.3.18 Structure Backfill

Backfill around and outside of structures shall be deposited in horizontal layers. Backfill shall be mechanically compacted. Compaction of structure backfill by rolling will be permitted provided the desired compaction is obtained and damage to the structure is prevented. Compaction of structure backfill by inundation with water will not be permitted.

Backfill material shall be composed of earth only and shall not contain wood, grass, roots, broken concrete, stones, trash, or debris of any kind.

No tamped, rolled, or otherwise mechanically compacted backfill shall be deposited or compacted in water.

All backfill material shall consist of loose earth having a moisture content required to obtain the specified density of the compacted soil. Moisture content shall be distributed uniformly. Water added for correction of moisture content shall be distributed uniformly prior to compaction. Granular material shall be wet, not just damp, when compacted.

02220.3.19 Geosynthetic Liner Subgrades

Preparation of the subgrade for geosynthetic liner including FAS subgrade for the ponds shall be completed to the designated lines and elevations.

Surfaces prepared for geotextile/geomembrane installation will be smooth and free of debris, roots, and angular or sharp rocks larger than 3/8 inch (10 mm) in diameter. No sharp stones or other hard objects that will not pass through a 3/8 inch (10 mm) screen will be present in the top 6 inches (152 mm) of the surface to be lined. The subgrade will be protected from erosion. Any areas of the subgrade that are soft, weak; maintain inadequate moisture conditioning; contain ruts, stones, sharp breaks, or holes; or are otherwise unacceptable will be removed or repaired prior to releasing the subgrade for liner installation.

Approval of the subgrade shall be subject to walk-through inspection by the Company and geotextile/ geomembrane supplier. Once approved, it will be the responsibility of the Contractor to keep the previously prepared subgrade in the accepted condition until the geotextile and geomembrane installations are complete.

02220.3.20 Compacted Rock Fill

Compacted rock fill shall consist of crushed rock. Compaction shall be performed with vibrating mechanical compactors.

Crushed rock for compacted fill shall be handled and placed in a manner that will prevent segregation of sizes. The fill material shall have the best practicable moisture content to achieve specified density.

If concrete is to be placed on the compacted rock fill, the fill shall be finished with a thin layer of clean concrete sand to fill all voids and interstices and to obtain the required subgrade elevation.

02220.3.21 Compacted Sand Fill

Compacted sand fill material shall consist of clean, natural sand.

Sand fills shall be placed on undisturbed subgrade. Sand shall be compacted using mechanical vibrators. Moisture content shall be adjusted for maximum density.

02220.3.22 Soil or Soil Bentonite Liner
Soil or soil-bentonite liner shall be installed in the locations indicated on the drawings. Bentonite shall be applied at a rate recommended by the manufacturer or independent soil expert. Completed soil-bentonite liners shall have a minimum of 5 percent bentonite by dry weight. Bentonite shall be thoroughly admixed with the soil throughout the entire thickness of each lift.

02220.3.23 Drainage Fills
Sand drainage fills and drainage filter material shall be as indicated on the drawings. Unwashed material is unacceptable.

Sand drainage fill and drainage filter material shall be compacted with a vibrating compactor. Moisture content shall be adjusted to achieve maximum density.

02220.3.24 Controlled Low Strength Material
Controlled low strength material (CLSM) shall be installed in the locations shown on the drawings or may be used in locations acceptable to the Company.

CLSM shall consist of a fluid, workable mixture of aggregate, cement, and water. Mix designs for review and approval by the Company shall be prepared and submitted prior to use.

02220.3.24.1 Materials. The aggregate, cement, and water shall be proportioned either by mass or by volume. Not less than 130 pounds of cement shall be used for each cubic yard of material produced. The water content shall not exceed 600 pounds per cubic yard, and shall be a workable mix that will flow and can be pumped without segregation of the aggregate while being placed.

CLSM shall be placed in a uniform manner that will prevent voids in or segregation of the backfill, and will not float or shift the pipe when used as trench backfill. Foreign material which falls into the trench prior to or during placing of the CLSM shall be immediately removed.

02220.3.24.2 Placement. Backfilling over or placing any material over CLSM shall not commence until 4 hours after the slurry cement backfill has been placed.

02220.3.24.3 Testing. Field and laboratory testing required to determine compliance with the specification requirements will be provided by the Company. Assistance shall be provided to the Company's field testing representative upon request. The Contractor will be furnished one copy of the test results.

At least four 6 inch diameter cylinders shall be molded from the first batch of CLSM provided for the project. Two cylinders shall be tested at an age of 7 days and the other two at an age of 28 days. The grout samples shall have a minimum compressive strength of 100 psi at the age of 28 days. Additional testing will be at the discretion of the Engineer and Construction Manager.

02220.3.25 Maintenance and Restoration of Fills, Embankments, and Backfills
Fills, embankments, and backfills that settle or erode before final acceptance of the work, and pavement, structures, and other facilities damaged by such settlement or erosion, shall be repaired. The settled or eroded areas shall be filled, compacted, and graded to conform to the elevation indicated on the drawings or to the elevation of the adjacent ground surface. Damaged facilities shall be repaired in a manner acceptable to the Company.

Earth slopes of the roads and railroads constructed under these specifications shall be maintained to the lines and grades indicated on the drawings until the final acceptance of the work.

02220.3.26 Final Grading

In areas where final grading is required, all ground surface areas disturbed by construction or construction plant and operations shall be graded. The grading shall be finished to the contours and elevations indicated on the drawings or, if not indicated, to the matching contours and elevations of the original, undisturbed ground surface. The final grading shall provide smooth uniform surfaces and effective drainage of the ground areas.

02220.3.27 Disposal of Materials

Surplus earth and materials not suitable for the work shall be spoiled on the site in a manner and location designated by the Company. Offsite disposal may be used, if allowed by the Company. Disposal shall be in accordance with all federal, state, and local requirements.

Table 1

Materials, Compaction, and Testing Requirements

Material	Plasticity Require-ments	Gradation Require-ments	Maximum Density	Maximum Density Test Frequency	Required Field Density	Field Density Test	Field Density Test Frequency	Required Field Water Content	Field Water Content Test	Required Lift Thickness	Remarks
Fly Ash Stabilized (FAS) Material	-	3 inch max ≤85 percent minus No. 200	ASTM D1557, Method C	3 initial tests, further tests as directed	95% Max. Dry Density	ASTM D2922; and ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 500 cy, or as required	-1% to +2% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	8 in uncompacted	Additional testing shall be performed in accordance with Article 02220.3.12.2.
Fill and embank-ment subgrade	-	-	ASTM D1557, Method C	3 initial tests; further tests as directed	90% Max. Dry Density	ASTM D2922; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 1,000 sy, or as required	-3% to +2% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	6 in. depth	Scarified and rolled

Table 1

Materials, Compaction, and Testing Requirements

Material	Plasticity Require-ments	Gradation Require-ments	Maximum Density	Maximum Density Test Frequency	Required Field Density	Field Density Test	Field Density Test Frequency	Required Field Water Content	Field Water Content Test	Required Lift Thickness	Remarks
Fills and embank-ments	-	6 inch max; 3 inch max in upper 18 inches	ASTM D1557, Method C	3 initial tests, further tests as directed	95% Max. Dry Density	ASTM D2922; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 500 cy, or as required	-3% to +2% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	8 in. uncompacted	-
Structure subgrade	-	-	ASTM D1557, Method C	1 initial test; further tests as directed	95% Max. Dry Density	ASTM D2922; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 1,000 sy, or as required. Min one per foundation for foundations over 10 sy	-3% to +2% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	6 in. depth	-

Table 1

Materials, Compaction, and Testing Requirements

Material	Plasticity Requirements	Gradation Requirements	Maximum Density	Maximum Density Test Frequency	Required Field Density	Field Density Test	Field Density Test Frequency	Required Field Water Content	Field Water Content Test	Required Lift Thickness	Remarks
Liner subgrade	LL <50 PI <15	3/8" max	ASTM D1557, Method C	3 initial tests, further tests as directed	95% Max. Dry Density	ASTM D2922; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 1,000 sy, or as required	0% to +2% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	6 in. depth	No sharp stones, sticks or other hard objects that will not pass through a 3/8 inch (10 mm) screen will be present in the top 6 inches (152 mm)
Structural fill (Fills beneath structures)	LL <50 PI <15	3 inch max ≤85 percent minus No. 200	ASTM D1557, Method C	3 initial tests, further tests as directed	95% Max. Dry Density	ASTM D2922; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 500 cy, or as required	-3% to +2% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	8 in. uncompacted	-

Table 1

Materials, Compaction, and Testing Requirements

Material	Plasticity Require-ments	Gradation Require-ments	Maximum Density	Maximum Density Test Frequency	Required Field Density	Field Density Test	Field Density Test Frequency	Required Field Water Content	Field Water Content Test	Required Lift Thickness	Remarks
Structure backfill	Structure backfill placed against below grade walls shall be non-swelling material with a liquid limit (LL) less than 50. Backfill containing cohesive material shall be classified as a CL or ML, according to the Unified Soil Classification System (USCS).	3 inch max ≤85 percent minus No. 200	ASTM D1557, Method C	3 initial tests; further tests as directed	95% Max. Dry Density	ASTM D2922; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 200 cy, or as required	-3% to +2% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	8 in. uncompacted	Compaction by inundation with water will not be permitted.

Table 1

Materials, Compaction, and Testing Requirements

Material	**Plasticity Require-ments**	**Gradation Require-ments**	**Maximum Density**	**Maximum Density Test Frequency**	**Required Field Density**	**Field Density Test**	**Field Density Test Frequency**	**Required Field Water Content**	**Field Water Content Test**	**Required Lift Thickness**	**Remarks**
Roadway roadbed	-	-	ASTM D1557, Method C	3 initial tests; further tests as directed	90% Max. Dry Density	ASTM D2922; and ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 500 sy, or as required	-3% to +2% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	8 in. depth	-
Compacted rock fill	Non-plastic	1-1/2 in. (38 mm) max. to crusher fines ASTM C33	ASTM D4253 and D4254	3 initial tests; further tests as directed	70% Relative Density	ASTM D2922; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 200 cy, or as required	-3% to +2% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	8 in. uncompacted	-

Table 1

Materials, Compaction, and Testing Requirements

Material	Plasticity Require-ments	Gradation Require-ments	Maximum Density	Maximum Density Test Frequency	Required Field Density	Field Density Test	Field Density Test Frequency	Required Field Water Content	Field Water Content Test	Required Lift Thickness	Remarks
Compacted sand fill	Non-plastic	Grade1 per Section 209 of Wisconsin DOT	ASTM D1557, Method C	3 initial tests; further tests as directed	90% Max. Dry Density	ASTM D2922; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 200 cy, or as required	-3% to +2% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	8 in. uncompacted	-
Compacted Soil Liner	Plasticity Index>12	>50% passing No. 200 sieve & <5% retained on No.4 sieve <2% organic material	ASTM D698	3 initial tests; further tests as directed	95% max Dry Density	ASTM D2992 or ASTM D2937	One test per 500 sy, minimum of 2 tests per lift per area, or as required	0 to +3% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	8 in. uncompacted	Minimum of five permeability tests shall be completed as required in Wisconsin Administrative Code NR213

Table 1

Materials, Compaction, and Testing Requirements

Material	Plasticity Requirements	Gradation Requirements	Maximum Density	Maximum Density Test Frequency	Required Field Density	Field Density Test	Field Density Test Frequency	Required Field Water Content	Field Water Content Test	Required Lift Thickness	Remarks
Compacted Soil-Bentonite Liner	Plasticity Index>12	>30% passing No. 200 sieve & <5% retained on No.4 sieve	ASTM D698	3 initial tests; further tests as directed	85% max Dry Density	ASTM D2992 or ASTM D2937	One test per 500 sy, minimum of 2 tests per lift per area, or as required	0 to +3% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	8 in. uncompacted	Minimum of five permeability tests shall be completed as required in Wisconsin Administrative Code NR213
Surplus earth and materials not suitable for the work	-	-	ASTM D1557, Method C	As directed	Compaction shall be by not less than three passes of a bulldozer.or 90% Max. Dry Density	ASTM D2922; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 1,000 cy, or as required	-3% to +2% of optimum water content	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	12 in. uncompacted	Spoil in a manner and location designated by Company. Disposal shall be in accordance with all federal, state, and local requirements pertaining to construction landfills.

Table 1

Materials, Compaction, and Testing Requirements

Material	Plasticity Require-ments	Gradation Require-ments	Maximum Density	Maximum Density Test Frequency	Required Field Density	Field Density Test	Field Density Test Frequency	Required Field Water Content	Field Water Content Test	Required Lift Thickness	Remarks
Sand drainage fill	Non-plastic	Uniformly graded from No. 4 to No. 100 sieve	ASTM D4253 and D4254	3 initial tests; further tests as directed	65% relative density	ASTM D2922; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 500 cy, or as required	As required	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	4 in. compacted	Clean concrete sand
Drainage filter material	Non-plastic	Uniformly graded from 1-1/2 inch to No. 4	ASTM D1557, Method C or ASTM D698, Method C	1 initial test; further tests as directed	65% relative density	ASTM D2922; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM S1556 or ASTM D2167)	One test per 500 sy, or as required	As required	ASTM D3017; ASTM D1556 or ASTM D2167 (10% of tests to be ASTM D 1556 or ASTM D 2167)	4 in. compacted	Washed rock or crushed gravel

Table 1

Materials, Compaction, and Testing Requirements

Material	Plasticity Require-ments	Gradation Require-ments	Maximum Density	Maximum Density Test Frequency	Required Field Density	Field Density Test	Field Density Test Frequency	Required Field Water Content	Field Water Content Test	Required Lift Thickness	Remarks
ASTM C33 = Standard Specification for Concrete Aggregates. ASTM D698 = Standard Test Methods for Laboratory Compaction Characteristics of Soil using Standard Effort (12,400 ft-lb/ft^3). ASTM D1556 = Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method. ASTM D1557 = Standard Test Methods for Laboratory Compaction Characteristics of Soil using Modified Effort (56,000 ft-lb/ft^3) ASTM D2167 = Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber-Balloon Method. ASTM D2922 = Standard Test Method for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth). ASTM D4253 = Standard Test Methods for Maximum Index Density and Unit Weight of Soils using a Vibratory Table. ASTM D4254 = Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.											

CERTIFICATION OF LINER COMPATIBILITY

wyo-ben

WYO-BEN, INC.

February 17, 2005

Mr. Jeff Peterson
N2251 Gibson Drive
P.O. Box 120
Medford, WI 54451

Re: Wisconsin Public Service Weston 4 Ash Ponds Liner

Dear Mr. Peterson:

Previously, you have asked us to provide you with a letter responding to the following questions regarding this project:

1. The compatibility of the Envirogel™ bentonite sealant to be used in the ash ponds liner with the waste water to be contained in the ash ponds.
2. The design mix for the ash pond liners.
3. The design life of the ash pond liners.

This letter responds to these questions.

1.) As of this date the permeability test results obtained by Maxim Technologies, Wausau, Wisconsin, over a test period of 501.9 hours (20.9 days) show a range of permeability between 2.9x10^{-8} cm/sec. and 6.7x10^{-9} cm/sec. with an average of 1.8x10^{-8} cm/sec. These test data also show a curious cyclic pattern of variability within this range with an approximate cycle period of 7 days where the highest test values are obtained on Sundays and then drop steadily through the week with the lowest values occurring on Fridays. Over the entire test period the <u>trend</u> of the permeability test results is, however, essentially flat with neither an apparent upward or downward movement of the results. Although no specific basis for the cyclic pattern has yet been found it is my opinion that it is an artifact of the testing method and equipment used. There is no evidence from the test data to suggest that it indicative of the response of the Envirogel™ 200 bentonite sealant to the pond water used for the test. Although only longer term testing will confirm this, the lack of any upward or downward trend in permeability during the test period makes it appear likely that equilibrium or near equilibrium conditions have been achieved. As a result, I believe that the permeability test results obtained to date show that the Envirogel™ 200 bentonite sealant is compatible with the Weston 4 pond water sample used in the testing. The extent to which this pond water sample is representative of the quality of the water in the ponds will define the in place compatibility of the Envirogel™ 200 sealant in the liners. The long term compatibility of the Envirogel™ 200 sealant with the pond water will be dependent upon the constancy of the chemical environment in which it is required to operate. Changes in the pond water quality over time that result in either increased concentration of chemical contaminants or the addition of chemical contaminants may alter this situation and reduce the operational capability of the sealant resulting in increased liner leakage.

2.) The permeability testing conducted by Maxim Technologies at a design mix of 9% Envirogel™ 200 sealant (wt : wt), based on the maximum dry density of the soil with which it was mixed, yielded permeability values that are sufficiently below the required permeability of $1x10^{-7}$ cm/Sec to enable a permeability less than or equal to the required permeability to be achieved in the field provided that the sealant is homogenously mixed into the soil and compacted to a minimum 90% standard Proctor at a moisture content 2% over the Proctor optimum for the mixture. It should be specifically noted that the applicability of this design mix is contingent upon the use of soil having characteristics, such as particle size gradation, Proctor values, Atterberg values, organic content and chemistry, that are the same as the soil used in the laboratory permeability testing. The use of soil having different characteristics than the permeability test soil, or the use of compaction or moisture levels other than those previously, or the containment of pond water with a chemical makeup different than that used in the laboratory testing may require a change in the design mix.

3.) The design life of the Envirogel™ 200 <u>sealant</u> in the pond liners will, essentially, be indefinite if the following assumptions remain true:

1. the physical and chemical characteristics of the soil used in the liner are the same as those of the test soil used in the laboratory permeability testing and they do not change over time.
2. the chemical characteristics of the pond water contained in the ash ponds is the same as that used in the permeability testing and it does not change over time.

The design life of the <u>liner</u> will be dependent upon its construction and its operational environment over time. Assuming the use of soil that has the same characteristics as that used in the laboratory permeability testing, and the use of construction practices that result in placement of the liner on a subgrade compacted to a minimum of 90% standard Proctor, and the use of a homogenous blend of soil and bentonite and a homogenously moistened soil-bentonite mixture, and that the mixture is homogenously compacted to a minimum of 90% standard Proctor at a moisture 2% over optimum using clean potable water into lifts of no greater thickness than 6 inches, and that the completed compacted liner is then immediately covered with a protective cover layer sufficient to prevent it from drying out and to prevent it from being damaged mechanically or from freezing through out its life, and that the chemistry of the water contained in the ponds remains constant then, the design life of the liner should, essentially, be indefinite.

These responses are based upon test data provided to Wyo-Ben, Inc. by third parties. While we have no reason to doubt their accuracy or completeness Wyo-Ben, Inc. did not conduct the testing that produced these results and can not be held responsible for them. It should be explicitly understood that, in providing this information, neither Wyo-Ben, Inc. nor its employees are providing engineering advice or engineering services of any kind.

If you should have any questions about any if the information presented here please don't hesitate to contact me at your convenience.

Sincerely,

Richard K. Brown

Richard K. Brown
Vice President, Resources

k:\docs\krb\[illegible] ash ponds ltr.doc

SUBSURFACE INVESTIGATION

Wisconsin Public Service Corporation
Weston North Unit 4
Rothschild, Wisconsin

Geotechnical Report
Revision 0

B&V Project 133116
B&V File No. 41.0403

January 14, 2004

BLACK & VEATCH CORPORATION
Overland Park, Kansas

BLACK & VEATCH

BORING LOG

BORING NO. BV-03
SHEET 1 OF 1

CLIENT: Wisconsin Public Service Corp.
PROJECT: Weston North Unit 4
PROJECT NO.: 133116
PROJECT LOCATION: Rothschild, WI
COORDINATES: N -3216.9' E -448.3'
GROUND ELEVATION (DATUM): 1180.4 ft (NGVD29)
TOTAL DEPTH: 25.0 (feet)
SURFACE CONDITIONS: Sloping, undulating grass cover, adjacent to trees
COORDINATE SYSTEM: Plant
DATE START: 9/23/03
DATE FINISHED: 9/23/03
LOGGED BY: J. Liljegren JAL
CHECKED BY: E. Meyer EWM
APPROVED BY: M. Petersen MMP

SAMPLING SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH (FEET)	ELEVATION (FEET)	CLASSIFICATION OF MATERIALS	REMARKS
SPT	1	1	1	2	3	1.0	0	1180	Silty CLAY; dark brown; soft; moist; high plasticity; w/ roots in top 4" [Topsoil]	Boring advanced w/3 1/4" ID; 6 1/2" OD hollow stem auger w/ center plug. Sampler driven w/auto hammer.
							0.5		SAND; light brown; very loose; moist; fine grained; well graded [Alluvium]	
							2	1178	grades medium dense	
SPT	2	2	3	7	10	1.0	4	1176		
SPT	3	6	18	21	39	1.0	6	1174	grades dense; medium grained; w/some fine gravel	
							7.0		Gravelly SAND; brown; medium dense; moist; coarse grained; well graded [Alluvium]	
SPT	4	8	11	14	25	1.0	8	1172		
							9.5		SAND; brown; medium dense; moist; medium grained; well graded; w/trace fine gravel	
SPT	5	5	6	7	13	1.0	10	1170		
							12	1168		
							14	1166	gravel grades out	
SPT	6	3	4	6	10	1.0	16	1164		
							18	1162	grades w/trace fine gravel	
SPT	7	5	6	8	14	1.0	20	1160		
							22	1158		
SPT	8	4	5	8	13	1.0	24	1156		
							25.0			Bottom of boring @ 25.0'. Water not encountered. Boring backfilled w/cement/ bentonite grout using tremie on 9/23/03.
							26	1154		
							28	1152		
							30			

CORING CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD	SAMPLE TYPE	GRAPHIC LOG

BLACK & VEATCH

BORING LOG

BORING NO. BV-04
SHEET 1 OF 1

CLIENT	Wisconsin Public Service Corp.
PROJECT	Weston North Unit 4
PROJECT NO.	133116
PROJECT LOCATION	Rothschild, WI
COORDINATES	N -1949.0' E -549.5'
GROUND ELEVATION (DATUM)	1170.1 ft (NGVD29)
TOTAL DEPTH	25.0 (feet)
SURFACE CONDITIONS	Sloping, within v-ditch, grass cover
COORDINATE SYSTEM	Plant
DATE START	9/24/03
DATE FINISHED	9/24/03
LOGGED BY	J. Liljegren JDL
CHECKED BY	E. Meyer EWM
APPROVED BY	M. Petersen MMP

SAMPLING: SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	DEPTH (FEET)	SAMPLE TYPE	ELEVATION (FEET)	GRAPHIC LOG	CLASSIFICATION OF MATERIALS	REMARKS
CORING: CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD						
SPT	1	3	4	6	10	1.5	0		1170		Silty SAND; dark brown; loose; moist; fine grained; well graded; w/roots in top 3" [Topsoil] 0.8 SAND; brown; loose; moist; fine grained; well graded; w/trace silt [Fill]	Boring advanced w/3 1/4" ID; 6 1/2" OD hollow stem auger w/ center plug. Sampler driven w/auto hammer.
							2		1168			
SPT	2	3	4	4	8	1.0	4		1166		5.2	
SPT	3	5	7	7	14	1.0	6		1164		SAND; light brown; medium dense; moist; medium grained; well graded [Alluvium] grades coarse grained; w/trace fine gravel	
SPT	4	5	7	7	14	1.0	8		1162			
SPT	5	11	11	12	23	0.0	10		1160			
							12		1158			
							14		1156			
SPT	6	8	12	20	32	1.0	16		1154		grades dense; fine grained; gravel grades to occasional	
							18		1152			
SPT	7	7	10	10	20	1.0	20		1150		grades medium dense; coarse grained; gravel grades to some 20.0' - grades medium grained; gravel grades out	
							22		1148			
SPT	8	4	6	10	16	1.5	24		1146		25.0	Bottom of boring @ 25.0'. Water not encountered. Boring backfilled w/cement/ bentonite grout using tremie on 9/24/03.
							26		1144			
							28		1142			
							30					

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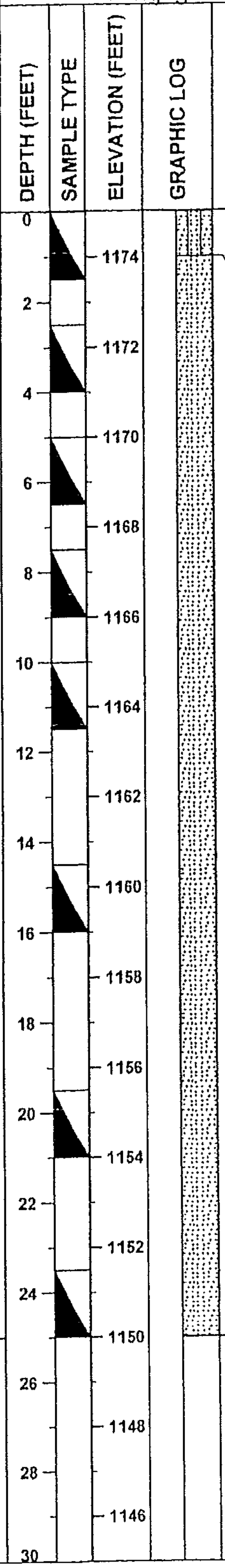
BORING LOG

BORING NO. BV-07
SHEET 1 OF 1

CLIENT: Wisconsin Public Service Corp.
PROJECT: Weston North Unit 4
PROJECT NO.: 133116
PROJECT LOCATION: Rothschild, WI
COORDINATES: N -3595.7' E 489.5'
GROUND ELEVATION (DATUM): 1175.0 ft (NGVD29)
TOTAL DEPTH: 25.0 (feet)
SURFACE CONDITIONS: Flat, level, grass cover, open pasture
COORDINATE SYSTEM: Plant
DATE START: 9/23/03
DATE FINISHED: 9/23/03
LOGGED BY: J. Liljegren SAL
CHECKED BY: E. Meyer EWM
APPROVED BY: M. Petersen MMP

SAMPLING								
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS	REMARKS
CORING								
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD		
SPT	1	1	3	4	7	0.5	Silty SAND; dark brown; loose; moist; fine grained; well graded; w/roots in top 6" [Topsoil] 1.0 SAND; light brown; loose; moist; fine grained; well graded [Alluvium]	Boring advanced w/3 1/4" ID; 6 1/2" OD hollow stem auger w/ center plug. Sampler driven w/auto hammer.
SPT	2	3	3	4	7	1.5		
SPT	3	4	10	12	22	1.5	grades medium dense; medium grained	
SPT	4	3	7	8	15	1.5	grades fine grained	
SPT	5	5	5	7	12	1.5	grades medium grained; w/trace fine gravel	
SPT	6	4	8	10	18	1.0	gravel grades to some	
SPT	7	6	12	14	26	0.5	grades coarse grained; gravel grades coarse, rounded	
SPT	8	4	9	9	18	1.5	grades medium grained; gravel grades to trace, fine 25.0	Bottom of boring @ 25.0'. Water not encountered. Boring backfilled w/cement/ bentonite grout using tremie on 9/23/03.



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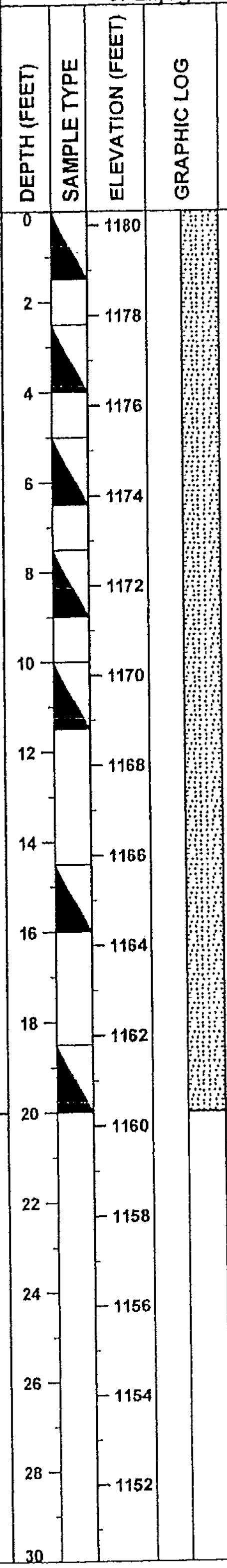
BORING LOG

BORING NO. BV-08
SHEET 1 OF 1

CLIENT Wisconsin Public Service Corp.
PROJECT Weston North Unit 4
PROJECT NO. 133116
PROJECT LOCATION Rothschild, WI
COORDINATES N -2637.5' E 497.4'
GROUND ELEVATION (DATUM) 1180.3 ft (NGVD29)
TOTAL DEPTH 20.0 (feet)
SURFACE CONDITIONS Flat, level, sand surface
COORDINATE SYSTEM Plant
DATE START 9/22/03
DATE FINISHED 9/22/03
LOGGED BY J. Liljegren SAL
CHECKED BY E. Meyer EWM
APPROVED BY M. Petersen MMP

SAMPLING: SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS	REMARKS
CORING: CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD		
SPT	1	2	4	6	10	1.5	SAND; dark brown; loose; moist; medium grained; well graded; w/some fine gravel [Alluvium]	Boring advanced w/3 1/4" ID; 6 1/2" OD hollow stem auger w/ center plug. Sampler driven w/auto hammer.
SPT	2	8	10	13	23	1.0	grades medium dense	
SPT	3	5	13	27	40	1.0	grades dense; gravel grades to trace	
SPT	4	7	16	17	33	1.5	grades light brown; coarse grained; gravel grades out	
SPT	5	4	6	10	16	1.5	grades medium dense; fine grained	
SPT	6	4	7	8	15	1.0	grades coarse grained; w/some fine gravel	
SPT	7	3	3	5	8	1.5	grades loose; medium grained; gravel grades out 20.0	
								Bottom of boring @ 20.0'. Water not encountered. Boring backfilled w/cement/ bentonite grout using tremie on 9/22/03.



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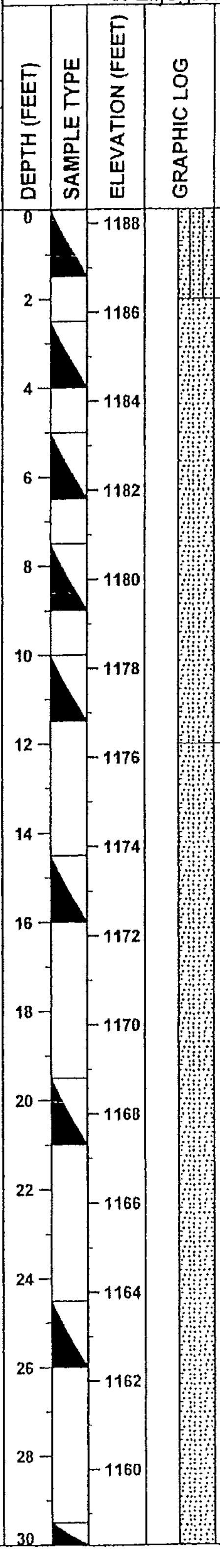
BORING LOG

BORING NO. BV-09
SHEET 1 OF 2

CLIENT Wisconsin Public Service Corp.	PROJECT Weston North Unit 4	PROJECT NO. 133116
PROJECT LOCATION Rothschild, WI	COORDINATES N -2333.8' E 232.5'	GROUND ELEVATION (DATUM) 1188.3 ft (NGVD)
TOTAL DEPTH 36.0 (feet)		
SURFACE CONDITIONS Flat, top of slope	COORDINATE SYSTEM Plant	DATE START 9/22/03
DATE FINISHED 9/22/03		
LOGGED BY J. Liljegren JDL	CHECKED BY E. Meyer EWM	APPROVED BY M. Petersen MMP

SAMPLING						
SAMPLE TYPE	SAMPLE NUMBER	SET 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N VALUE	SAMPLE RECOVERY
CORING						
CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD
SPT	1	1	2	2	4	1.5
SPT	2	4	3	3	6	1.5
SPT	3	3	8	8	16	1.5
SPq	4	2	3	3	6	1.0
SPT	5	3	4	4	8	1.0
SPT	6	5	16	17	33	1.0
SPT	7	5	7	7	14	1.0
SPT	8	4	7	8	15	1.5



CLASSIFICATION OF MATERIALS

Silty SAND; black; loose; moist; fine grained; well graded; w/organics & roots in top 2" [Topsoil]

2.0

SAND; brownish orange; loose; moist; medium grained; well graded; w/some fine rounded gravel [Fill]

grades dark brown; medium dense

grades loose; fine grained

grades medium grained; gravel grades to trace

12.0

SAND; light brown; dense; moist; medium grained; well graded w/some fine gravel [Alluvium]

grades medium dense; gravel grades to trace

grades coarse grained; gravel grades to some

gravel grades fine to coarse

REMARKS

Boring advanced w/3 1/4" ID; 6 1/2" OD hollow stem auger w/ center plug. Sampler driven w/auto hammer.

Table 6-1
Soils and Bedrock Engineering Properties

Geologic unit type	Alluvium	Bedrock
Depth to top of unit (feet) [1]	Ground Surface	~95
Unit thickness (feet)	~95	Not Known
Elevation of top of unit (feet NGDV29)	1,180	1,085
Average $N_{spt\ field}$ (blows/foot)	20	NA
Average N_{60} (blows/foot)	27	NA
Relative density (percent)	65	NA
Total moist unit weight, γ_m (pcf)	120	165
Total saturated unit weight γ_{sat} (pcf)	130	165
Effective unit weight γ' (pcf)	70	105
In situ moisture content (percent)	3.5	NT
Static stress-strain modulus, E_s (ksf)	1,000	1.2 x 10^6
Constrained static modulus, M (ksf)	1,350	-
Poisson's ratio	0.3	0.25
Angle of internal friction (degrees)	35	NT
Percent fines (percent)	2.4	NA
Hydraulic conductivity (cm/sec)	5.8 x 10^{-2}	NT
Unconfined compressive Strength (ksf)	NA	2,100

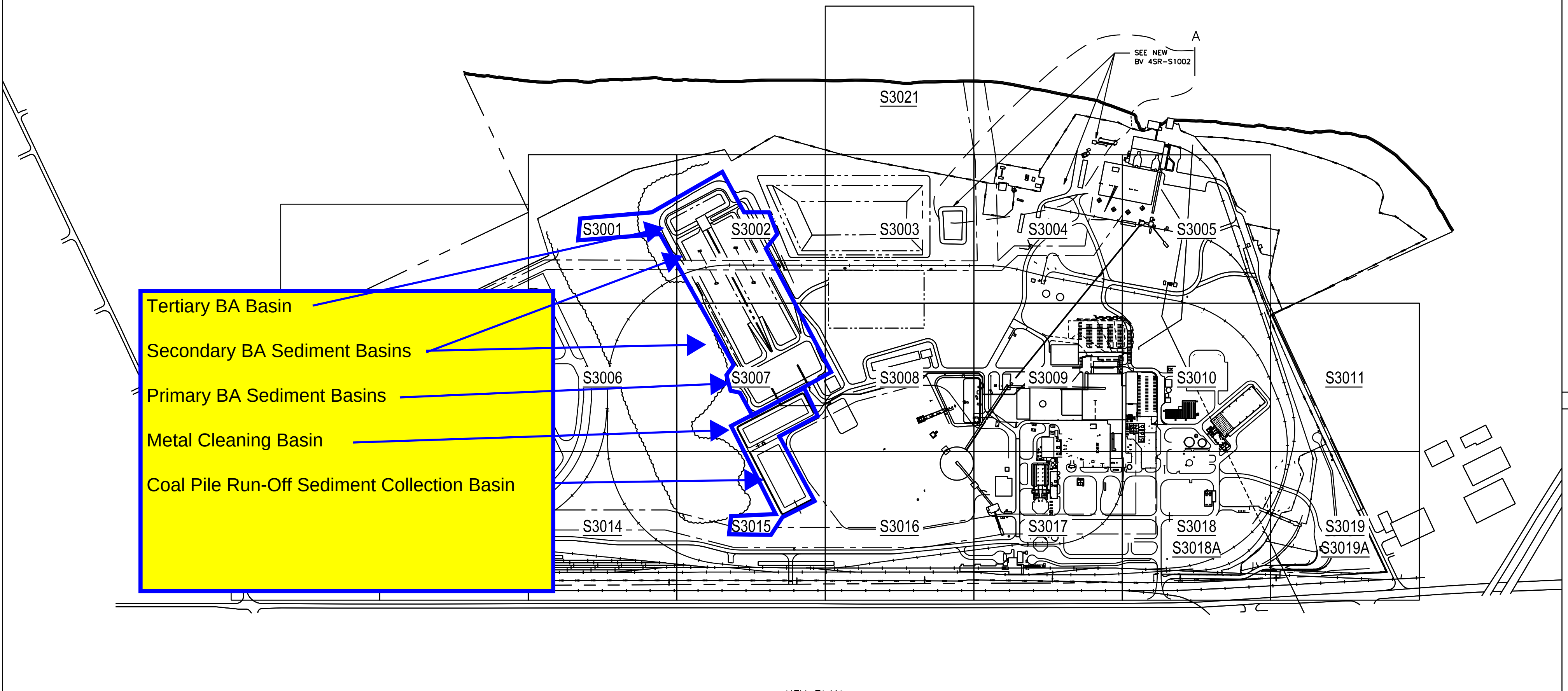
Abbreviations:
pcf – pounds per cubic foot
ksf – kips per square foot
cm/sec – centimeters per second
NA – Not applicable.
NT – Not tested.
Note:
The unit thickness and depth to top of bedrock values are limited to the area of the proposed Unit 4. Since the bedrock generally appears to dip to the northeast, others areas should evaluated on a case to case basis.

APPENDIX A

Document 11

Black & Veatch Drawing S3000, Grading & Drainage, Site Key Plan, General Notes & Legend

133116-4SD -S3000 A
PROJECT DRAWING NUMBER REV



KEY PLAN
SCALE: 1"=300'

GENERAL NOTES

1. PLANT GRID COORDINATE N 10,000 E 10,000 EQUALS UNIT 3 SITE GRID COORDINATE 0+00 N, 0+00 E. PLANT GRID COORDINATE N 10,000 E 10,000 IS EQUIVALENT TO NAD 27 WISCONSIN STATE PLANE, CENTRAL ZONE, FEET, N 374,611.6, E 2,090,770.04. ELEVATIONS SHOWN ARE NGVD29 FEET. THE GROUND GRID FACTOR IS 0.99988520. PLANT NORTH IS ROTATED 25° 10' CLOCKWISE FROM TRUE NORTH.
2. GENERAL NOTES APPLICABLE TO ALL S3000 SERIES DRAWINGS.
3. SEE DWG 133116-4SR -S1000 FOR OVERALL SITE PLOT PLAN.
4. SEE DWG 133116-4SR -S1001 FOR SITE ARRANGEMENT.
5. COORDINATES SHOWN ARE BASED ON THE PLANT GRID SYSTEM.
6. THE LOCATIONS OF THE EXISTING FACILITIES AND UNDERGROUND UTILITIES SHOWN ON THIS SERIES OF DRAWINGS REPRESENT THE BEST KNOWLEDGE OF THE ENGINEER. BEFORE ANY WORK IS STARTED IN THE AREA OF EXISTING FACILITIES AND UNDERGROUND UTILITIES, THE SUBCONTRACTOR SHALL CONFIRM THEIR LOCATIONS AND NOTIFY THE OWNER THAT WORK IS PLANNED IN THIS AREA.
7. GRADE SHALL SLOPE UNIFORMLY BETWEEN FINISH SPOT ELEVATIONS AND CONTOURS SHOWN ON THE PLANS.
8. A SMOOTH VERTICAL TRANSITION SHALL BE PROVIDED AT ROAD INTERSECTIONS.
9. ALL SLOPES SHALL BE 2.5(H):1(V) OR FLATTER, UNLESS NOTED OTHERWISE.
10. THE SUBCONTRACTOR IS RESPONSIBLE FOR TYING FINISHED CONTOURS INTO EXISTING CONTOURS IN AREAS WHERE THERE IS INSUFFICIENT SURVEY DATA OF THE EXISTING GRADE.
11. ALL DISTURBED AREAS NOT RECEIVING AGGREGATE, ASPHALT, OR CONCRETE SURFACING SHALL BE SEEDED PER EROSION CONTROL PLAN DWG.
12. SEE DWGS 133116-4SR -S3200 AND 133116-4SR -S3250 FOR SITE FENCING AND SURFACING PLAN AND DETAILS.
13. SEE DWGS 133116-4SR -S3400, 133116-4SR -S3910 AND 133116-4SR -S3911 FOR PLANT ROAD PLANS AND DETAILS.
14. SEE DRAWING 133116-4SD -S3900, S3901 AND S3902 FOR GRADING AND DRAINAGE DETAILS.
15. SPOT ELEVATIONS AND CONTOURS ON THESE DRAWINGS ARE TOP OF FINISHED GRADE. SUBTRACT FINISH SURFACING MATERIAL THICKNESS TO OBTAIN TOP OF SUBGRADE. CONTOURS IN AREAS OF NEW RAILWAY REPRESENT TOP OF SUBBALLAST. SEE DRAWINGS 133116-4SR -S3600 THROUGH 133116-4SR -S3607 FOR RAILWAY ALIGNMENT.
16. ALL AREAS OUTSIDE OF POWER BLOCK DISTURBED DURING CONSTRUCTION SHOULD BE RESTORED TO THEIR PRE-CONSTRUCTION CONDITIONS, AND STABILIZED UNLESS NOTED OTHERWISE.
17. ALL UNDERGROUND UTILITIES INCLUDING THE CIRCULATING WATER PIPE SHOULD HAVE A MINIMUM OF 2 FEET OF 95% COMPACTED EARTH COVER BEFORE BEING SUBJECTED TO ANY CONSTRUCTION TRAFFIC, UNLESS NOTED OTHERWISE. IF CONSTRUCTION TRAFFIC EXCEEDS 2700 PSF (EQUIVALENT TO THE TRACK LOAD OF A MANITOWOC M888 CRANE IN TRANSIENT CONDITION WITH NO BOOM LOAD), ONCE THE COVER REQUIREMENT IS MET, THEN THE LOAD MUST BE SPREAD OUT TO 2700 PSF OR LESS USING MATS OR CRIBBING.
18. SLOPE GRADE TO DRAIN IN DIRECTON OF FLOW ARROWS.
19. SEE DRAWING 133116-4SD -S3901 FOR CULVERT SCHEDULE AND DETAILS.
20. THE FINISHED GRADE SHALL BE SET 6 INCHES BELOW TOP OF CONCRETE UNLESS NOTED OTHERWISE. FINISHED GRADE SHOULD SLOPE AWAY FROM THE STRUCTURE AT A MINIMUM SLOPE OF 5% FOR THE FIRST FIVE FEET AND 2% FOR THE NEXT FIVE FEET.
21. EXISTING CULVERTS THAT INTERFERE WITH THE NEW DRAINAGE PLAN SHALL BE REMOVED.
22. ALL WORK DETAILED ON S3000 SERIES DRAWINGS SHALL BE COMPLETED UNDER CONTRACT 71.0201 EXCEPT AS NOTED OTHERWISE.

LEGEND APPLICABLE TO ALL S3000 DRAWINGS

PROPERTY LINE
—R/W— LIMIT OF RIGHT-OF-WAY
PERMANENT SECURITY FENCE
TEMPORARY CONSTRUCTION FENCE (PHASE 1)
TEMPORARY CONSTRUCTION FENCE (PHASE 2)
—99— NEW CONTOUR
□ AREA INLET
NEW STORM WATER SYSTEM
NEW CULVERT
DITCH/SWALE FLOW INDICATOR
GRADE SURFACE FLOW INDICATOR
123.45 + NEW SPOT ELEVATION
◉ SURVEY CONTROL MONUMENT
EXISTING FENCE
—99— EXISTING CONTOUR
- - -99- - - NEW CONTOUR (PHASE 1)
EXISTING TREELINE

ASPHALT SURFACING
AGGREGATE SURFACING
CONCRETE
EARTH
RIPRAP
SAND/BEDDING MAT'L
GRASS
WETLANDS

1 ← SECTION OR DETAIL NUMBER
S3000 ← DRAWING DESIGNATION NUMBER

PROJECT SURVEY CONTROL

EXISITNG CONTROL MONUMENT LOCATIONS

MONUMENT NO.	PLANT GRID COORDINATES		ELEVATION	DESCRIPTION	COMMENTS
	NORTHING	EASTING			
222	7265.00	10468.25	1178.77	CONCRETE MON. W/ ALUMINUM CAP	NEW MONUMENT
223	8369.18	11306.00	1171.14	CONCRETE MON. W/ ALUMINUM CAP	NEW MONUMENT
225	9256.00	11112.00	1179.44	CONCRETE MON. W/ ALUMINUM CAP	NEW MONUMENT
227	9650.00	11112.00	1179.08	CONCRETE MON. W/ ALUMINUM CAP	NEW MONUMENT
228	10000.00	10474.00	1179.09	CONCRETE MON. W/ ALUMINUM CAP	NEW MONUMENT
232	10360.00	11009.50	1177.92	CONCRETE MON. W/ ALUMINUM CAP	NEW MONUMENT
287	9400.00	11112.00	1178.90	CONCRETE MON. W/ ALUMINUM CAP	NEW MONUMENT
289	10310.00	10606.50	1180.00	CONCRETE MON. W/ ALUMINUM CAP	NEW MONUMENT
290	10310.00	10766.00	1179.16	CONCRETE MON. W/ ALUMINUM CAP	NEW MONUMENT
291	9138.00	11340.00	1173.60	CONCRETE MON. W/ ALUMINUM CAP	NEW MONUMENT
A East	9650.00	11471.10	1174.46	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
E East	9540.00	11471.10	1174.81	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
L East	9380.00	11471.10	1174.25	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
ADJ TRANS. LEVEL	9336.08	11471.10	1173.97	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
BM 6	10000.00	11471.10	1175.85	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
12	10350.00	10469.00	1179.96	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
8	10350.00	10373.00	1180.86	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
5	10350.00	10285.00	1180.66	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
1	10350.00	10185.00	1182.52	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
BM 4	10350.00	10000.00	1184.76	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
BM 1	10000.00	10000.00	1184.86	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
A West	9650.00	10000.00	1177.37	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
E West	9540.00	10000.00	1181.78	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT
L West	9380.00	10000.00	1182.52	CONCRETE MON. W/ ALUMINUM CAP	EXISTING MONUMENT

NOTE:

1. PUBLISHED COORDINATES FOR ADJ TRANS. LEVEL WERE NOT AVAILABLE. COORDINATES SHOWN ARE MEASURED.

ABBREVIATIONS APPLICABLE TO ALL S3000 DRAWINGS

A – ARC LENGTH
AGG – AGGREGATE
APPROX – APPROXIMATE
ASPH – ASPHALT
AVG – AVERAGE
BLDG – BUILDING
B/MH – BOTTOM OF MANHOLE ELEVATION
BOD – BOTTOM OF ELECTRICAL DUCT BANK
BOP – BOTTOM OF PIPE
BU – BELL UP
CHDPE – CORRUGATED HIGH DENSITY POLYETHYLENE PIPE
CJ – CONTRACTION JOINT
CL – CENTERLINE
CMP – CORRUGATED METAL PIPE
CO – CLEAN OUT
D – DEGREE OF CURVE
Δ – DELTA ANGLE OF HORIZONTAL CURVE
DI – DUCTILE IRON
DIA – DIAMETER
DIM – DIMENSION
DWG – DRAWING
E – EAST
EA – EACH
EF – EACH FACE
EGP – EDGE OF PAVEMENT
EGS – EDGE OF SHOULDER
EHH – ELECTRICAL HANDHOLE
EL – ELEVATION
EJ – EXPANSION JOINT
EW – EACH WAY
EXP – EXPANSION
FD – FLOOR DRAIN
FDN – FOUNDATION
FF – FINISHED FLOOR
FG – FINISHED GRADE
FRP – FIBER REINFORCED PIPE
FT – FOOT
HC – HANDICAPPED
HDPE – HIGH DENSITY POLYETHYLENE
HVCM – HORIZ & VERT CONTROL MONUMENT
HP – HIGH POINT
ID – INSIDE DIAMETER
IN – INCH
INV – INVERT
L – LENGTH
LC – LENGTH OF VERTICAL CURVE
LS – LIFT STATION
LTR – LATER
MATL – MATERIAL
MH – MANHOLE
MSL – MEAN SEA LEVEL
MW – MONITORING WELL
N – NORTH
NO. – NUMBER
NTS – NOT TO SCALE
OD – OUTSIDE DIAMETER
OWS – OIL/WATER SEPARATOR
PC – POINT OF CURVATURE
PE – PLAIN END
PI – POINT OF INTERSECTION
PL – PROPERTY LINE
PLCS – PLACES
PRC – POINT OF REVERSE CURVE
PT – POINT OF TANGENT
PVC – POINT OF VERTICAL CURVE
PVI – POINT OF VERTICAL INTERSECTION
PVT – POINT OF VERTICAL TANGENT
R – RADIUS
RCP – REINFORCED CONCRETE PIPE
RD – ROOF DRAIN
RED – REDUCER
REQ'D – REQUIRED
REV – REVISION
R/W – RIGHT-OF-WAY
S – SOUTH
SE – SUPERELEVATION
SIM – SIMILAR
STA – STATION
T – TANGENT LENGTH
TMH – TOP OF MANHOLE
TOC – TOP OF CONCRETE
TOG – TOP OF GRATING
TOP – TOP OF PAVEMENT
TYP – TYPICAL
UNO – UNLESS NOTED OTHERWISE
V – DESIGN SPEED
VERT – VERTICAL
W – WEST
W/ – WITH
W/O – WITHOUT
WP – WORK POINT

ZZ0S1F E1 ACAD 16.1s (LMS Tech)
A1APL006 1=1
10/23/08 10:58:21

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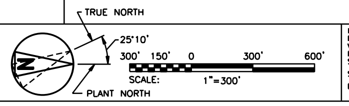
A	08/23/12	REVISED PER ECR #293370, DCF 6486	CMF	JD(JACOBS)			
4	08/20/08	CONFORMED TO CONSTRUCTION RECORDS – NIC	MRR	EX	MJS	MEH	JAH
3	03/07/07	REVISED PER ECN N-S-0215	MRR	EX	MJS	MEH	JAH
2	10/19/04	REVISED PER ECN N-S-0012	MRR	ACM	RLH	MEH	JAH
1	09/15/04	APPROVED FOR CONSTRUCTION	MRR	ACM	MJS	MEH	JAH
0	08/03/04	ISSUED FOR BIDS	WG	ACM		MEH	JAH



SCALE: 1"=300'

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WISCONSIN.
SIGNED MONTY E. HINTZ
DATE 09/15/04 REG NO. E-36488

BLACK & VEATCH CORPORATION

ENGINEER	ACM	DRAWN	WG
CHECKED	MJS	DATE	09/15/04

WISCONSIN PUBLIC SERVICE CORP
WESTON GENERATING STATION UNIT 4

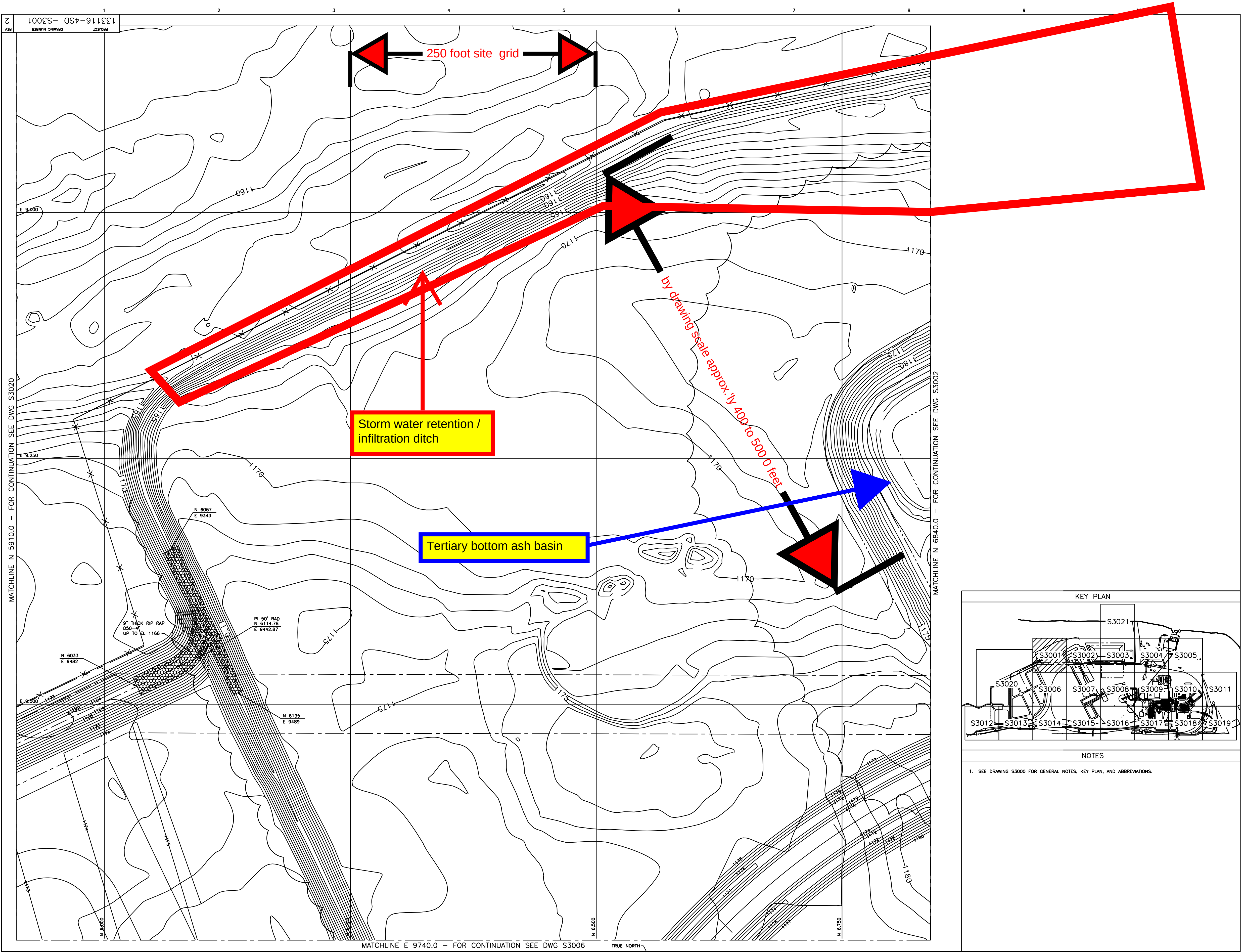
GRADING & DRAINAGE-SITE
KEY PLAN, GENERAL NOTES & LEGEND

PROJECT DRAWING NUMBER 133116-4SD -S3000
REV A
CODE
AREA

APPENDIX A

Document 12

Black & Veatch Drawing S3001, Grading & Drainage, Site Area 1 Plan



NOTES

1. SEE DRAWING S3000 FOR GENERAL NOTES, KEY PLAN, AND ABBREVIATIONS.

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
2	08/20/08	CONFORMED TO CONSTRUCTION RECORDS – NIC	MRR	ACM	MJS	MEH	JAH
1	09/15/04	APPROVED FOR CONSTRUCTION	MRR	ACM	MJS	MEH	JAH
0	08/03/04	ISSUED FOR BIDS	WG	ACM		MEH	JAH

TRUE NORTH
25°10'
PLANT NORTH
30' 20' 10' 0 30' 60'
SCALE: 1"=30'

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WISCONSIN.
SIGNED MONTY E. HINTZ
DATE 09/15/04 REG NO. E-36488

BLACK & VEATCH CORPORATION
ENGINEER ACM
DRAWN WG
CHECKED MJS
DATE 09/15/04

WISCONSIN PUBLIC SERVICE CORP
WESTON GENERATING STATION UNIT 4

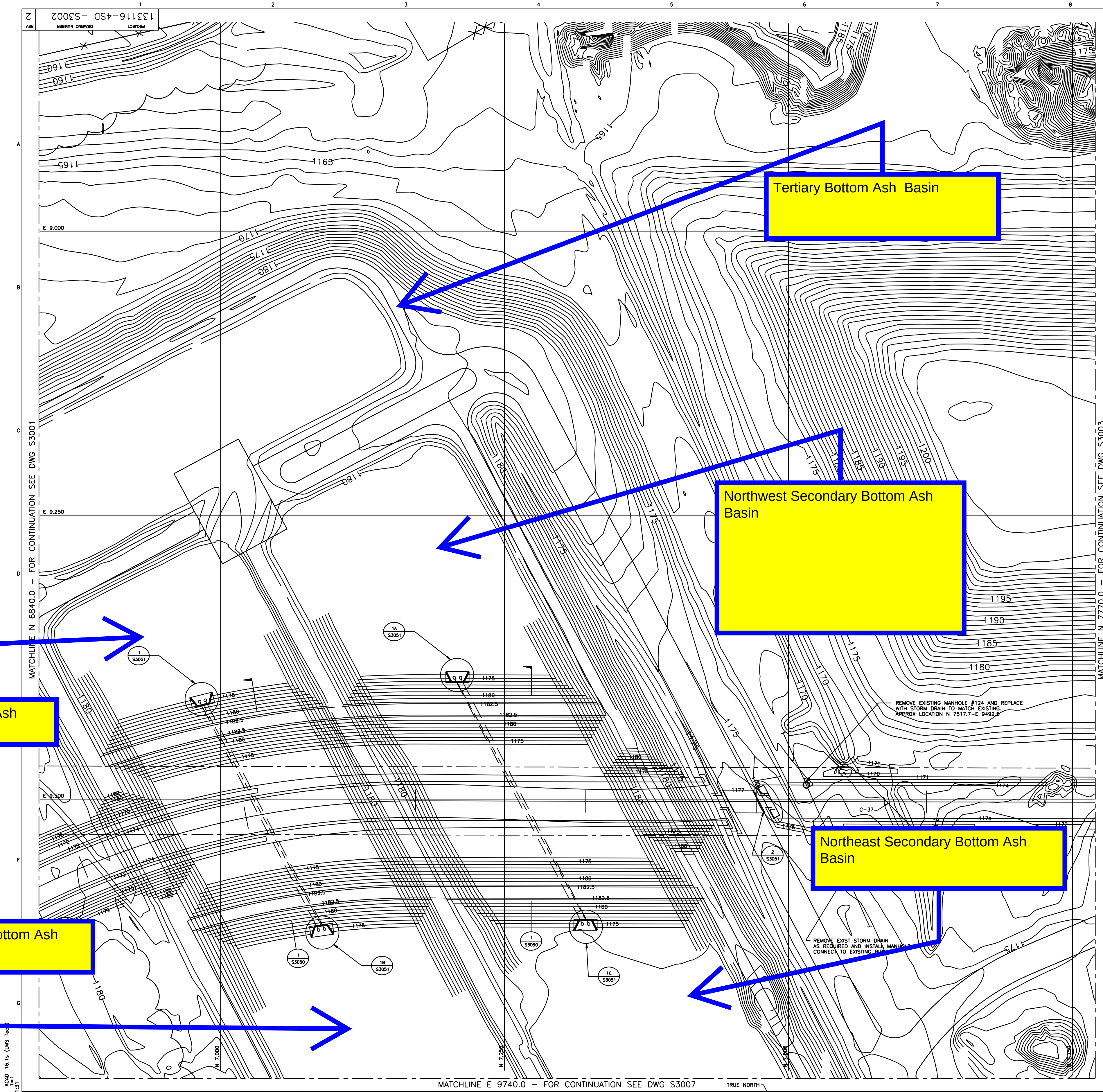
GRADING & DRAINAGE-SITE
AREA 1-PLAN

PROJECT DRAWING NUMBER
133116-4SD -S3001
REV 2
CODE
AREA

APPENDIX A

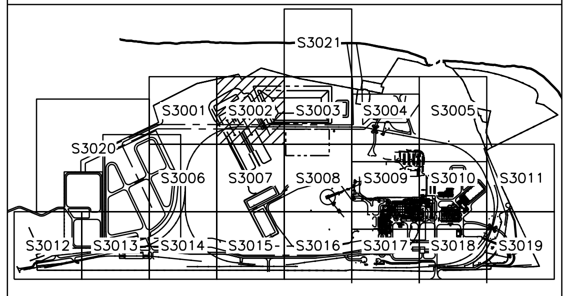
Document 13

Black & Veatch Drawing S3002, Grading & Drainage, Site Area 2 Plan



REMOVE EXISTING MANHOLE #124 AND REPLACE WITH STORM DRAIN TO MATCH EXISTING. APPROX LOCATION N 7517.7–E 9492.5

REMOVE EXIST STORM DRAIN AS REQUIRED AND INSTALL MANHOLE CONNECT TO EXISTING PIPE



NOTES

1. SEE DRAWING S3000 FOR GENERAL NOTES, KEY PLAN, AND ABBREVIATIONS.
2. FOR LOCATION OF EXISTING MANHOLE #124 SEE SARGENT & LUNDY DWGS C-20 AND C-40.

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
2	08/20/08	CONFORMED TO CONSTRUCTION RECORDS – NIC	MRR	ACM	MJS	MEH	JAH
1	09/15/04	APPROVED FOR CONSTRUCTION	MRR	ACM	MJS	MEH	JAH
0	08/03/04	ISSUED FOR BIDS	WG	ACM		MEH	JAH

TRUE NORTH
25°10'
PLANT NORTH
30' 20' 10' 0 30' 60'
SCALE: 1"=30'

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WISCONSIN.
SIGNED MONTY E. HINTZ
DATE 09/15/04 REG NO. E-36488

BLACK & VEATCH CORPORATION
ENGINEER ACM
DRAWN WG
CHECKED MJS
DATE 09/15/04

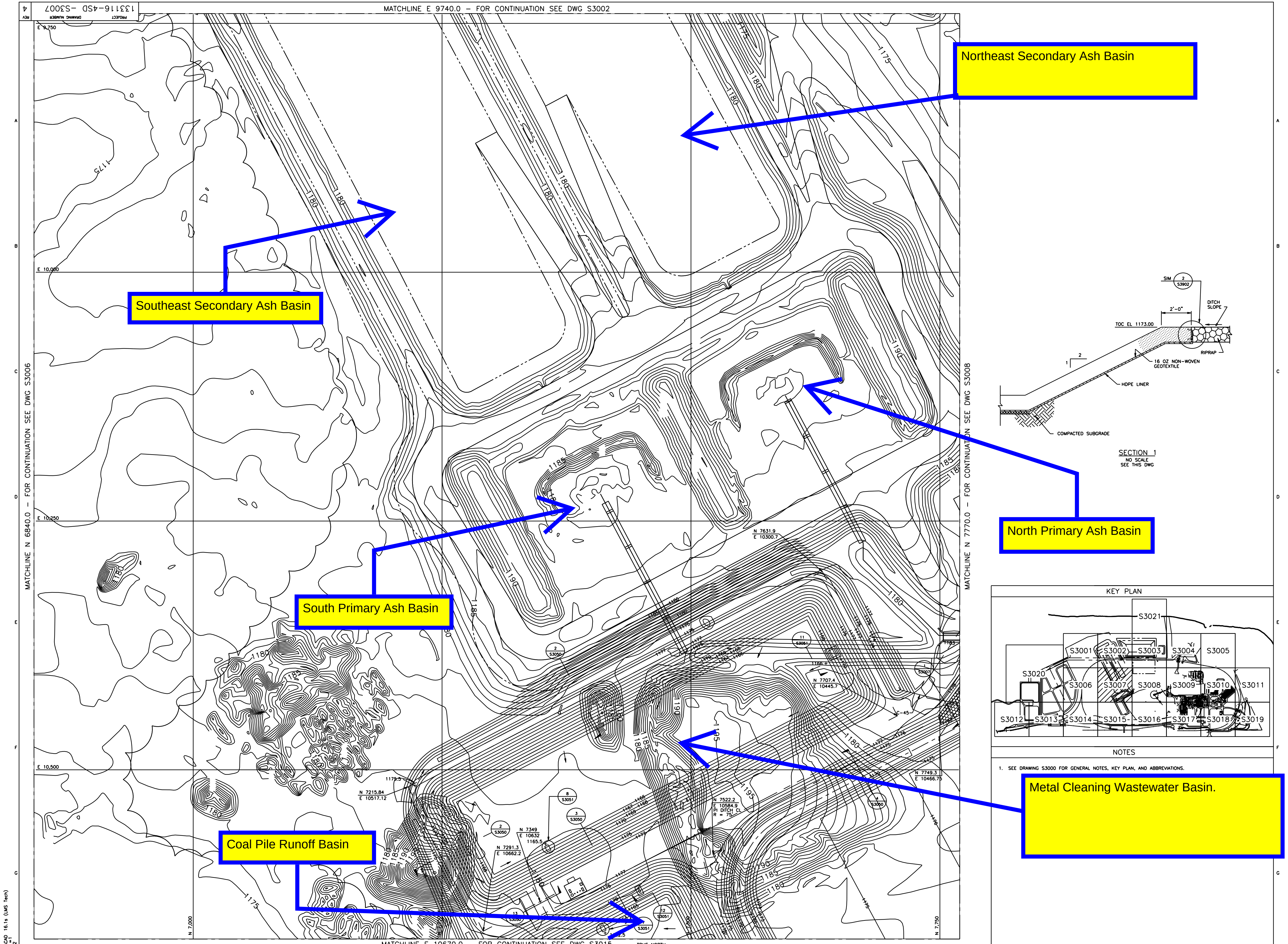
WISCONSIN PUBLIC SERVICE CORP
WESTON GENERATING STATION UNIT 4
GRADING & DRAINAGE–SITE
AREA 2–PLAN

PROJECT DRAWING NUMBER 133116–4SD –S3002
REV 2
CODE
AREA

APPENDIX A

Document 14

Black & Veatch Drawing S3007, Grading & Drainage, Site Area 7 Plan



NOTES

1. SEE DRAWING S3000 FOR GENERAL NOTES, KEY PLAN, AND ABBREVIATIONS.

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
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3	06/13/05	REVISED PER ECN N-S-0104	WG	ACM	MJS	MEH	JAH
2	06/03/05	REVISED PER ECN N-S-0101	WG	ACM	MJS	MEH	JAH
1	09/15/04	APPROVED FOR CONSTRUCTION	MRR	ACM	MJS	MEH	JAH
0	08/03/04	ISSUED FOR BIDS	WG	ACM		MEH	JAH

TRUE NORTH 25°10'
PLANT NORTH

30' 20' 10' 0 30' 60'
SCALE: 1"=30'

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WISCONSIN.

SIGNED MONTY E. HINTZ
DATE 09/15/04 REG NO. E-36488

BLACK & VEATCH CORPORATION
ENGINEER ACM DRAWN WG
CHECKED MJS DATE 09/15/04

WISCONSIN PUBLIC SERVICE CORP
WESTON GENERATING STATION UNIT 4

GRADING & DRAINAGE-SITE
AREA 7-PLAN

PROJECT 133116-4SD
DRAWING NUMBER -S3007
REV 4
CODE
AREA

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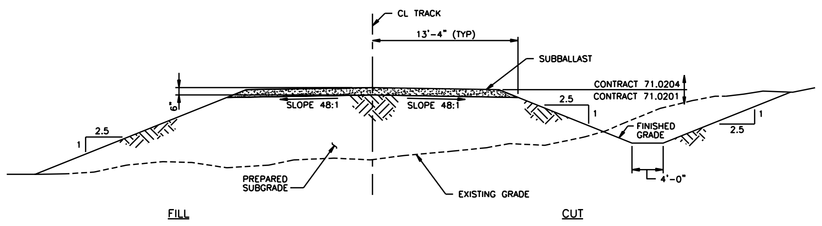
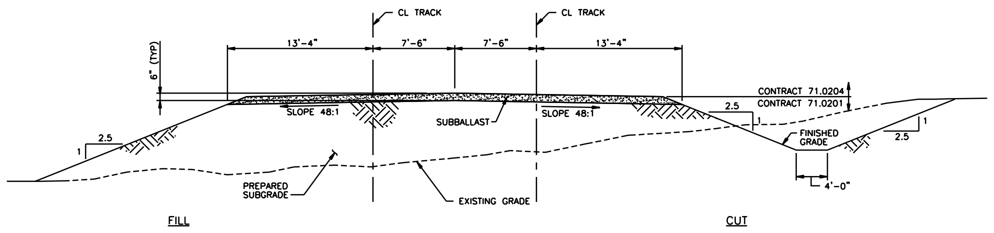
APPENDIX A

Document 15

Black & Veatch Drawing S3050, Grading & Drainage, Site Typical Sections



TYPICAL RAILROAD TRACK EMBANKMENT SECTION (SINGLE TRACK)
NO SCALE



TYPICAL RAILROAD TRACK EMBANKMENT SECTION (DOUBLE TRACK)
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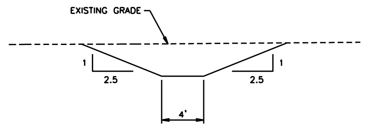
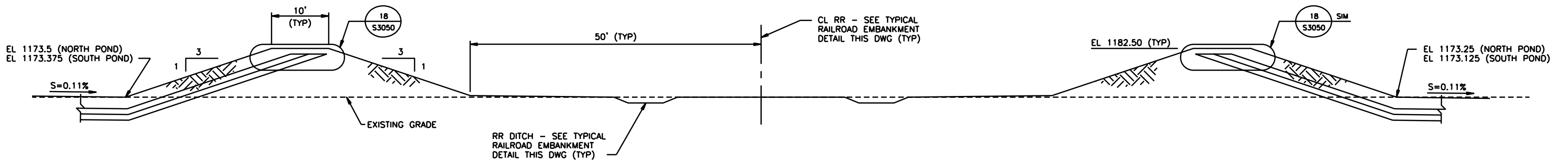


NOTE: THIS DITCH SECTION APPLICABLE TO ALL DITCHES UNLESS OTHERWISE NOTED.

TYPICAL DITCH SECTION
NOT TO SCALE



SECTION 1
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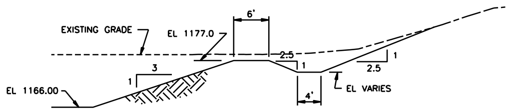
SEE DWG S3002



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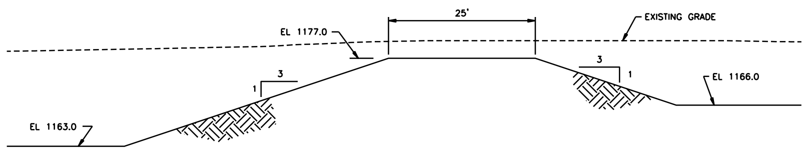
NO SCALE
SEE DWG S3007



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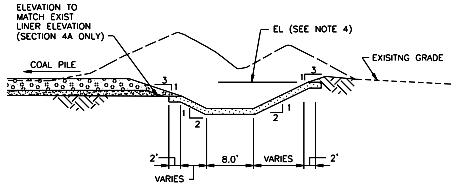
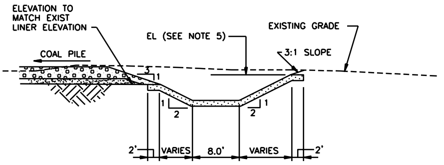
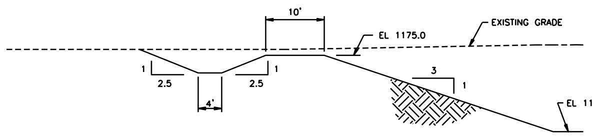
NO SCALE
SEE DWG S3007



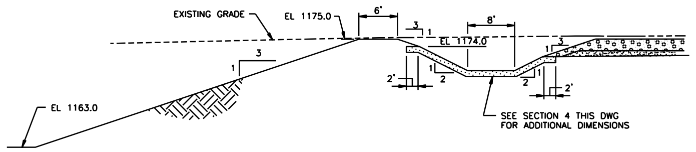
SECTION 4 & 4A
NO SCALE
SEE DWGS S3007, S3008, & S3009



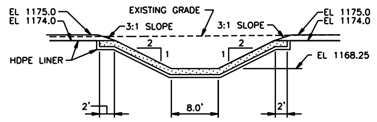
SECTION 5
NO SCALE
SEE DWGS S3009 & S3017



SECTION 6
NO SCALE
SEE DWG S3015



SECTION 7
NO SCALE
SEE DWG S3015



SECTION 8
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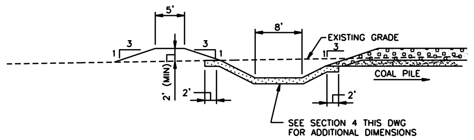
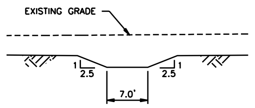
SEE DWG S3015



SECTION 9
NO SCALE
SEE DWGS S3015 & S3016



SECTION 10
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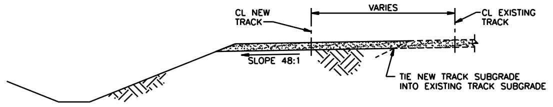
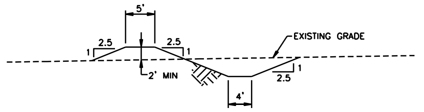
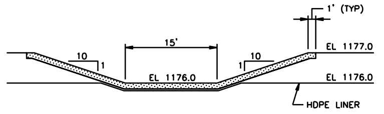
SEE DWG S3020



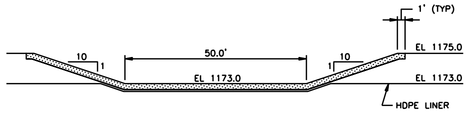
SECTION 11
NO SCALE
SEE DWGS S3014, S3015, & S3016



SECTION 12
NO SCALE
SEE DWG S3017



SECTION 13
NO SCALE
SEE DWG S3007



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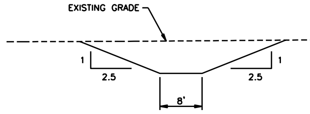
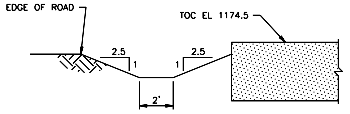


SECTION 15
NOT TO SCALE
SEE DWG S3004



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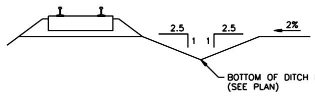
SEE DWG S3013



SECTION 17
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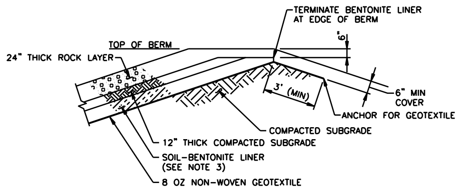


DETAIL 18
NO SCALE
SEE THIS DWG

NOTES

1. SEE DWG S3000 FOR GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. SEE DWG S3902 FOR CONCRETE DITCH LINER AND CONCRETE SPILLWAY LINER DETAILS.
3. SOIL BENTONITE LINER SHALL BE 12" THICK FROM EL 1182.0' (TOP OF LINER) TO EL 1178.5 AND SHALL INCREASE UNIFORMLY THEREAFTER TO A 20" THICK SECTION AT THE BASE OF THE BERM.
4. THE TOP OF CONCRETE ELEVATION ON THE OUTSIDE OF THE DITCH SHALL BE MAINTAINED 30" ABOVE THE TOP OF LINER ELEVATION ON THE INSIDE OF THE DITCH.
5. THE TOP OF CONCRETE ELEVATION ON THE OUTSIDE OF THE DITCH SHALL BE MAINTAINED 24" ABOVE THE TOP OF LINER ELEVATION ON THE INSIDE OF THE DITCH.

ZZ0S1F E1 ACAD 16.1s (LMS Tech)
A1APL006 12:19:28 1=1
10/23/08

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
5	08/20/08	CONFORMED TO CONSTRUCTION RECORDS - NIC	SLS	ACM	MJS	MEH	JAH
4	10/05/05	REVISED PER ECN-N-S-0139	SLS	ACM	MJS	MEH	JAH
3	06/03/05	REVISED PER ECN-N-S-0101	MJW	ACM	MJS	MEH	JAH
2	05/18/05	REVISED PER ECN-N-S-0088	MDS	ACM	JLL	MEH	JAH
1	09/15/04	APPROVED FOR CONSTRUCTION	MRR	ACM	MJS	MEH	JAH
0	08/03/04	ISSUED FOR BIDS	WG	ACM		MEH	JAH

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WISCONSIN.
SIGNED MONTY E. HINTZ
DATE 09/15/04 REG NO. E-36488

BLACK & VEATCH
CORPORATION

ENGINEER ACM
DRAWN WG
CHECKED MJS
DATE 09/15/04

WISCONSIN PUBLIC SERVICE CORP
WESTON GENERATING STATION UNIT 4

GRADING & DRAINAGE-SITE
TYPICAL SECTIONS

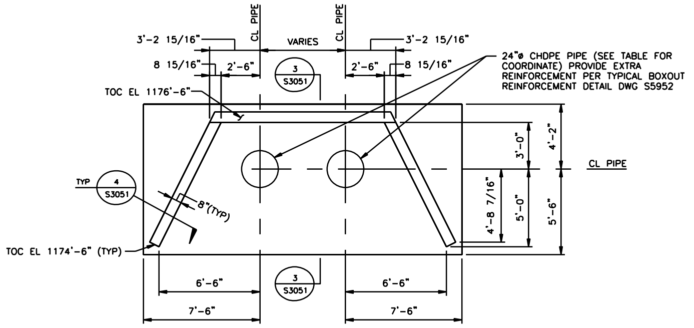
PROJECT DRAWING NUMBER REV
133116-4SD -S3050 5
CODE
AREA

APPENDIX A

Document 16

Black & Veatch Drawing S3051, Grading & Drainage, Site Typical Sections & Details

133116-4SD -S3051 4
PROJECT DRAWING NUMBER REV



DETAIL 1, 1A, 1B, 1C

SEE DWG S3002
SCALE: 1/4"=1'-0"

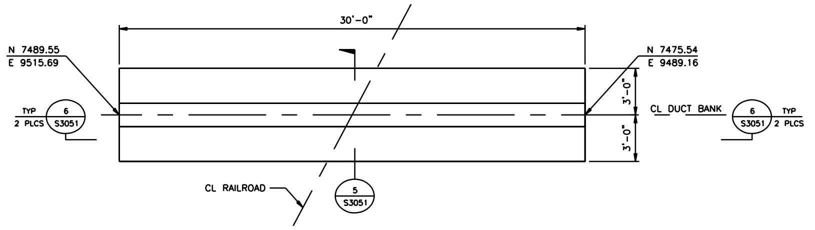
BILL OF QUANTITY TABLE*			
ITEM	CONCRETE (CY)	ESTIMATED REBAR (TNS)	EMBEDMENTS (LBS)
FND/MATS	58.8	1.40	0
PED/WALLS/ EQUIP BASES	8.0	0.48	0
ELEVATED CONCRETE	0	0	0

* BILL OF QUANTITY IS FOR ALL 4 FOUNDATIONS

NOTES:

1. FOR AS-BUILT REINFORCING QUANTITIES REFER TO REINFORCING STEEL SHOP DRAWINGS.
2. CONCRETE QUANTITIES ARE "NEAT" QUANTITIES.
3. QUANTITIES INDICATED ARE FOR CONSTRUCTION PLANNING PURPOSES ONLY. ALL QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO PURCHASING MATERIALS FOR FORMWORK AND CONCRETE PLACEMENT.
4. ESTIMATED REINFORCING QUANTITIES DO NOT INCLUDE STANDEES, CHAIRS OR SUPPLEMENTAL REINFORCEMENT.

SECTION	PIPE 1		PIPE 2	
	NORTHING	EASTING	NORTHING	EASTING
1	6986.50	9413.00	6981.50	9414.25
1A	7211.25	9393.25	7205.75	9393.25
1B	7086.25	9615.25	7091.50	9614.50
1C	7318.50	9610.00	7324.00	9610.00



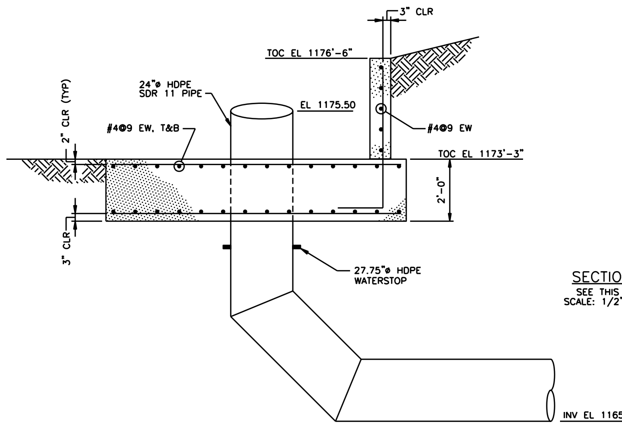
DETAIL 2

SEE DWG S3002
SCALE: 1/4"=1'-0"
(SEE NOTE 4)

BILL OF QUANTITY TABLE			
ITEM	CONCRETE (CY)	ESTIMATED REBAR (TNS)	EMBEDMENTS (LBS)
FND/MATS	13.6	1.17	0
PED/WALLS/ EQUIP BASES	0	0	0
ELEVATED CONCRETE	0	0	0

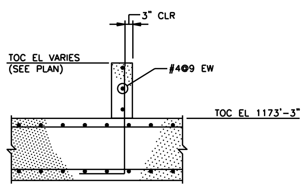
NOTES:

1. FOR AS-BUILT REINFORCING QUANTITIES REFER TO REINFORCING STEEL SHOP DRAWINGS.
2. CONCRETE QUANTITIES ARE "NEAT" QUANTITIES.
3. QUANTITIES INDICATED ARE FOR CONSTRUCTION PLANNING PURPOSES ONLY. ALL QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO PURCHASING MATERIALS FOR FORMWORK AND CONCRETE PLACEMENT.
4. ESTIMATED REINFORCING QUANTITIES DO NOT INCLUDE STANDEES, CHAIRS OR SUPPLEMENTAL REINFORCEMENT.



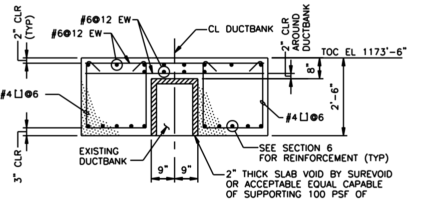
SECTION 3

SEE THIS DWG
SCALE: 1/2"=1'-0"



SECTION 4

SEE THIS DWG
SCALE: 1/2"=1'-0"



SECTION 5

SEE THIS DWG
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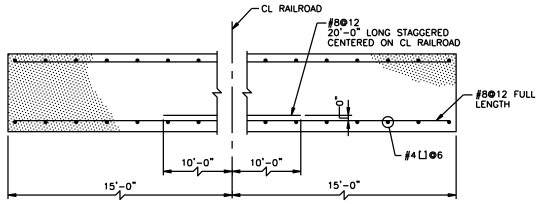


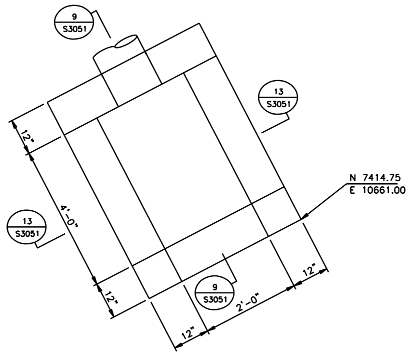
SECTION 6

SEE THIS DWG
SCALE: 1/2"=1'-0"

BILL OF QUANTITY TABLE			
ITEM	CONCRETE (CY)	ESTIMATED REBAR (TNS)	EMBEDMENTS (LBS)
FND/MATS	1.6	0.08	0
PED/WALLS/ EQUIP BASES	1.6	0.04	0
ELEVATED CONCRETE	0	0	0

NOTES:

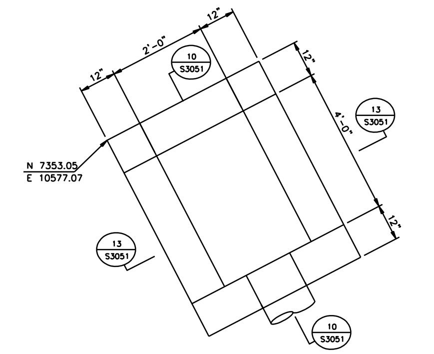
1. FOR AS-BUILT REINFORCING QUANTITIES REFER TO REINFORCING STEEL SHOP DRAWINGS.
2. CONCRETE QUANTITIES ARE "NEAT" QUANTITIES.
3. QUANTITIES INDICATED ARE FOR CONSTRUCTION PLANNING PURPOSES ONLY. ALL QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO PURCHASING MATERIALS FOR FORMWORK AND CONCRETE PLACEMENT.
4. ESTIMATED REINFORCING QUANTITIES DO NOT INCLUDE STANDEES, CHAIRS OR SUPPLEMENTAL REINFORCEMENT.



DETAIL 7

COAL RUN-OFF POND SUMP DETAIL

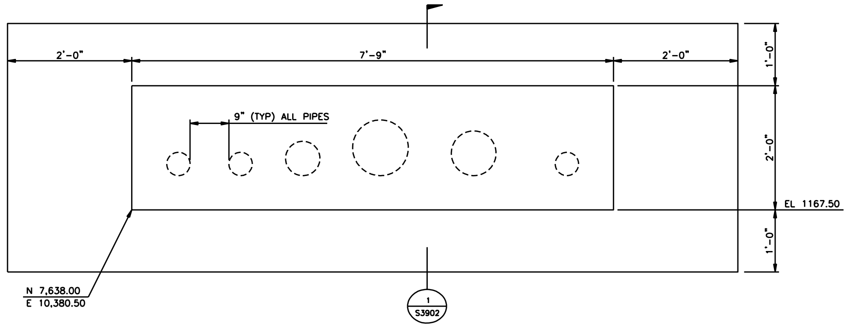
NO SCALE
SEE DWG S3007



DETAIL 8

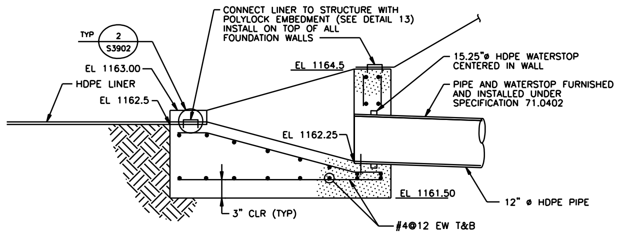
METAL WASTE CLEANING POND SUMP DETAIL

NO SCALE
SEE DWG S3007



SECTION 11

NO SCALE
SEE DWG S3007



SECTION 9

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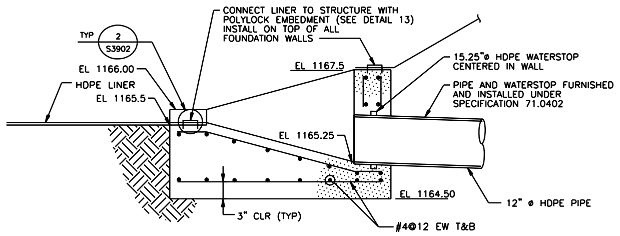

SECTION 10

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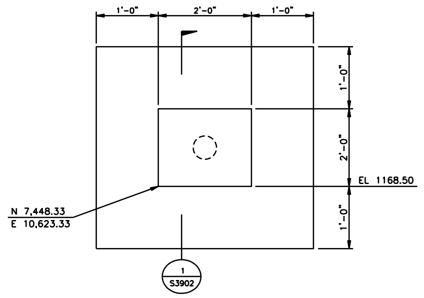
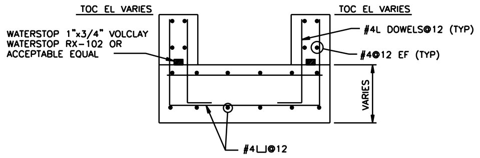


SECTION 12

NO SCALE
SEE DWG S3007



SECTION 13

NO SCALE
SEE DWG S3051

NOTES

1. SEE DWG S3000 FOR GENERAL NOTES, LEGEND, AND ABBREVIATIONS.
2. CONCRETE SHALL BE MIX CLASS B1.
3. ALL WORK ON THIS DRAWING SHALL BE PERFORMED UNDER SPECIFICATION 71.0201 UNLESS NOTED OTHERWISE.
4. LOCATION OF EXISTING DUCTBANK SHALL BE FIELD VERIFIED.

ZZ0S1F ACAD 16.1s (LMS Tech)
A1APL006 E1 1=1
10/23/08 12:21:07

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
4	08/20/08	CONFORMED TO CONSTRUCTION RECORDS – NIC	MJW	TLK	ACM	MEH	JAH
3	04/06/05	REVISED PER ECN N-S-0071	MJW	TLK	ACM	MEH	JAH
2	03/02/05	ISSUED PER ECN-N-S-0056	MJW	TLK	ACM	MEH	JAH
1	09/15/04	APPROVED FOR CONSTRUCTION	MRR	ACM	MJS	MEH	JAH
0	08/03/04	ISSUED FOR BIDS	MJW	ACM		MEH	JAH

12" 6" 0 1' 2' 3' 4' 5'
1/2"=1'-0"
4' 2' 0 4' 8'
1/4"=1'-0"

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF WISCONSIN.
SIGNED MONTY E. HINTZ
DATE 09/15/04 REG NO. E-36488

BLACK & VEATCH CORPORATION

ENGINEER	ACM	DRAWN	MJW
CHECKED	MJS	DATE	09/15/04

WISCONSIN PUBLIC SERVICE CORP
WESTON GENERATING STATION UNIT 4

GRADING & DRAINAGE-SITE
TYPICAL SECTIONS & DETAILS

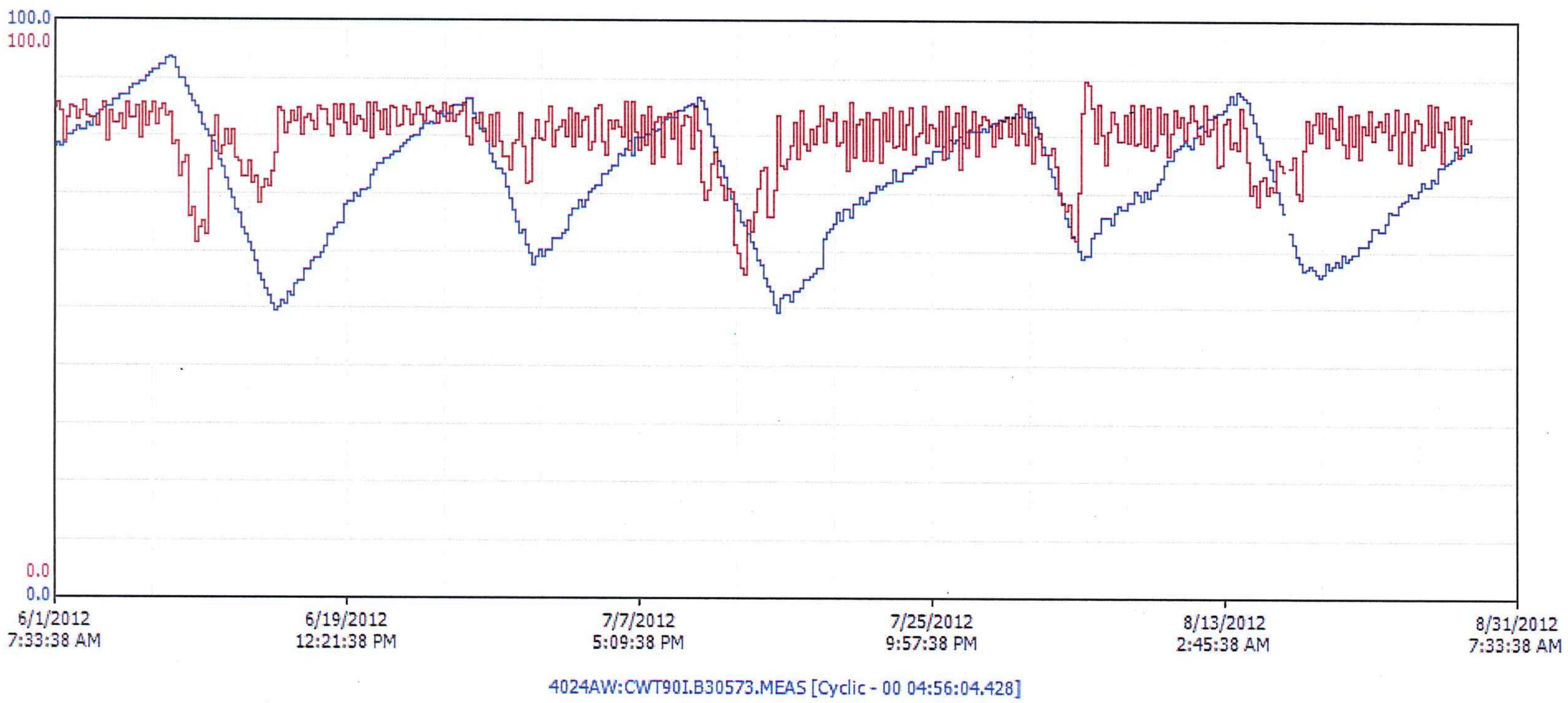
PROJECT 133116-4SD
DRAWING NUMBER -S3051
REV 4
CODE
AREA

APPENDIX A

Document 17

Typical Pond Water Level Report

BAT Pond Levels



Tag Name	Description	Server	Color	Units	Minimum	Maximum	IO Address	Time Offset
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☑ CWT90I.B...	BOTTOM ASH TREATMENT WATER STORAGE POND LEVEL	4024AW	🟥	in	0.0	100.0	\\4024AW\InSQL_MDA...	0:00:00....

8/28/2012 2:33:00 PM
\\integrys\data\users\BBEATY\ActiveFactoryTrends\BAT Pond Levels.aaTrend

APPENDIX A

Document 18

Preventive Management Procedure (Draft)

Wisconsin Public Service Corporation	No: PMP-W00-WT-001	REV: 0
Weston Power Plant	Subject: Waste Treatment Pond Impoundment Inspection	
Preventative Maintenance Procedure	Date:	Page 1 of 5
Reviewed By:	Approved By:	

1.0 PURPOSE

1.1 This procedure provides instruction for performing visual inspections of the Units 3 & 4 waste water treatment ponds for embankment integrity. This inspection will allow for the identification of potential problems and resolution in a timely manner.

2.0 PREPARATION

2.1 PREREQUISITES

1. TOOLS AND SUPPLIES
   - a. None
2. PERMITS, FORMS, CHECKLISTS REQUIRED
   - a. Inspection checklist forms for documenting observations

2.2 PRECAUTIONS AND LIMITATIONS

1. AVOID walking though poisin ivy
2. AVOID walking into thistles

3.0 INITIAL CONDITIONS

3.1 None

4.0 PROCEDURE

4.1 Conducting Inspections

1. The inspections will consist of a visual overview of the embankments conducted from the embankment crest or access road, concentrating on unusually or hazardous conditions and for appearances of possible embankment instability which warranted the implementation of additional inspections. It is expected that such weekly inspections will be conducted from a vehicle or walking the embankment crest and shall record all issues identified.

4.2 NORTH PRIMARY BASIN

1. VERIFY water elevation is below X. NOTIFY Shift Manager immedately if water level is above XX indicated elevation.
2. VERIFY all visible slopes of embankment are free of erosion, cracks, seepage, bulges, animal holes or other signs of instability. RECORD all identified discrepancies.

4.2 (Continued)

3. VERIFY no trees or woody vegetation is growing in the embankment. RECORD all identified discrepancies.
4. VERIFY no cracks, scarps or settlement on crest. RECORD all identified discrepancies.
5. VERIFY inlet culvert is not clogged and water is able to flow freely. RECORD all identified discrepancies.
6. VERIFY outlet culvert is not clogged and water is able to flow freely. RECORD all identified discrepancies.
7. VERIFY no "Boils" beneath ponded water. RECORD all OBSERVED "Boils".
8. VERIFY there are no "wet areas" or sinkholes outside of the embankment. Any observed wet areas could indicate leakage and must be investigated further. RECORD all OBSERVED "wet areas" or sinkholes.

4.3 SOUTH PRIMARY BASIS

1. VERIFY water elevation is below X. NOTIFY Shift Manager immedately if water level is above XX indicated elevation.
2. VERIFY all visible slopes of embankment are free of erosion, cracks, seepage, bulges, animal holes or other signs of instability. RECORD all identified discrepancies.
3. VERIFY no trees or woody vegetation is growing in the embankment. RECORD all identified discrepancies..
4. VERIFY no cracks, scarps or settlement on crest. RECORD all identified discrepancies.
5. VERIFY inlet culvert is not clogged and water is able to flow freely. RECORD all identified discrepancies.
6. VERIFY outlet culvert is not clogged and water is able to flow freely. RECORD all identified discrepancies.
7. VERIFY no "Boils" beneath ponded water. RECORD all OBSERVED "Boils".
8. VERIFY there are no "wet areas" or sinkholes outside of the embankment. Any observed wet areas could indicate leakage and must be investigated further. RECORD all OBSERVED "wet areas" or sinkholes.

4.4 NORTH SECONDARY BASIN

1. VERIFY water elevation is below X. NOTIFY Shift Manager immedately if water level is above XX indicated elevation.
2. VERIFY all visible slopes of embankment are free of erosion, cracks, seepage, bulges, animal holes or other signs of instability. RECORD all identified discrepancies.

4.4 (Continued)

3. VERIFY no trees or woody vegetation is growing in the embankment. RECORD all identified discrepancies.
4. VERIFY no cracks, scarps or settlement on crest. RECORD all identified discrepancies.
5. VERIFY inlet culvert is not clogged and water is able to flow freely. RECORD all identified discrepancies.
6. VERIFY outlet culvert is not clogged and water is able to flow freely. RECORD all identified discrepancies.
7. VERIFY no "Boils" beneath ponded water. RECORD all OBSERVED "Boils".
8. VERIFY there are no "wet areas" or sinkholes outside of the embankment. Any observed wet areas could indicate leakage and must be investigated further. RECORD all OBSERVED "wet areas" or sinkholes.

4.5 SOUTH SECONDARY BASIN

1. VERIFY water elevation is below X. NOTIFY Shift Manager immedately if water level is above XX indicated elevation.
2. VERIFY all visible slopes of embankment are free of erosion, cracks, seepage, bulges, animal holes or other signs of instability. RECORD all identified discrepancies.
3. VERIFY no trees or woody vegetation is growing in the embankment. RECORD all identified discrepancies.
4. VERIFY no cracks, scarps or settlement on crest. RECORD all identified discrepancies.
5. VERIFY inlet culvert is not clogged and water is able to flow freely. RECORD all identified discrepancies.
6. VERIFY outlet culvert is not clogged and water is able to flow freely. RECORD all identified discrepancies.
7. VERIFY no "Boils" beneath ponded water. RECORD all OBSERVED "Boils".
8. VERIFY there are no "wet areas" or sinkholes outside of the embankment. Any observed wet areas could indicate leakage and must be investigated further. RECORD all OBSERVED "wet areas" or sinkholes.

4.6 SLUICE WATER STORAGE BASIN

1. VERIFY water elevation is below X. NOTIFY Shift Manager immedately if water level is above XX indicated elevation.
2. VERIFY all visible slopes of embankment are free of erosion, cracks, seepage, bulges, animal holes or other signs of instability. RECORD all identified discrepancies.

4.6 (Continued)

3. VERIFY no trees or woody vegetation is growing in the embankment. RECORD all identified discrepancies.
4. VERIFY no cracks, scarps or settlement on crest. RECORD all identified discrepancies.
5. VERIFY inlet culvert is not clogged and water is able to flow freely. RECORD all identified discrepancies.
6. VERIFY outlet culvert is not clogged and water is able to flow freely. RECORD all identified discrepancies.
7. VERIFY no "Boils" beneath ponded water. RECORD all OBSERVED "Boils".
8. VERIFY there are no "wet areas" or sinkholes outside of the embankment. Any observed wet areas could indicate leakage and must be investigated further. RECORD all OBSERVED "wet areas" or sinkholes.

5.0 RELINE UP

5.1 None

6.0 POST MAINTENANCE TEST/RETEST

6.1 None

7.0 REFERENCES

ATTACHMENT A - INSPECTION CHECKLIST
(Page 1 of 1)

	North Pri Basin	South Pri Basin	North Sec Basin	South Sec Basin	Sluice Water Storage Basin
Water Elevation above indicated level					
Any signs of bank instability, animal holes, seepage					
Any woody trees or vegetation in enbankment					
Any cracks, scraps or settlement on crest					
Inlet culvert clogged with debris material					
Outlet culvert clogged with debris material					
Any "Boils" beneath ponded water					
Any "wet areas" or sinkholes outside of embankment					
Comments					

APPENDIX B

Document 19

Dam Inspection Check Lists

Site Name:	**Weston Power Plant**	**Date:**	**8/21/12**
Unit Name:	**Northwestern Secondary Pond**	**Operator's Name:**	
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** ☒
	Inspector's Name:	Cleighton Smith and Lauren Ohotzke	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	N/A		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	X		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	X		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	X		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?	N/A		Is water exiting outlet flowing clear?	N/A	
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	N/A		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
1	Inspections are done periodically; not currently documented, but draft of documentation to be used in future internal inspections is currently in the process of being finalized.
2	Documentation provided by Utility.
3	Documentation provided by Utility.
4	“Not Applicable”
5	Documentation provided by Utility.
6	“Not Applicable”
8	Information regarding foundation prep is not currently available, but not problems were seen while on site.
12	“Not Applicable”
20	“Not Applicable”

Coal Combustion Waste (CCW)

Impoundment Inspection:

There is currently a WPDES Permit issued for the discharge of the “Weston Units 3 & 4” (power units); however, this permit does not address the impoundments and is therefore not applicable here.

Impoundment NPDES Permit **INSPECTOR**

Date
Impoundment Name

Impoundment Company
EPA Region

State Agency
(Field Office) Address
Name of Impoundment

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☐

Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment?	☒	☐

IMPOUNDMENT FUNCTION: Receives water from Northeastern Secondary Pond via 2 submerged 24” CDHP pipes (under the railroad tracks separating the two ponds). This pond continues with the same function as the Northeastern Secondary Pond, collecting bottom ash residuals via settling only. Water is then pumped from the pond through the treatment center, followed by the Tertiary Pond.

Nearest Downstream Town Name: Mosinee, WI

Distance from the impoundment: Approx. 4.5 miles

Location:

Latitude	44	Degrees	51	Minutes	15	Seconds	**N**
Longitude	-89	Degrees	39	Minutes	26	Seconds	**W**

State Wisconsin **County** Marathon

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency? Wisconsin Department of Natural Resources

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☒ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

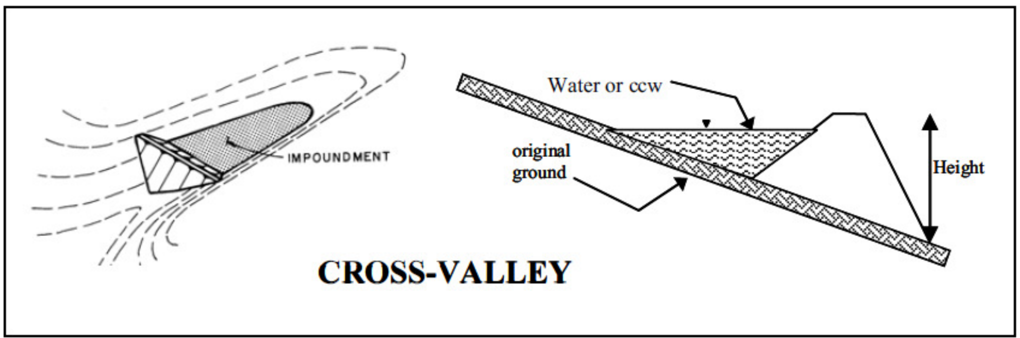
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

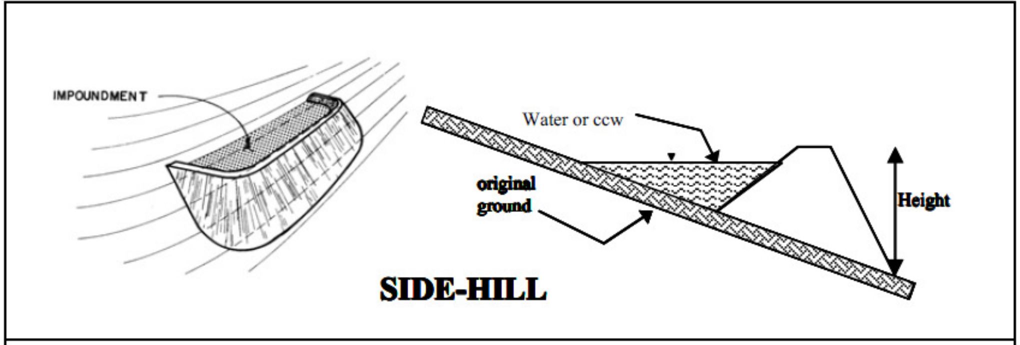
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

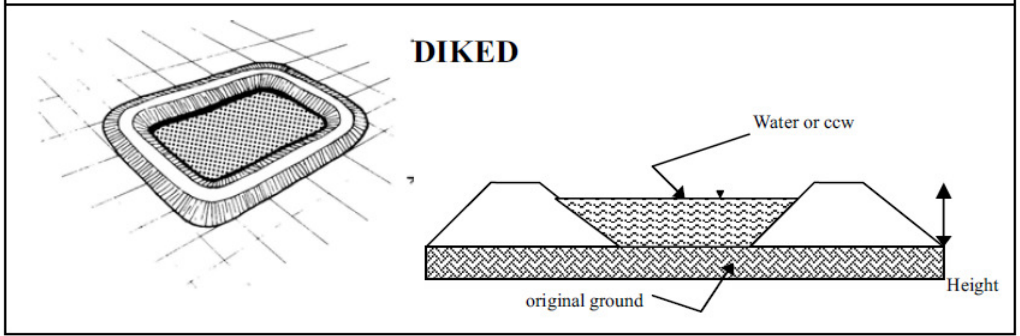
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

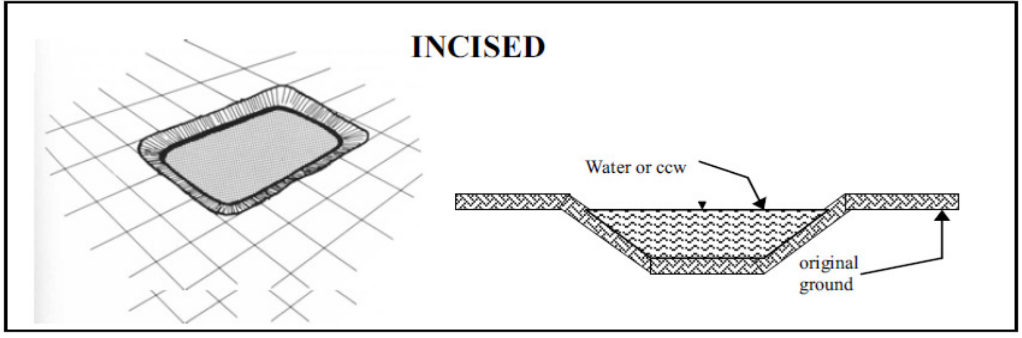
This unit is diked on all sides. If there were to be a failure at this location, the discharge would either go West into the Tertiary Pond, skipping the Treatment Center, East down the embankment and then South, or directly South into the Southwestern Secondary Pond, followed by approximately125± yards South to a perimeter ditch which encompasses the entire plant. If the discharge overtopped that ditch it would then travel a variable distance South and West, where it would then reach the Wisconsin River. If all ponds were to overtop, the discharge would travel approximately 150± yards West beyond the Tertiary Pond to the perimeter ditch and then another approximate 100± yards West where it would reach a naturally occurring ditch, then travel another variable distance where it would reach the Wisconsin River. It is not likely, given the amount of storage within the pond that this discharge would ever reach the River. The pond has been given the "**low**" in the rare circumstance that the discharge from the pond would ever reach the River without first going through the series of Secondary ponds and Treatment Center for purification.

CONFIGURATION:









☒ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	Not available at this time	**Embankment Material**	Native fill (documents provided by Utility)
Pool Area (ac)	Not available at this time	**Liner**	Bentonite Clay
Current Freeboard (ft)	Not available at this time	**Liner Permeability**	Not available at this time.

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

☐ Trapezoidal

☐ Triangular

☐ Rectangular

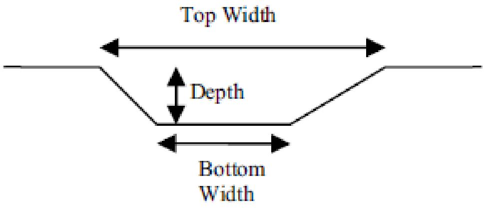
☐ Irregular

depth (ft)

average bottom width (ft)

top width (ft)

TRAPEZOIDAL



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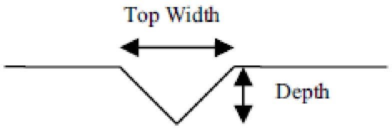

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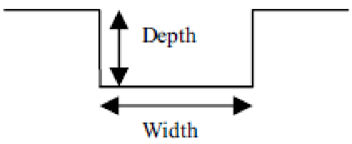
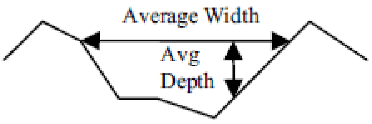


IRREGULAR



☒ **Outlet**

10” diameter

steel pipe which pumps water from a sump, shared with the SW Secondary Pond and located beneath the Treatment Center, up to and through the Treatment Center.

Material

☐ corrugated metal

☒ welded steel

☐ concrete

☐ plastic (hdpe, pvc, etc.)

☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By Original design done by Sargent & Lundy. Secondary basin modifications designed by Black & Veatch.

	Yes	No
Has there ever been a failure at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

No information.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

Yes.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

No.

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name:	**Weston Power Plant**	Date:	**8/21/12**
Unit Name:	**Northeastern Secondary Pond**	Operator's Name:	
Unit I.D.:		Hazard Potential Classification:	**High** ☐ **Significant** ☐ **Low** ☒
Inspector's Name:		Cleighton Smith and Lauren Ohotzke	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	N/A		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	X		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	X		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	X		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?	N/A		Is water exiting outlet flowing clear?	N/A	
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	N/A		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
1	Inspections are done periodically; not currently documented.
2	Documentation provided by Utility.
3	Documentation provided by Utility.
4	“Not Applicable”
5	Documentation provided by Utility.
6	“Not Applicable”
8	Information regarding foundation prep is not currently available, but not problems were seen while on site.
12	“Not Applicable”
20	“Not Applicable”

Coal Combustion Waste (CCW)

Impoundment Inspection:

There is currently a WPDES Permit issued for the discharge of the "Weston Units 3 & 4" (power units); however, this permit does not address the impoundments and is therefore not applicable here.

Impoundment NPDES Permit **INSPECTOR**

Date
Impoundment Name

Impoundment Company
EPA Region

State Agency
(Field Office) Address
Name of Impoundment

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☐

	Yes	**No**
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment?	☒	☐

IMPOUNDMENT FUNCTION: Receives sluiced water and fines carried from the Northern Primary Pond. The CCR is then passed through a series of 2 silt curtains to facilitate settling of CCRs. Water then drains into the Northwestern Secondary Pond via 2 24" CDHPE pipes submerged beneath the railroad tracks separating the two ponds.

Nearest Downstream Town Name: Mosinee, WI

Distance from the impoundment: Approx. 4.5 miles

Location:

Latitude	44	Degrees	51	Minutes	15	Seconds	**N**
Longitude	-89	Degrees	39	Minutes	18	Seconds	**W**

State Wisconsin **County** Marathon

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency? Wisconsin Department of Natural Resources

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☒ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

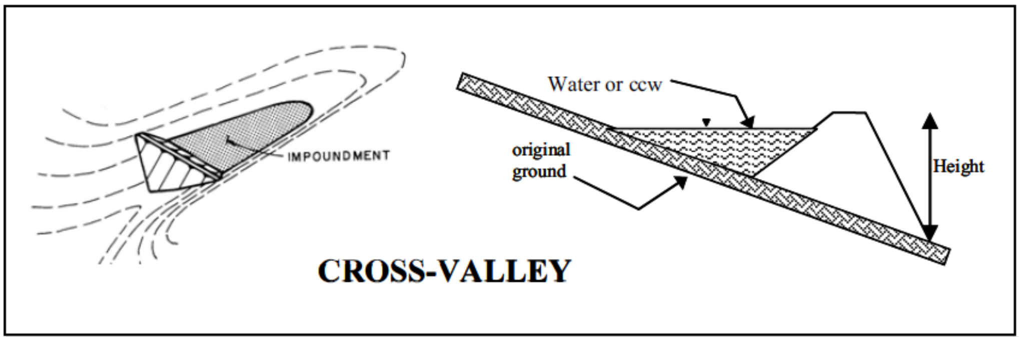
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

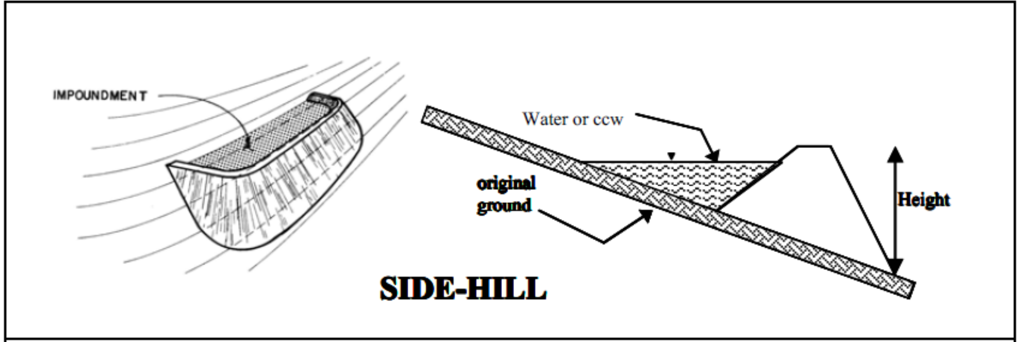
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

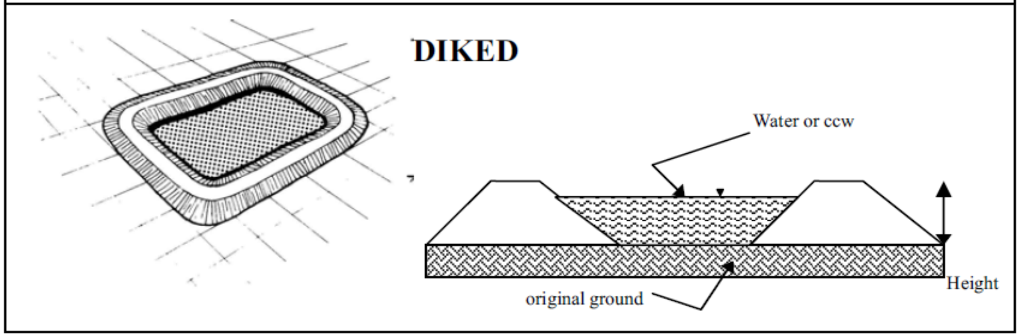
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

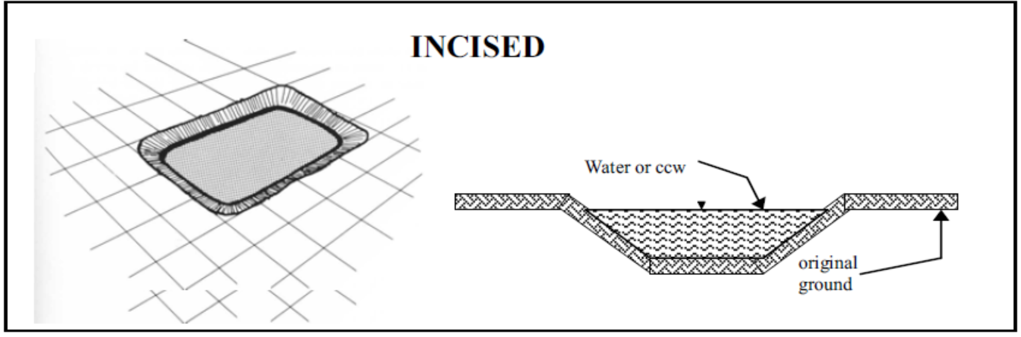
This unit is diked on all sides. If there were to be a failure at this location, the discharge would either go West down the embankments, travel approximately 10 yards West across railroad tracks to the toe of the Northwestern Secondary Pond or South approximately150± yards to a perimeter ditch which encompasses the entire plant. If the discharge overtopped that ditch it would then travel a variable distance South and West, where it would then reach the Wisconsin River. The discharge that had reached the toe of the Northwestern Secondary Pond would then presumably climb up the embankment into the Northwestern Secondary Pond or drain South to that same perimeter ditch. If the discharge did enter the Northwestern Secondary Pond, it would then enter the Tertiary Pond, where the water is received post-treatment and is either recirculated to the plant or discharged to the Wisconsin River (permitted by WPDES Permit No. WI-0042765-07-0). If all ponds were to overtop, the discharge would travel approximately 150± yards West beyond the Tertiary Pond to the perimeter ditch and then another approximate 100± yards West where it would reach a naturally occurring ditch, then travel another variable distance where it would reach the Wisconsin River. It is not likely, given the amount of storage within the pond that this discharge would ever reach the River. The pond has been given the "**low**" in the rare circumstance that the discharge from the pond would ever reach the River without first going through the series of Secondary ponds or the Treatment Center for purification.

CONFIGURATION:









☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	Not available at this time.	**Embankment Material**	Native fill (documents provided by Utility)
Pool Area (ac)	Not available at this time.	**Liner**	Clay
Current Freeboard (ft)	Not available at this time.	**Liner Permeability**	Not available at this time.

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

☐ Trapezoidal

☐ Triangular

☐ Rectangular

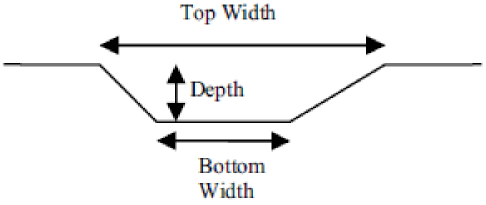
☐ Irregular

depth (ft)

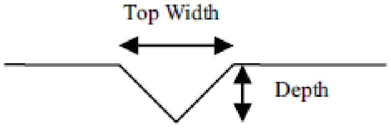
average bottom width (ft)

top width (ft)

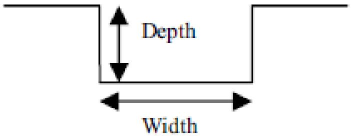
TRAPEZOIDAL



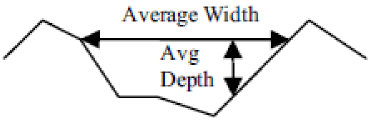
TRIANGULAR



RECTANGULAR



IRREGULAR



☒ **Outlet**

(2) 24” diameter
submerged pipes balanced by water pressure between the Northeastern and Northwestern Secondary Ponds.

Material

☐ corrugated metal

☐ welded steel

☐ concrete

☐ plastic (hdpe, pvc, etc.)

☒ other (specify): CDHPE

	Yes	No
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By Original design done by Sargent & Lundy. Secondary basin modifications designed by Black & Veatch.

	Yes	No
Has there ever been a failure at this site?	☒	☐

If So When? The first occurrence was in January 2008. A second overtopping event occurred in February 2008.

If So Please Describe : See Section 3.3 of the report.

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

No information.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

Yes.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

Yes. See Section 3.3 of the report.

Site Name:	**Weston Power Plant**	**Date:**	**8/21/12**
Unit Name:	**Northern Primary Pond**	**Operator's Name:**	
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** ☒
	Inspector's Name:	Cleighton Smith and Lauren Ohotzke	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	N/A		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	N/A		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	X		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	X		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?	N/A		Is water exiting outlet flowing clear?	N/A	
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	N/A		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
1	Inspections are done periodically; not currently documented, but draft of documentation to be used in future internal inspections is currently in the process of being finalized.
2	“Not Applicable” as pool elevation for the primary ponds continually changes due to gravity settling.
3	Documentation provided by Utility.
4	“Not Applicable”
5	Documentation provided by Utility.
6	“Not Applicable”
8	Information regarding foundation prep is not currently available, but not problems were seen while on site.
12	“Not Applicable”
20	“Not Applicable”

Coal Combustion Waste (CCW)

Impoundment Inspection:

There is currently a WPDES Permit issued for the discharge of the "Weston Units 3 & 4" (power units); however, this permit does not address the impoundments and is therefore not applicable here.

Impoundment NPDES Permit

INSPECTOR

Date

Impoundment Name

Impoundment Company

EPA Region

State Agency

(Field Office) Address

Name of Impoundment

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☐

	Yes	**No**
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment?	☒	☐

IMPOUNDMENT FUNCTION: Receives sluiced CCR directly from the plant. The Northern Primary and Southern Primary Ponds are identical. The two are not used simultaneously. The Northern Primary pond discharges to the series of Northern Secondary Ponds.

Nearest Downstream Town Name: Mosinee, WI

Distance from the impoundment: Approx. 4.5 miles

Location:

Latitude	44	Degrees	51	Minutes	15	Seconds	**N**
Longitude	-89	Degrees	39	Minutes	13	Seconds	**W**

State Wisconsin **County** Marathon

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency? Wisconsin Department of Natural Resrouces

<u>**HAZARD POTENTIAL**</u> *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☒ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

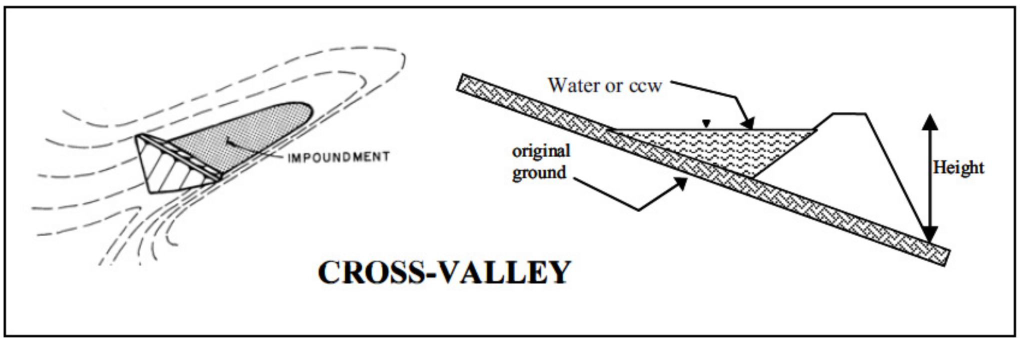
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

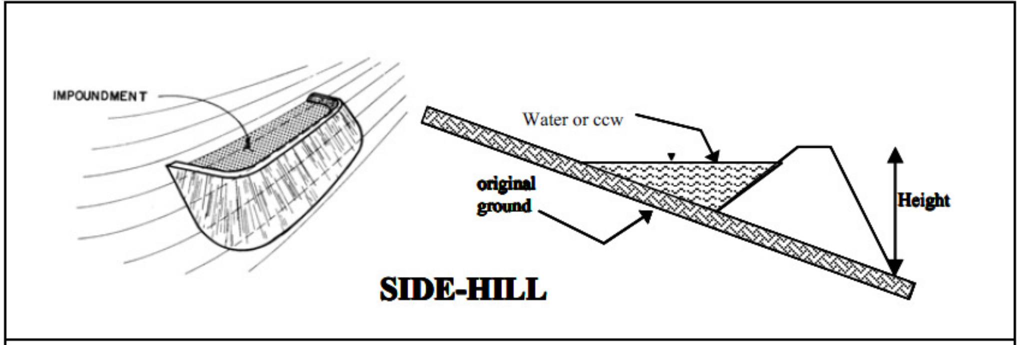
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

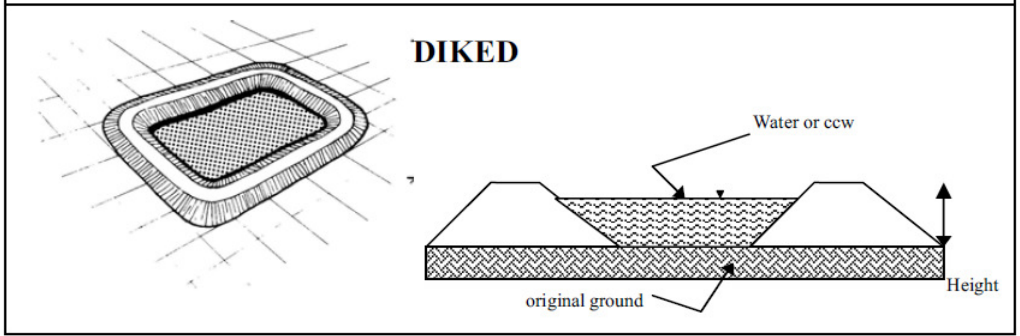
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

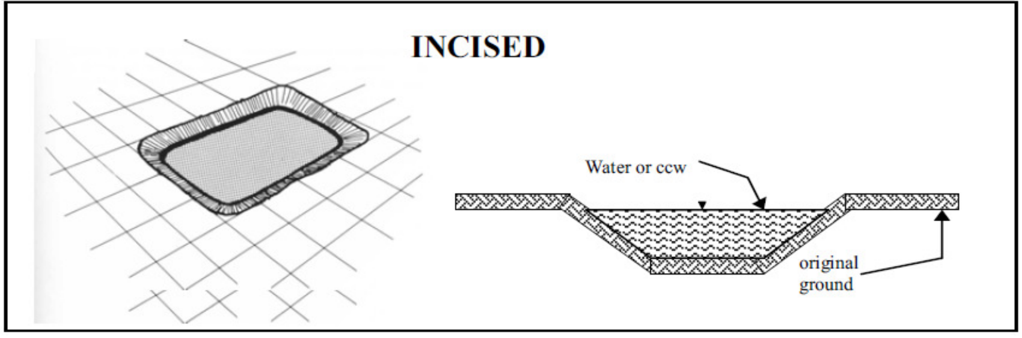
This unit is diked on all sides. If there were to be a failure at this location, the discharge would first go down the embankments, travel approximately 5 yards West to the Northeastern Secondary Pond or South into the Southern Primary Pond and then if that overtopped, approximately150± yards further South to a perimeter ditch which encompasses the entire plant. The discharge that had entered the Northeastern Secondary Pond would then go to the Northwestern Secondary Pond and then the Tertiary Pond, where the water is received post-treatment and either recirculated to the plant or discharged to the Wisconsin River, which is permitted with WPDES Permit No. WI-0042765-07-0. If all ponds were to overtop, the discharge would travel approximately 150± yards West beyond the Tertiary Pond to the perimeter ditch and then another approximate 100± yards West where it would reach a naturally occurring ditch, then travel another variable distance where it would reach the Wisconsin River. It is not likely, given the amount of storage within the pond that this discharge would ever reach the River. The pond has been given the “low” in the rare circumstance that the discharge from the pond would ever reach the River without first going through the series of Secondary ponds and Treatment Center for purification.

CONFIGURATION:









☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft) 3.5

Embankment Material Native fill (documents provided by Utility)

Pool Area (ac) .19

Liner Bentonite Clay

Current Freeboard (ft) 2.5

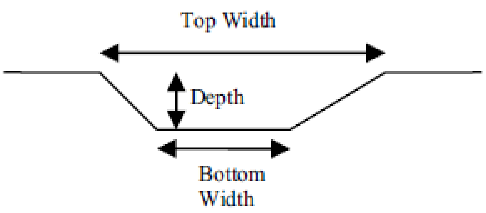
Liner Permeability Not available at this time.

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

☐ Trapezoidal
☐ Triangular
☐ Rectangular
☐ Irregular
depth (ft)
average bottom width (ft)
top width (ft)

TRAPEZOIDAL



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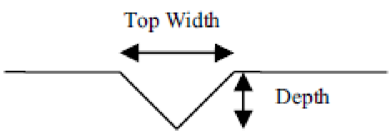

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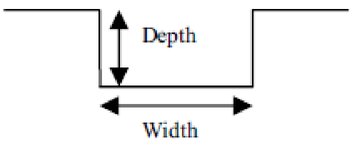
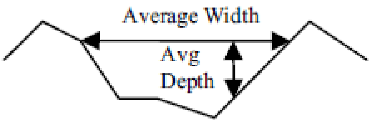


IRREGULAR



☒ **Outlet**

30” diameter pipe

Material

☒ corrugated metal
☐ welded steel
☐ concrete
☐ plastic (hdpe, pvc, etc.)
☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By Original design done by Sargent & Lundy. Secondary basin modifications designed by Black & Veatch.

	Yes	No
Has there ever been a failure at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

No information.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

Yes.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

No.

Coal Combustion Dam Inspection Checklist Form

US Environmental
Protection Agency

Site Name:	**Weston Power Plant**	**Date:**	**8/21/12**
Unit Name:	**Southeastern Secondary Pond**	**Operator's Name:**	
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** ☒
	Inspector's Name:	Cleighton Smith and Lauren Ohotzke	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	N/A		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	X		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	X		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	X		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?	N/A		Is water exiting outlet flowing clear?	N/A	
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	N/A		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
1	Inspections are done periodically; not currently documented.
2	Documentation provided by Utility.
3	Documentation provided by Utility.
4	"Not Applicable"
5	Documentation provided by Utility.
6	"Not Applicable"
8	Information regarding foundation prep is not currently available, but not problems were seen while on site.
12	"Not Applicable"
20	"Not Applicable"

Coal Combustion Waste (CCW)

Impoundment Inspection:

There is currently a WPDES Permit issued for the discharge of the "Weston Units 3 & 4" (power units); however, this permit does not address the impoundments and is therefore not applicable here.

Impoundment NPDES Permit

INSPECTOR

Date

Impoundment Name

Impoundment Company

EPA Region

State Agency

(Field Office) Address

Name of Impoundment

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☐

	Yes	**No**
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment?	☒	☐

IMPOUNDMENT FUNCTION: Receives sluiced water and fines carried from the Southern Primary Pond. The CCR is then passed through a silt curtain to facilitate settling of CCRs. Water then drains into the Southwestern Secondary Pond via 2 24" CDHPE pipes submerged beneath the railroad tracks separating the two ponds.

Nearest Downstream Town Name: Mosinee, WI

Distance from the impoundment: Approx. 4.5 miles

Location:

Latitude	44	Degrees	51	Minutes	13	Seconds	**N**
Longitude	-89	Degrees	39	Minutes	18	Seconds	**W**

State Wisconsin **County** Marathon

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency? Wisconsin Department of Natural Resources

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☒ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

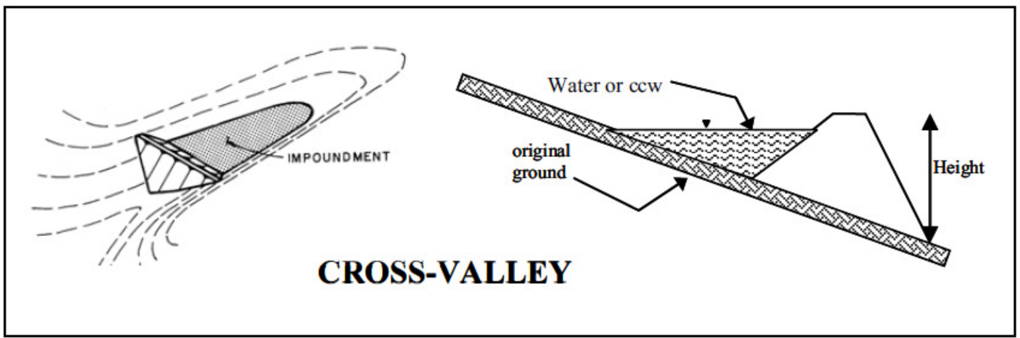
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

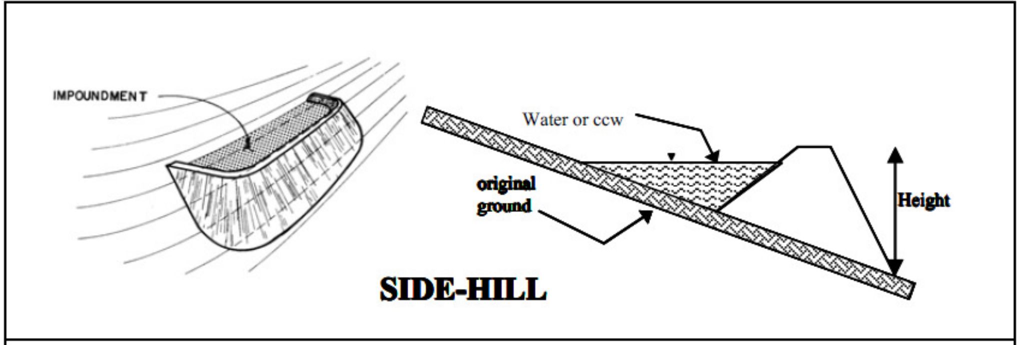
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

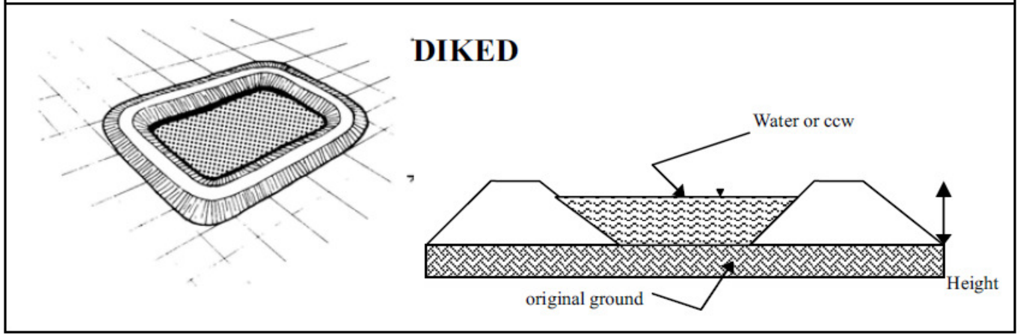
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

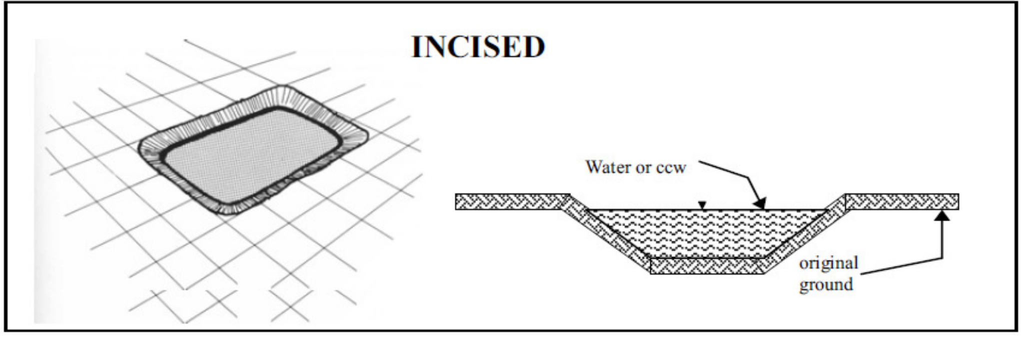
This unit is diked on all sides. If there were to be a failure at this location, the discharge would either go West down the embankments, travel approximately 10 yards West across railroad tracks to the toe of the Southwestern Secondary Pond or South approximately125± yards to a perimeter ditch which encompasses the entire plant. If the discharge overtopped that ditch it would then travel a variable distance South and West, where it would then reach the Wisconsin River. The discharge that had reached the toe of the Southwestern Secondary Pond would then presumably climb up the embankment into the Southwestern Secondary Pond or drain South to that same perimeter ditch. If the discharge did enter the Southwestern Secondary Pond, it would then enter the Tertiary Pond, where the water is received post-treatment and is either recirculated to the plant or discharged to the Wisconsin River (permitted by WPDES Permit No. WI-0042765-07-0). If all ponds were to overtop, the discharge would travel approximately 150± yards West beyond the Tertiary Pond to the perimeter ditch and then another approximate 100± yards West where it would reach a naturally occurring ditch, then travel another variable distance where it would reach the Wisconsin River. It is not likely, given the amount of storage within the pond that this discharge would ever reach the River. The pond has been given the "**low**" in the rare circumstance that the discharge from the pond would ever reach the River without first going through the series of Secondary ponds or Treatment Center for purification.

CONFIGURATION:









☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	Not available at this time.	**Embankment Material**	Native fill (documents provided by Utility)
Pool Area (ac)	Not available at this time.	**Liner**	Clay
Current Freeboard (ft)	Not available at this time.	**Liner Permeability**	Not available at this time.

TYPE OF OUTLET (Mark all that apply)

☐ Open Channel Spillway

☐ Trapezoidal

☐ Triangular

☐ Rectangular

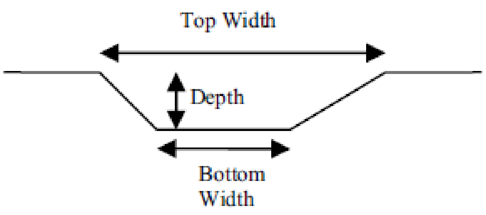
☐ Irregular

depth (ft)

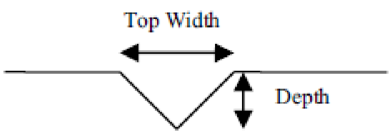
average bottom width (ft)

top width (ft)

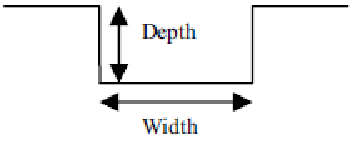
TRAPEZOIDAL



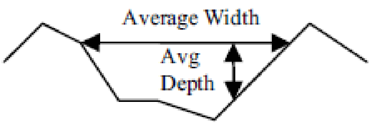
TRIANGULAR



RECTANGULAR



IRREGULAR



☒ Outlet

(2) 24” diameter
submerged pipes balanced by water pressure between the Southeastern and Southwestern Secondary Ponds.

Material

☐ corrugated metal

☐ welded steel

☐ concrete

☐ plastic (hdpe, pvc, etc.)

☒ other (specify): CDHPE

	Yes	No
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By Original design done by Sargent & Lundy. Secondary basin modifications designed by Black & Veatch.

	Yes	No
Has there ever been a failure at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

No information.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

Yes.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

No.

Site Name:	**Weston Power Plant**	**Date:**	**8/21/12**
Unit Name:	**Southern Primary Pond**	**Operator's Name:**	
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** ☒
	Inspector's Name:	Cleighton Smith and Lauren Ohotzke	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	N/A		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	N/A		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	X		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	X		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?	N/A		Is water exiting outlet flowing clear?	N/A	
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	N/A		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
1	Inspections are done periodically; not currently documented.
2	“Not Applicable” as pool elevation for the primary ponds continually changes due to gravity settling.
3	Documentation provided by Utility.
4	“Not Applicable”
5	Documentation provided by Utility.
6	“Not Applicable”
8	Information regarding foundation prep is not currently available, but not problems were seen while on site.
12	“Not Applicable”
20	“Not Applicable”

Coal Combustion Waste (CCW)

Impoundment Inspection:

There is currently a WPDES Permit issued for the discharge of the "Weston Units 3 & 4" (power units); however, this permit does not address the impoundments and is therefore not applicable here.

Impoundment NPDES Permit **INSPECTOR**

Date

Impoundment Name

Impoundment Company

EPA Region

State Agency

(Field Office) Address

Name of Impoundment

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☐

	Yes	**No**
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment?	☒	☐

IMPOUNDMENT FUNCTION: Receives sluiced CCR directly from the plant. The Southern Primary and Northern Primary Ponds are identical. The two are not used simultaneously. The Southern Primary pond discharges to the series of Southern Secondary Ponds.

Nearest Downstream Town Name: Mosinee, WI

Distance from the impoundment: Approx. 4.5 miles

Location:

Latitude	44	Degrees	51	Minutes	13	Seconds	**N**
Longitude	-89	Degrees	39	Minutes	13	Seconds	**W**

State Wisconsin **County** Marathon

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency? Wisconsin Department of Natural Resrouces

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☒ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

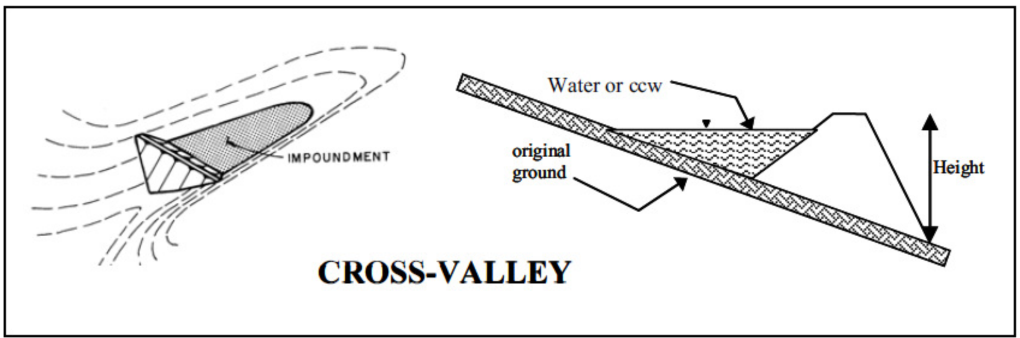
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

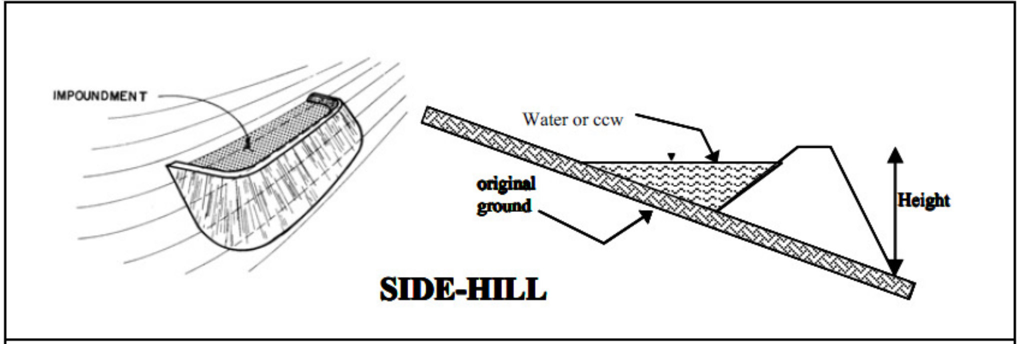
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

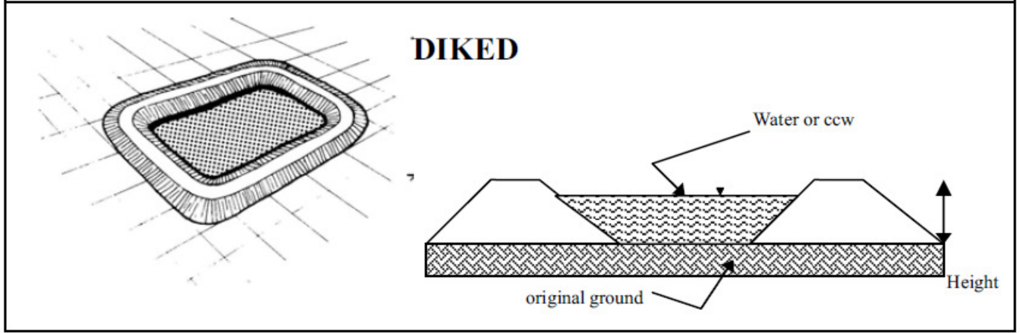
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

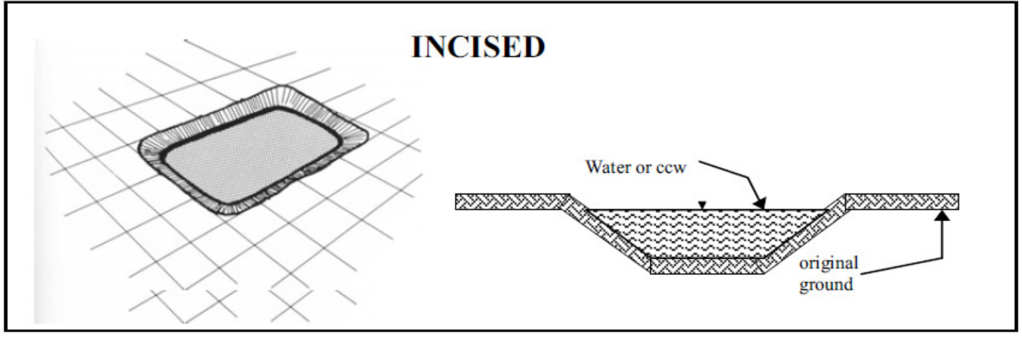
This unit is diked on all sides. If there were to be a failure at this location, the discharge would either go West down the embankments, travel approximately 5 yards West to the Southeastern Secondary Pond or South approximately150± yards to a perimeter ditch which encompasses the entire plant. If the discharge overtopped that ditch it would then travel a variable distance South and West, where it would then reach the Wisconsin River. The discharge that had entered the Northeastern Secondary Pond would then enter the Northwestern Secondary Pond and then the Tertiary Pond, where the water is received post-treatment and is either recirculated to the plant or discharged to the Wisconsin River (permitted by WPDES Permit No. WI-0042765-07-0). If all ponds were to overtop, the discharge would travel approximately 150± yards West beyond the Tertiary Pond to the perimeter ditch and then another approximate 100± yards West where it would reach a naturally occurring ditch, then travel another variable distance where it would reach the Wisconsin River. It is not likely, given the amount of storage within the pond that this discharge would ever reach the River. The pond has been given the "low" in the rare circumstance that the discharge from the pond would ever reach the River without first going through the series of Secondary ponds and Treatment Center for purification.

CONFIGURATION:









☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	1	**Embankment Material**	Native fill (documents provided by Utility)
Pool Area (ac)	.19	**Liner**	Bentonite Clay
Current Freeboard (ft)	2	**Liner Permeability**	Not available at this time.

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

☐ Trapezoidal

☐ Triangular

☐ Rectangular

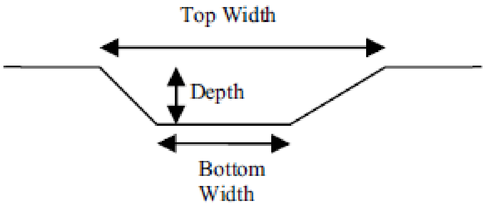
☐ Irregular

depth (ft)

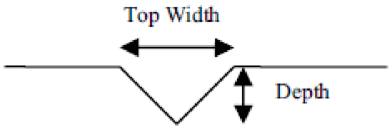
average bottom width (ft)

top width (ft)

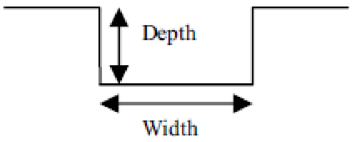
TRAPEZOIDAL



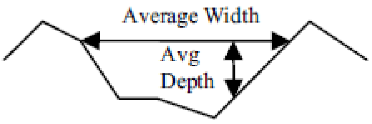
TRIANGULAR



RECTANGULAR



IRREGULAR



☒ **Outlet**

30” diameter pipe

Material

☒ corrugated metal

☐ welded steel

☐ concrete

☐ plastic (hdpe, pvc, etc.)

☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By Original design done by Sargent & Lundy. Secondary basin modifications designed by Black & Veatch.

	Yes	No
Has there ever been a failure at this site?	☐	☒

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

No information.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

Yes.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

No.

Site Name:	**Weston Power Plant**	**Date:**	**8/21/12**
Unit Name:	**Southwestern Secondary Pond**	**Operator's Name:**	
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** ☒
		Inspector's Name:	Cleighton Smith and Lauren Ohotzke

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	N/A		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	X		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	X		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	X		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?	N/A		Is water exiting outlet flowing clear?	N/A	
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	N/A		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
1	Inspections are done periodically; not currently documented, but draft of documentation to be used in future internal inspections is currently in the process of being finalized.
2	Documentation provided by Utility.
3	Documentation provided by Utility.
4	“Not Applicable”
5	Documentation provided by Utility.
6	“Not Applicable”
8	Information regarding foundation prep is not currently available, but not problems were seen while on site.
12	“Not Applicable”
20	“Not Applicable”

Coal Combustion Waste (CCW)

Impoundment Inspection:

There is currently a WPDES Permit issued for the discharge of the "Weston Units 3 & 4" (power units); however, this permit does not address the impoundments and is therefore not applicable here.

Impoundment NPDES Permit **INSPECTOR**

Date
Impoundment Name

Impoundment Company
EPA Region

State Agency
(Field Office) Address
Name of Impoundment

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☐

	Yes	No
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment?	☒	☐

IMPOUNDMENT FUNCTION: Receives water from Southeastern Secondary Pond via 2 submerged 24" CDHP pipes (under the railroad tracks separating the two ponds). This pond continues with the same function as the Southeastern Secondary Pond, collecting bottom ash residuals via settling only. Water is then pumped from the pond through the treatment center, followed by the Tertiary Pond.

Nearest Downstream Town Name: Mosinee, WI

Distance from the impoundment: Approx. 4.5 miles

Location:

Latitude	44	Degrees	51	Minutes	13	Seconds	**N**
Longitude	-89	Degrees	39	Minutes	26	Seconds	**W**

State Wisconsin **County** Marathon

Does a state agency regulate this impoundment? ☒ ☐

If So Which State Agency? Wisconsin Department of Natural Resources

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☒ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

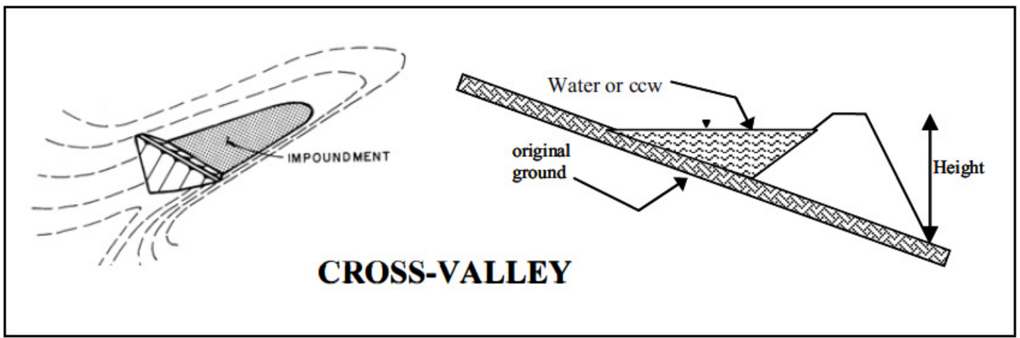
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

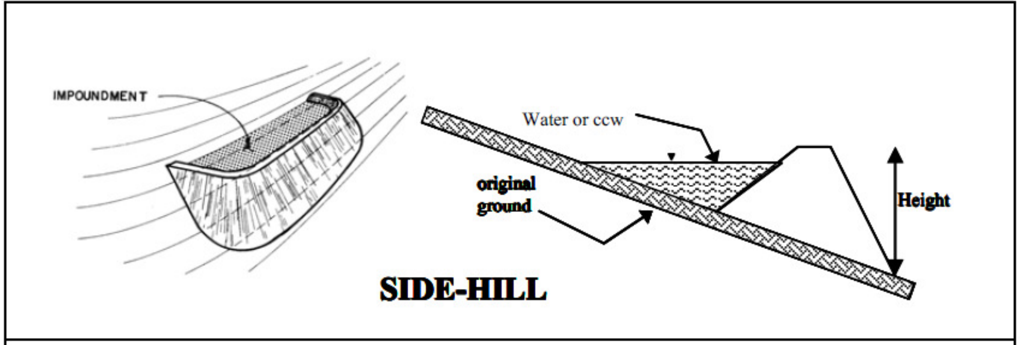
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

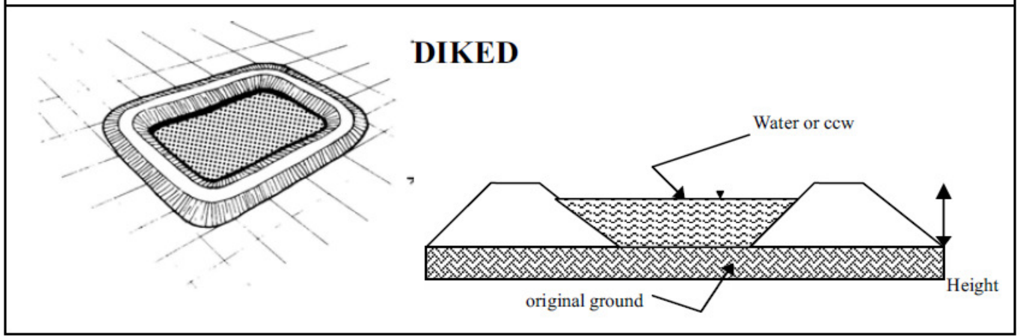
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

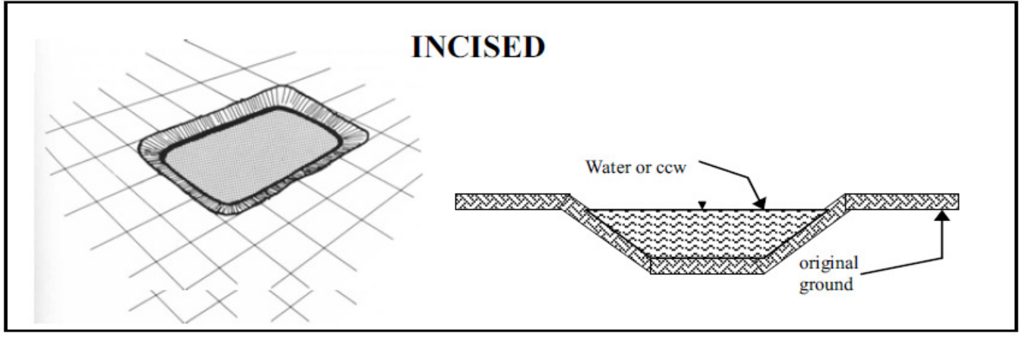
This unit is diked on all sides. If there were to be a failure at this location, the discharge would either go West into the Tertiary Pond, skipping the Treatment Center, East or South down the embankment, followed by approximately125± yards South to a perimeter ditch which encompasses the entire plant. If the discharge overtopped that ditch it would then travel a variable distance South and West, where it would then reach the Wisconsin River. If all ponds were to overtop, the discharge would travel approximately 150± yards West beyond the Tertiary Pond to the perimeter ditch and then another approximate 100± yards West where it would reach a naturally occurring ditch, then travel another variable distance where it would reach the Wisconsin River. It is not likely, given the amount of storage within the pond that this discharge would ever reach the River. The pond has been given the "**low**" in the rare circumstance that the discharge from the pond would ever reach the River without first going through the series of Secondary ponds and Treatment Center for purification.

CONFIGURATION:









☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	Not available at this time	**Embankment Material**	Native fill (documents provided by Utility)
Pool Area (ac)	Not available at this time	**Liner**	Bentonite Clay
Current Freeboard (ft)	Not available at this time	**Liner Permeability**	Not available at this time

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

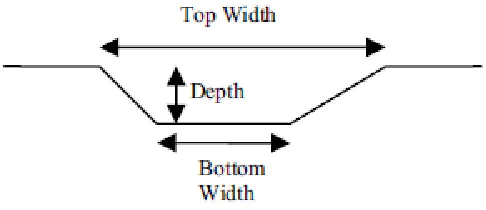
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

average bottom width (ft)

top width (ft)

TRAPEZOIDAL



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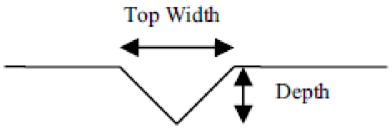
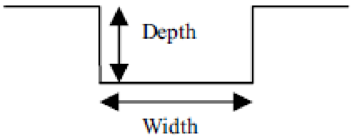
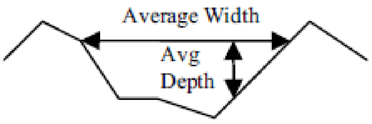


RECTANGULAR



IRREGULAR



☒ **Outlet**

10” diameter

steel pipe which pumps water from a sump, shared with the NW Secondary Pond and located beneath the Treatment Center, up to and through the Treatment Center.

Material

- ☐ corrugated metal
- ☒ welded steel
- ☐ concrete
- ☐ plastic (hdpe, pvc, etc.)
- ☐ other (specify):

	Yes	No
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By Original design done by Sargent & Lundy. Secondary basin modifications designed by Black & Veatch.

	Yes	No
Has there ever been a failure at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

No information.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

Yes.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

No.

Site Name:	**Weston Power Plant**	**Date:**	**8/21/12**
Unit Name:	**Tertiary Pond**	**Operator's Name:**	
Unit I.D.:		**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** ☒
		Inspector's Name:	Cleighton Smith and Lauren Ohotzke

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	N/A		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	X		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	X		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	X		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?	N/A		Is water exiting outlet flowing clear?	N/A	
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	N/A		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Issue #	Comments
1	Inspections are done periodically; not currently documented, but draft of documentation to be used in future internal inspections is currently in the process of being finalized.
2	Documentation provided by Utility.
3	Documentation provided by Utility.
4	"Not Applicable"
5	Documentation provided by Utility.
6	"Not Applicable"
8	Information regarding foundation prep is not currently available, but not problems were seen while on site.
12	"Not Applicable"
20	"Not Applicable"

Coal Combustion Waste (CCW)

Impoundment Inspection:

There is currently a WPDES Permit issued for the discharge of the "Weston Units 3 & 4" (power units); however, this permit does not address the impoundments and is therefore not applicable here.

Impoundment NPDES Permit

INSPECTOR

Date

Impoundment Name

Impoundment Company

EPA Region

State Agency

(Field Office) Address

Name of Impoundment

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ☐ **Update** ☐

	Yes	No
Is impoundment currently under construction?	☐	☒
Is water or ccw currently being pumped into the impoundment?	☒	☐

IMPOUNDMENT FUNCTION: Receives post-treatment water from the Treatment Center which is either recirculated to the plant for sluicing or discharged to the Wisconsin River (permitted by WPDES Permit No. WI-0042765-07-0).

Nearest Downstream Town Name: Mosinee, WI

Distance from the impoundment: Approx. 4.5 miles

Location:

Latitude	44	Degrees	51	Minutes	14	Seconds	**N**
Longitude	-89	Degrees	39	Minutes	28.5	Seconds	**W**

State Wisconsin **County** Marathon

	Yes	No
Does a state agency regulate this impoundment?	☒	☐

If So Which State Agency? Wisconsin Department of Natural Resouces

HAZARD POTENTIAL *(In the event the impoundment should fail, the following would occur):*

☐ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

☒ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

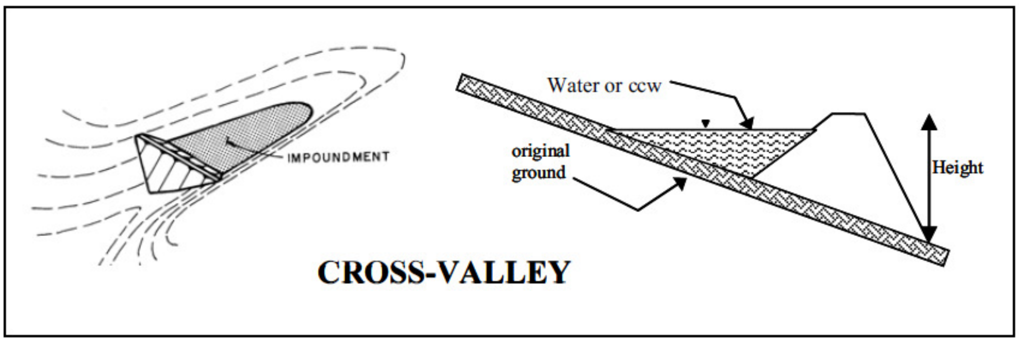
☐ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

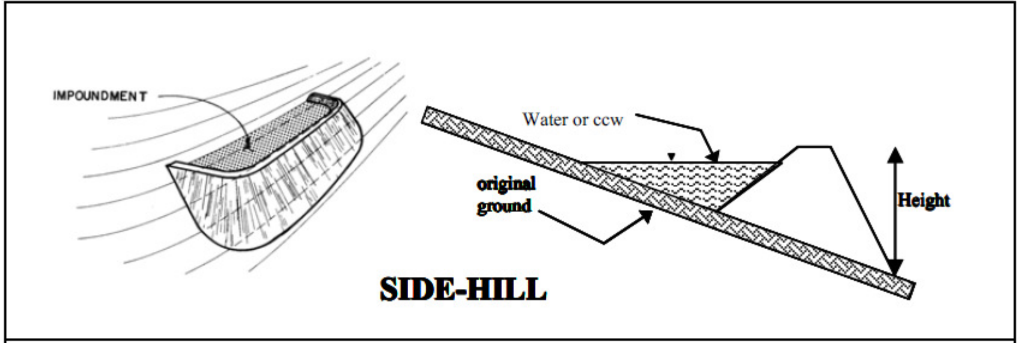
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

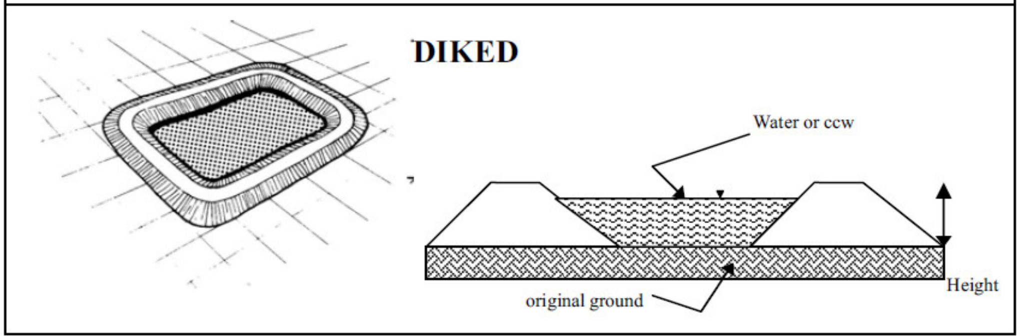
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

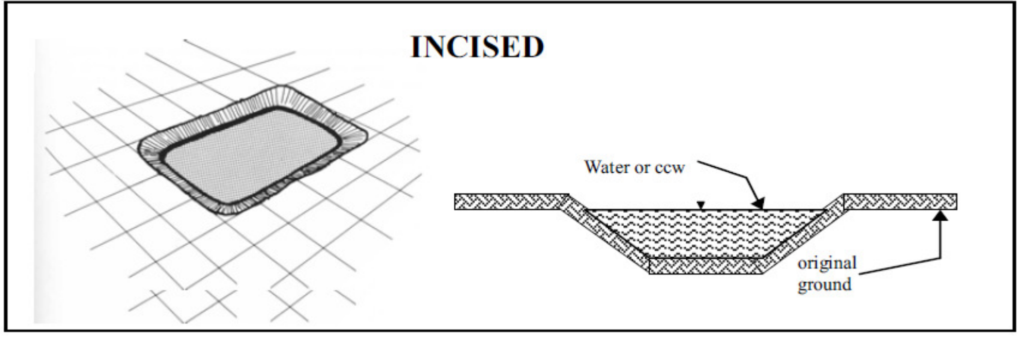
This unit is diked on all sides and the water it is receiving has already passed through a series of secondary ponds, each containing silt fences, collecting the CCR, thereby "purifying" the water. This water is either recirculated to the plant or discharged into the Wisconsin River (which has been permitted by WPDES Permit No. WI-0042765-07-0). If there were to be a failure at this location, the discharge would first go down the embankments, travel approximately 150± yards West to a perimeter ditch which encompasses the entire plant. Next the discharge would travel another approximate 100± yards West where it would reach a naturally occurring ditch, then travel another variable distance West where it would then reach the Wisconsin River. It is not likely, given the amount of storage within the pond that this discharge would ever reach the River. The pond has been given the "low" rating and not the "less than low" rating, only because it is closest in proximity to the River than any of the other ponds on site.

CONFIGURATION:









☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	15	**Embankment Material**	Native fill (documents provided by Utility)
Pool Area (ac)	1.04	**Liner**	Clay
Current Freeboard (ft)	1	**Liner Permeability**	Not available at this time

TYPE OF OUTLET (Mark all that apply)

☐ **Open Channel Spillway**

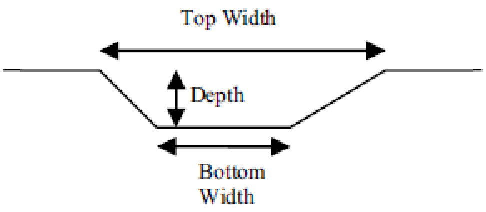
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

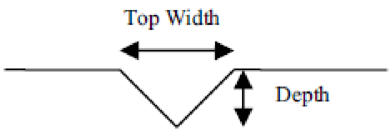
average bottom width (ft)

top width (ft)

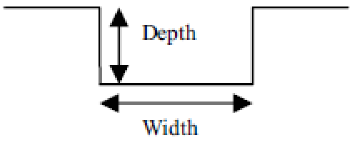
TRAPEZOIDAL



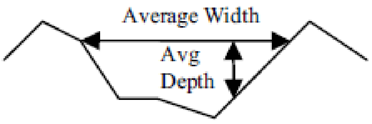
TRIANGULAR



RECTANGULAR



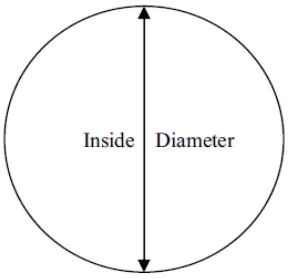
IRREGULAR



☒ **Outlet**

6” diameter
pipe pumps water from the pond, over the embankment down to a manhole at the toe of the embankment which then recirculates the water to the plant for sluicing.

A second pipe pumps water to the Wisconsin River (permited by WPDES permit No. WI-0042765-07-0.



Material

- ☐ corrugated metal
- ☒ welded steel-pipe recirculating water back to plant.
- ☐ concrete
- ☐ plastic (hdpe, pvc, etc.)
- ☐ other (specify):

	Yes	**No**
Is water flowing through the outlet?	☒	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

The Impoundment was Designed By	Original design done by Sargent & Lundy. Secondary basin modifications designed by Black & Veatch.

Yes **No**

Has there ever been a failure at this site? ☐ ☒

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	☒
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	☒
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

No information.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

Yes.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

No.

APPENDIX C

Document 20

Photographs

Photo 1. Silver silo to store fly ash _Weston Generating Station _082112

Photo 2. Temporary fly and bottom ash storage _Weston Generating Station _082112

Photo 3. Looking SE at sluicing at S Primary Pond _Weston Generating Station _082112

Photo 4. Looking NW from midpoint of NE Secondary Pond's S embankment (note silt curtain in foreground) _Weston Generating Station _082112

Photo 5. Looking NW from midpoint of NE Secondary Pond's S embankment (note silt curtain in foreground) _Weston Generating Station _082112

Photo 6. Looking S at location where sluicing coming out and sometimes boiler room drains combined combustion waste, bottom ash to the right (note silt curtain method being used here) _Weston Generating Station _082112

Photo 7. Water level monitoring point _Weston Generating Station _082112

Photo 8. Looking S at pipe leading from secondary to tertiary incisions if necessary _Weston Generating Station _082112

Photo 9. Looking S from berm between secondary and tertiary incisions _Weston Generating Station _082112

Photo 10. Looking NE at tertiary incision _Weston Generating Station _082112

Photo 11. Looking SW from berm between secondary and tertiary incisions; looking at Tertiary incision _Weston Generating Station _082112

Photo 12. Looking N at Tertiary incision from berm between secondary and tertiary incisions _Weston Generating Station _082112

Photo 13. Looking S at Secondary incisions from berm between Secondary and Tertiary incisions _Weston Generating Station _082112

Photo 14. Looking W, from SW toe of Tertiary Pond; looking toward woods/perimeter ditch _Weston Generating Station _082112

Photo 15. Looking W from SW Secondary Pond _Weston Generating Station _082112

Photo 16. Looking W, along perimeter ditch; this location is approximately 150 yds SW of Tertiary Pond _Weston Generating Station _082112

Photo 17. Looking S, along perimeter ditch; this location is approximately 150 yds SW of Tertiary Pond _Weston Generating Station _082112