FINAL

Coal Combustion Residue Impoundment

Round 12 - Dam Assessment Report

JB Sims Power Plant (Site 04)

East and West Bottom Ash Ponds
Grand Haven Board of Power and Light
Grand Haven, Michigan

Prepared for:

United States Environmental Protection Agency
Office of Resource Conservation and Recovery

Prepared by:

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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 East Bottom Ash Pond and West Bottom Ash Pond (referred in this report as the East Pond and West Pond or East and West Ponds) is based on a review of available documents and on the site assessment conducted by Dewberry personnel on Wednesday, August 22, 2012. Both ponds are rated as Significant hazard potential. We found the supporting technical Documentation inadequate (Section 1.1.3). As detailed in Section 1.2, there are several recommendations based on field observations that may help to maintain a safe and trouble-free operation.

In summary, the East Pond is POOR for continued safe and reliable operation, with no visual management unit safety deficiencies. The West Pond is POOR for continued safe and reliable operation, with no visual management unit safety deficiencies.

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 unit) 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 determine the 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 & Davis LLC about the East and West Ponds that 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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1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

Conclusions are based on visual observations from a one-day site visit, Wednesday, August 22, 2012, and review of technical Documentation provided by Grand Haven Board of Power and Light.

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

The dikes surrounding the East Pond appear to be structurally sound based upon visual inspection. The dikes surrounding the West Pond may have clay liner disturbance by the excavator. The clay liner disturbance, if controlled to surficial damage, as was observed, should not affect the structural integrity of the embankment. We observed ponding of water at the toe of the southern and western dikes. The utility indicated the ponding was due to a rainfall event (0.32 inches) six days prior to the site visit. However ponding could be due to seepage and there was no documentation (such as water analyses or field inspection notes) to identify the source of the ponded water. Dewberry engineers could not determine the structural soundness of the dikes due to the fact that requested technical data was not provided by Grand Haven Board of Power and Light (GHBPL, the utility).

The utility has committed (in an e-mail to the EPA (see Appendix D, Doc 12) from Grand Haven Board of Light and Power's Paul Cedarquist, on January 13, 2013) to doing dike stability studies and the EPA will be reviewing the results whenever those studies are complete to confirm the safety of the dikes.

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. The ponds only receive water from sluicing and direct precipitation, there is no external drainage into the ponds.

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

The supporting technical Documentation is inadequate. Engineering documentation reviewed is referenced in Appendix A.

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

The description of the management units provided by the utility was an inaccurate representation of what Dewberry observed in the field. Specifically, there is an overflow spillway shown on the construction drawings for the East Pond. The utility noted (Appendix A, Doc 11) that the spillway was removed for safety reasons related to the utility substation. Pond filling and ash removal procedures preclude the need for the spillway.

1.1.5 Conclusions Regarding the Field Observations

Dewberry staff was provided access to all areas in the vicinity of the management units required to conduct a thorough filed observation.

1.1.6 Conclusions Regarding the Adequacy of Maintenance and Methods of Operation

The current maintenance and methods of operation appear to be inadequate for the bottom ash management units.

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

The management unit dikes do not have a surveillance program or a monitoring program.

Subsequent to the Draft report, the utility has stated that a written monitoring program is being developed. The utility also explained in detail current surveillance operations at the plant (Appendix D, Doc 11).

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operation

Both the East Pond and West Pond are rated POOR for continued safe and reliable operation due to the lack of technical information on the design, lack of seismic and dam slope stability safety analyses, lack of hydrologic information and analyses, and lack of formal maintenance procedures.

Additionally, concerns were noted during field assessments of ponded water below the southern and western toes of the West Pond. This ponding is either representative of seepage from the ponds and is therefore

of concern to the EPA or is/was an issue of poor grading on clayey soils from precipitation events, as the utility presented during the site visit and in subsequent comments on the Draft report (Appendix D, Doc 11). We note that the utility stated in its comments that the roadway has been re-graded and no ponding has occurred, supporting the argument that previous ponding was due to poor drainage. Photographs taken one day after a 1-inch rainfall in November 2013 confirm this statement.

1.2 RECOMMENDATIONS

1.2.1 Recommendations Regarding the Structural Stability

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

It is recommended that a liquefaction potential analysis be performed if a qualitative analysis of embankment soil material or underlying foundation materials indicates the soil type is susceptible to liquefaction.

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety

Hydrologic and hydraulic analyses of both the East and West Ponds' performance under flood conditions should be performed.

1.2.3 Recommendations Regarding the Supporting Technical Documentation

Dewberry recommends that new dam design documents be generated to reflect the removal of the spillway.

1.2.4 Recommendations Regarding the Maintenance and Methods of Operation

We recommend that formal maintenance procedures be adopted for both the East and West Ponds; the Michigan Dam Safety office can provide guidance on creating one. There needs to be written procedures and provisions for follow up actions.

Subsequent to the Draft report, the utility has stated that they are in the process of developing such written procedures (Appendix D, Doc 11).

1.2.5 Recommendations Regarding the Surveillance and Monitoring Program

A recommendation on a surveillance program for both the East and West Ponds is dependent on the type of maintenance plan developed, post Dewberry visit. Formal maintenance procedures for both the East and West ponds should be documented.

Subsequent to the Draft report, the utility has stated that they are in the process of developing such written procedures (Appendix D, Doc 11).

1.2.6 Recommendations Regarding Continued Safe and Reliable Operation

Dewberry recommended that the ponding seen during the site visit be addressed by the utility. Subsequent to the Draft report, the utility has provided information stating that "the plant has been re-sloped and [the plant has] repaved the roadway to the south of the ponds as part of its regular maintenance, in part to redirect storm water" (Appendix D, Doc 11).

1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

1.3.1 List of Participants

Paul Cederquist, Grand Haven Board of Light and Power
Jeff Chandler, Grand Haven Board of Light and Power
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 22, 2012.

Cleighton D. Smith, P.E.

STATE OF MICHIGAN
CLEIGHTON D. SMITH
ENGINEER
No. 51077
LICENSED PROFESSIONAL ENGINEER

Lauren E. Ohotzke, P.E.

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

2.1 LOCATION AND GENERAL DESCRIPTION

The J.B. Sims Generating Station is a 65 MW coal-fired power plant located in Grand Haven, MI, on what is referred to as Harbor Island, at 1231 North 3rd Street. It is bounded by the Grand River on both the east and west sides (see the Vicinity Map below).

Figure 2.1.a: Vicinity Map

There are two bottom ash ponds formed by ring dikes located on the north end of the plant property as shown on the Site Map below. These ponds (East and West Ponds) are used to store bottom ash, as well as boiler slag and FGD Gypsum ("synthetic gypsum") from the power plant. The ash is sluiced to the ponds, where the ash is allowed to settle. Water from the ponds is then pumped back to the plant for reuse in plant operations. Fly ash is transported off site by truck.

The East Pond and West Pond are formed by earthen embankments. Older ash management ponds at this site, no longer in use, are considered incised and therefore are not subject to assessment in this report.

Figure 2.1.b: Site Map

Tables 2.1a and 2.1b summarize the dimensions and size of these embankments.

Table 2.1a: Summary of Dam Dimensions and Size	
	East Pond
Dam Height (ft)	13
Crest Width (ft)	10
Length (ft)	611
Side Slopes (upstream) H:V	2:1
Side Slopes (downstream) H:V	3:1

Table 2.1b: Summary of Dam Dimensions and Size	
	West Pond
Dam Height (ft)	13
Crest Width (ft)	10
Length (ft)	625
Side Slopes (upstream) H:V	2:1
Side Slopes (downstream) H:V	3:1

2.2 COAL COMBUSTION RESIDUE HANDLING

2.2.1 Fly Ash

The fly ash produced by the plant is loaded into trucks via the loader shown in Appendix C, Photo 1 (also shown as Photo 5.3.3j within this report). This ash is then transported to an off-site disposal area.

2.2.2 Bottom Ash

The bottom ash is sluiced to the East and West Ponds (Appendix C, Photos 2, 3 and 4) for settling. The bottom ash is excavated from these ponds via crane as necessary (i.e., when the ponds near capacity for managing the coal combustion wastes) and transported by truck to off-site sale or disposal. The embankments which form the ring dikes comprise the East and West Ponds.

2.2.3 Boiler Slag

During a conversation with plant personnel at the site visit, Dewberry was informed that boiler slag is processed with bottom ash at this plant. This statement was confirmed in the Ash Pond Construction Summary submitted by the utility following submission of the Draft report to the EPA (Appendix D, Doc 11, referenced as “pulverizer rejects”).

2.2.4 Flue Gas Desulfurization Sludge

Based on a conversation between Dewberry and plant personnel the day of the site visit, flue gas desulfurization sludge is referred to as “synthetic gypsum” at the JB Sims Power Plant. “Quick lime” goes up to the silo and is mixed with water; this forms a paste which is used to scrub sulfur dioxide in the scrubber module. Flue gas then goes through an absorption bed and removes most sulfur dioxide. The material becomes dense slurry which is then dewatered.

The synthetic gypsum is trucked out daily; approximately 250 tons are managed each week. While awaiting removal from the plant, the material is stored in a concrete building, just south of the plant (see Appendix C, Photo 5).

Dewberry personnel noted during the site visit that there was a pile of the synthetic gypsum in the southwest corner of the West Pond (see Appendix C, Photo 6).

2.3 SIZE AND HAZARD POTENTIAL CLASSIFICATION

Per Table 2.2a, these impoundments are **Small** as they are less than 40 feet high and their storage capacity is less than 1,000 acre-feet.

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

The adjacent property owner to the north of the plant would be adversely affected by a failure of the northern edge of either the East or West Pond ring dikes. In addition, the Grand River has significant recreational uses and would undoubtedly be impacted by a release, since the plant is situated on an island in the river. For these reasons, based on Table 2.2b, these embankments are considered a **Significant** hazard potential.

Table 2.2b: FEMA Federal Guidelines for Dam Safety Hazard Potential 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)

To the best of Dewberry's knowledge, neither the state nor the utility have given a hazard potential classification to either of the two ponds (East or West).

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

The capacity of each pond is ever-changing as bottom ash is continually being sluiced into either the East Pond or West Pond. This bottom ash is dug out with an excavator to allow the continuation of this sluicing without ever fully filling either one of the ponds. From Black and Veatch construction drawings dated 8-19-1983, calculations were made by Dewberry to conclude the storage capacity for each

pond, assuming full capacity from the top of the clay liner to the top of the surrounding dikes. Those calculations yielded the following results:

Table 2.3: Maximum Capacity of Unit	
East Pond Name	
Surface Area (acre)	0.2
Current Storage Capacity (cubic yards)	varies
Current Storage Capacity (acre-feet)	varies
Total Storage Capacity (cubic yards)	3,820
Total Storage Capacity (acre-feet)	2.37
Crest Elevation (feet)	594.0
Normal Pond Level (feet)	Not provided

Table 2.4: Maximum Capacity of Unit	
West Pond Name	
Surface Area (acre)	0.3
Current Storage Capacity (cubic yards)	varies
Current Storage Capacity (acre-feet)	varies
Total Storage Capacity (cubic yards)	4,790
Total Storage Capacity (acre-feet)	2.97
Crest Elevation (feet)	594.0
Normal Pond Level (feet)	Not provided

2.5 PRINCIPAL PROJECT STRUCTURES

2.5.1 Earth Embankment

The embankments were designed by Black & Veatch in 1981. Plant personnel were unable to obtain the design report. However, they were able to provide the plan and profile drawings for the embankments (see Appendix A, Docs 01 and 02). These embankments are comprised of compacted clay with nominal 3H:1V downstream side slopes and 2H:1V upstream side slopes and 10 feet width at the top of the crest. Subsequent to the Draft report, a Construction Summary was provided and is included as Appendix D, Doc 11.

2.5.2 Outlet Structures

These ponds do not have an outlet structure. Water is pumped back to the plant for reuse after bottom ash settling has occurred. A sidestream from the recycled water is discharged to control solids (total and dissolved) in the recycled water. There is a concrete overflow structure to allow for

flow between the two ponds as well as a low level sluice valve (Photo 5.4.1a within this report shows both structures). Alternating the filling of the ponds precludes the need for an overflow spillway.

2.6 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

Appendix C, Photo 10 shows the river line infrastructure of the City of Grand Haven downstream of the plant. There is a considerable amount of development down gradient from the JB Sims Station. Consulting the map shown below, "critical infrastructure" has been called out. In addition to this "critical infrastructure" there are a number of marinas and parks down gradient within a five mile radius. A scale of 2 miles is present in the bottom left corner of the map for reference.

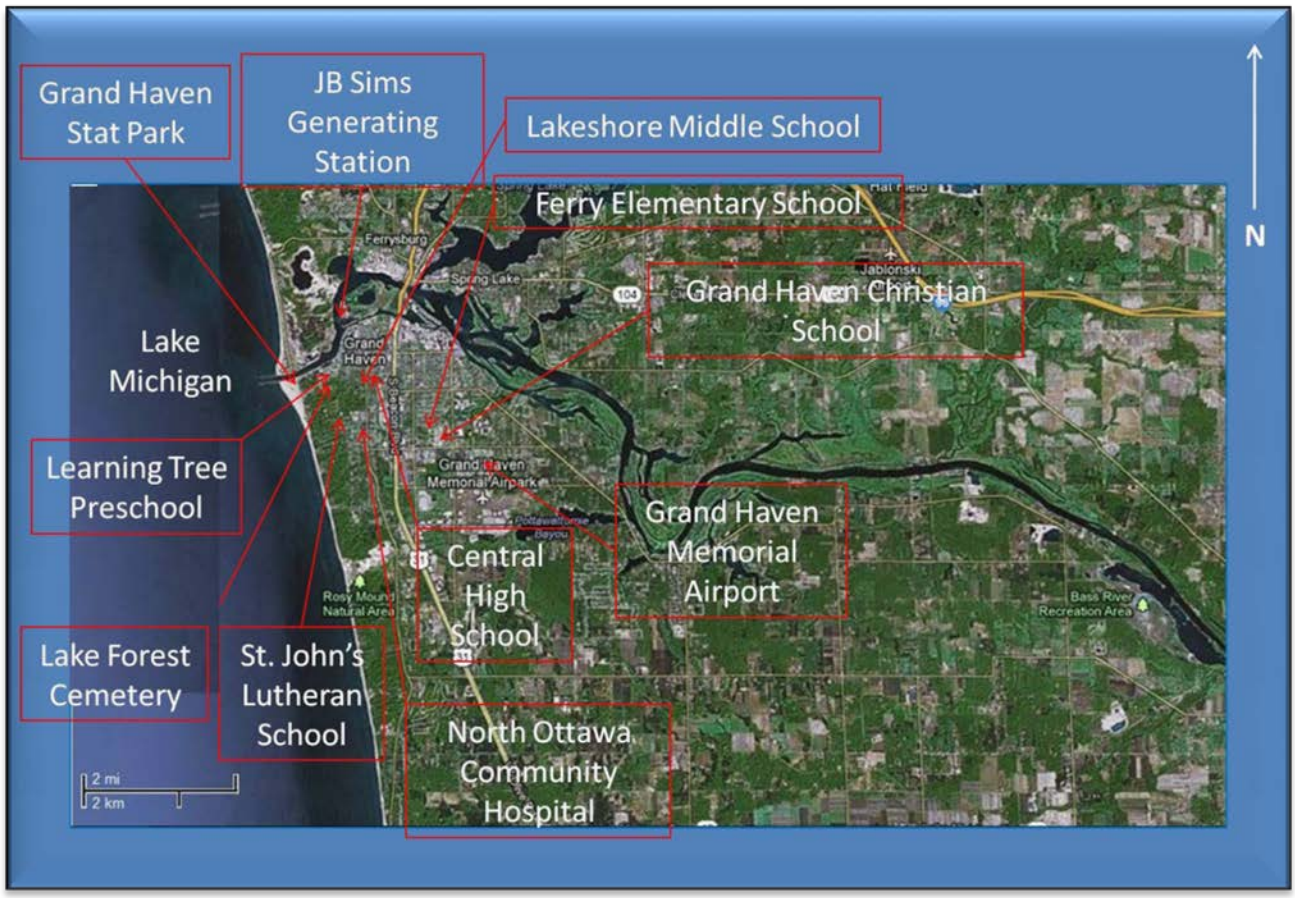


Figure 2.6: Critical Infrastructure

3.0 SUMMARY OF RELEVANT REPORTS, PERMITS, AND INCIDENTS

3.1 SUMMARY OF REPORTS ON THE SAFETY OF THE MANAGEMENT UNIT

No reports on the safety of the management units were provided for review.

3.2 SUMMARY OF LOCAL, STATE, AND FEDERAL ENVIRONMENTAL PERMITS

The embankments are not regulated as dams by the Michigan Dam Safety office.

Discharge from the ponds (i.e., the sidestream from the recycled water loop) is regulated by the Michigan Department of Environmental Quality (DEQ) Permit number MI-0000278, referenced in Appendix A, Doc 04. Michigan DEQ permits meet the standards of the US EPA National Pollutant Discharge Elimination System. This current Michigan DEQ permit is in the process of being revised (closure of one outfall and creation of new internal monitoring point are some of the changes). The new permit, which took effect November 1, 2012, is shown in Appendix A, Doc 03. The Public Notice and a Fact Sheet issued as part of the permit revision process are shown in Appendix A, Docs 04 and 05, respectively.

3.3 SUMMARY OF SPILL/RELEASE INCIDENTS

Data reviewed by Dewberry did not indicate any spills, unpermitted releases, or other performance related problems with the dam over the last 10 years.

4.0 SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION

4.1 SUMMARY OF CONSTRUCTION HISTORY

4.1.1 Original Construction

The embankments were designed by Black & Veatch in 1981. Plan and section drawings were provided by plant personnel (Appendix A, Docs 01 and 02). However, no additional information, such as design reports and/or supporting calculations, was initially provided. Dewberry received additional information subsequent to the Draft report, including a detailed construction summary (Appendix D, Doc 11). This document still does not specify what was actually constructed at the site, but it does specify that both the East and West Ponds were designed to be constructed "totally of compacted clay with a 3-foot thick clay bottom."

4.1.2 Significant Changes/Modifications in Design since Original Construction

An overflow spillway is shown on the Black & Veatch original construction design drawings (Appendix A, Docs 1 and 2) located on the east embankment of the East Pond, but was not present during Dewberry's site assessment. No information has been provided regarding why this spillway is shown on the original design drawings but not currently located on the embankment. Subsequently, in December 2013 (Appendix A, Doc 11) the utility provided an explanation as to the discrepancy. The utility noted that the spillway was removed for safety reasons related to the utility substation. The utility also explained that alternating pond filling and ash removal procedures between the two ponds precludes the need for the spillway. (See Section 4.2.4 below)

4.1.3 Significant Repairs/Rehabilitation since Original Construction

Periodically, the Grand Haven Board of Power & Light uses contractors to repair and reline the ash ponds with clay. During the process of excavating the bottom ash from the ponds via excavator (see Appendix C, Photos 2, 3 and 4), some of the clay liner is dug up as well. Over time, the clay liner deteriorates and is replaced. Appendix A, Doc 06 contains the specifications for East Ash Pond Repair and Relining. Appendix A, Doc 07 shows final grading; the most recent relining was completed in October 1996.

4.2 SUMMARY OF OPERATIONAL PROCEDURES

4.2.1 Original Operational Procedures

Operational procedures were not described by plant personnel, but were observed and presumed to be as follows: bottom ash and boiler slag has water added in the plant and is then sluiced by pipe to either the East or West Pond. In Appendix C, Photos 2, 3 and 4, the ash is being sluiced into the West Pond. After settling of the bottom ash occurs, the water is pumped back into the plant for reuse in plant operations. After sufficient settling and drying has occurred, the bottom ash is excavated from the ponds via excavator and either sold into the local construction materials market or trucked to an off-site disposal landfill.

4.2.2 Significant Changes in Operational Procedures and Original Startup

No significant changes in operating procedures have been reported. The revision to the MI DEQ permit concerning changes in effluent discharge locations does not impact the treatment of coal combustion waste at the plant.

4.2.3 Current Operational Procedures

Current operational procedures are unchanged from original procedures.

4.2.4 Other Notable Events since Original Startup

No notable events since original startup were mentioned during Dewberry's site visit or subsequent communications with plant personnel. We note that the East Pond spillway was removed when it was determined by the utility to be a risk to the plant's substation (Appendix D, Doc 11). The spillway could be removed because the two ash ponds were being operated in tandem with one being filled while the other was left on standby to take over when the first ash pond was filled. A spillway between the ponds provides a conduit to manage the water levels.

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 Wednesday, August 22, 2012 in company with the participants.

The site visit began at 8:00 AM. The weather was 75 degrees Fahrenheit, with clear, sunny skies. Observation notes taken during the site visit are provided in the Dam Inspection Checklist in Appendix B, Doc 08. Photographs were taken of conditions observed. Selected photographs are provided below and included in Appendix C, Doc 09, for ease of visual reference. All pictures were taken by Dewberry personnel during the site visit.

The overall assessment of the two units (the East and West Ponds) was that they were in poor condition; this is especially the case due to unexplained ponding downstream of the West Pond embankments.

5.2 EAST POND

5.2.1 Crest

The crest appeared in fair condition, especially on the east embankment of the East Pond, where an excavator is regularly mounted for scraping bottom ash that has settled to the bottom of the pond (see Photo 5.2.1 below). No indications of significant settlement, cracking, or significant depressions, tension cracks or other indications of settlement or shear failure of the crest were observed.

Photo 5.2.1: Looking south at East Pond's east berm

5.2.2 Upstream/Inside Slope

The inside slope appeared in poor condition (see Photo 5.2.2 below). Plant operations continually scrape portions of the clay liner from the inside slope.

Photo 5.2.2: Inside slope of East Pond at the northeast corner (Note disturbance of clay liner at top of photo.)

5.2.3 Downstream/Outside Slope and Toe

The outside slopes appeared in fair condition (see Photos 5.2.3a - 5.2.3e below). No indications of significant depressions, tension cracks or other indications of settlement or shear failure or sloughing were observed.

Photo 5.2.3a: Looking north from plant at East Pond's south embankment

Photo 5.2.3b: Looking north along eastern embankment and toe of East Pond

Photo 5.2.3c: Looking northwest along eastern embankment and toe of East Pond; note presence of bottom ash (black material covering ground) on the outside slope.

Photo 5.2.3d: Northeast toe corner of East Pond

Photo 5.2.3e: Looking south at Plant from northeast toe/corner of East Pond

5.2.4 Abutments and Groin Areas

Being ring dikes, these embankments do not have abutments or groin areas.

5.3 WEST POND

5.3.1 Crest

The crest appeared in fair condition. No indications of significant settlement, significant depressions, tension cracks or other indications of settlement or shear failure of the crest were observed (see Photo 5.3.1a – 5.3.1d below).

Photo 5.3.1a: Looking southeast at West Pond

Photo 5.3.1b: Looking south along west embankment/toe of West Pond (note the water midway south along the toe of the embankment)

Photo 5.3.1c: From northwest corner of West Pond

Photo 5.3.1d: Looking north along West Pond's west embankment (note visibility of clay liner)

5.3.2 Upstream/Inside Slope

The inside slope appeared in fair condition. No indications of significant depressions, tension cracks or other indications of settlement or shear failure sloughing were observed (see Photo 5.3.2 below as well as 5.3.1d above).

Photo 5.3.2: East embankment of West Pond (divider dike)

5.3.3 Downstream/Outside Slope and Toe

Most of the outside slope appeared in fair condition. No indications of significant depressions, tension cracks or other indications of settlement or shear failure, or sloughing were observed (see Photos 5.3.3a – 5.3.3d below, as well as Photo 5.3.3 above).

Photo 5.3.3a: Looking north from plant at West Pond's southern embankment (observed height approximately 8-10 ft)

Photo 5.3.3b: Looking down at West Pond's north toe along adjacent property

Photo 5.3.3c: Northwest toe at northwest corner of West Pond

Photo 5.3.3d: West Pond's southwest corner/toe

During the site visit ponding was observed at the south and west toe of the embankments in several areas (see Photos 5.3.3e – 5.3.3j below, as well as Photos 5.3.1b and 5.3.1c above). These particular areas of the downstream/outside slope and toe are considered to have poor drainage conditions.

Photo 5.3.3e: Looking northwest from plant; water course is the Grand River. Note two wet areas along toe of West Pond at west and southwest locations; plant personnel said this is from rain and a surface that is not very permeable.

Photo 5.3.3f: Looking south down west toe of West Pond (treeline is along a natural river embankment (not part of the bottom ash pond systems)

Photo 5.3.3g: Ponded water along west toe of West Pond

Photo 5.3.3h: Animal prints in the bottom ash along the West Pond's west embankment's toe

Photo 5.3.3i: Looking south from West Pond's southwest embankment (note ponded water)

Photo 5.3.3j: Looking east from West Pond's southwest toe at presence of ponded water along Ponds' south toe

5.3.4 Abutments and Groin Areas

Being ring dikes, these embankments do not have abutments or groin areas.

5.4 OUTLET STRUCTURES

5.4.1 Overflow Structure

A concrete overflow structure between the East and West Ponds exists to allow for spilling into the other pond to prevent overtopping of the embankment (see Photos 5.4.1a and 5.4.1b below). There is no overflow structure leaving either the East or West Ponds.

Photo 5.4.1a: Northwest corner of East Pond

Photo 5.4.1b: Looking southeast at spillover between East and West Ponds

5.4.2 Outlet Conduit and Low Level Outlet

There is a low level sluice gate conduit between the East and West Ponds (see Photos 5.4.2a and 5.4.2b below, as well as Photo 5.4.1a above. There is no conduit leaving either the East or West Ponds. Water is pumped back to the plant for reuse in operations.

Photo 5.4.2a: Valve pit/ low level sluice gate conduit (eastern side)

Photo 5.4.2b: Valve pit/ low level sluice gate conduit (western side)

5.4.3 Emergency Spillway

There is not an emergency spillway present at this site.

6.0 HYDROLOGIC/HYDRAULIC SAFETY

6.1 SUPPORTING TECHNICAL DOCATION

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. A review of topographic information for the plant site shows that there is no surface drainage into the ponds from outside the embankment crests. Essentially if the freeboard for the ash pond exceeds the maximum precipitation value then there will be no overflow of pond water.

6.1.3 Spillway Rating

There is not a spillway currently present at this site. An overflow spillway is specified in the submitted construction drawings (Appendix A, Docs 1 and 2) as well as the design and construction summary (Appendix D, Doc 11).

Information from the plant indicates that the spillway was removed when operational procedures changed to use one pond at a time to manage the coal combustion residual materials (Appendix D, Doc 11). The spillway was considered a risk to the utility substation, if it was not needed to control water levels in the ponds. The operational change was to use (i.e., fill) one unit at a time, while keeping the other unit drained. The spillway between the ponds alleviates the concern of overfilling the active pond.

6.1.4 Downstream Flood Analysis

No downstream flood analysis was provided.

6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCATION

Supporting documentation reviewed by Dewberry is inadequate.

6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY

The hydrologic/hydraulic safety is poor due to the lack of design flood or maximum precipitation calculations. The utility noted that there have been two "100-year" storm events in the past three years, with no release of water from the two ash ponds. In the event of extreme rainfall events there are two operational provisions to prevent embankment overtopping and embankment failure: a spillway between the two ponds, plus pumps in the ponds that release water to the plant's discharge line (Appendix D, Doc 11).

7.0 STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCATION

7.1.1 Stability Analyses and Load Cases Analyzed

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

7.1.2 Design Parameters and Dam Materials

Information not provided. Design drawings note embankment material is compacted clay.

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 analysis or soil embankment materials composition data was provided.

7.1.6 Critical Geological Conditions

This information cannot be assessed without the design report.

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Structural stability documentation is inadequate. On January 13, 2013 the Grand Haven Board of Light and Power informed EPA that complete stability analyses of the embankments for both ponds would be performed.

7.3 ASSESSMENT OF STRUCTURAL STABILITY

Overall, the structural stability of the two ponds is rated to be POOR based on the lack of supporting technical information concerning dam structural stability and safety factor determination. .

8.0 ADEQUACY OF MAINTENANCE AND METHODS OF OPERATION

8.1 OPERATING PROCEDURES

Operational procedures were not available at the time of the site visit; these procedures were provided verbally during Dewberry's site visit. Subsequent to the Draft report, the utility has stated that written procedures are being developed (Appendix D, Doc 11).

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

Proper maintenance of embankments cannot be determined. Maintenance procedures are informal and not documented. Excavator activities to recover ash material from the pond can damage the pond liner.

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 inadequate for settling and removing bottom ash from the plant.

8.3.2 Adequacy of Maintenance

Based on the assessments of this report, maintenance procedures appear to be inadequate. Maintenance procedures should be documented. Follow-up action on the ponding along the toe of the West Pond should be undertaken.

Subsequent to the Draft report, the utility addressed the ponded water issue along the West Pond toe (Appendix D, Doc 11). Additionally, written maintenance documents are being developed by the utility.

9.0 ADEQUACY OF SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

No surveillance procedures or equipment were identified during Dewberry's site visit.

Subsequent to the Draft report, the utility submitted additional information, noting that they had developed and instituted a formal monitoring program. Additionally stated in that subsequent documentation is an explanation of the use of security cameras at the plant; using these cameras, control room operators can observe the ash ponds 24 hours per day, 7 days per week.

9.2 INSTRUMENTATION MONITORING

This plant does not have an instrumentation monitoring system.

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, the inspection program appears to be inadequate. It is recommended the plant adopt formal written inspection procedures. The Michigan Dam Safety office could provide a sample to begin from.

As stated above in Section 9.1, subsequent to the Draft report, the utility developed and instituted a formal monitoring program. The program checklist is provided in Appendix D, Doc 11.

9.3.2 Adequacy of Instrumentation Monitoring Program

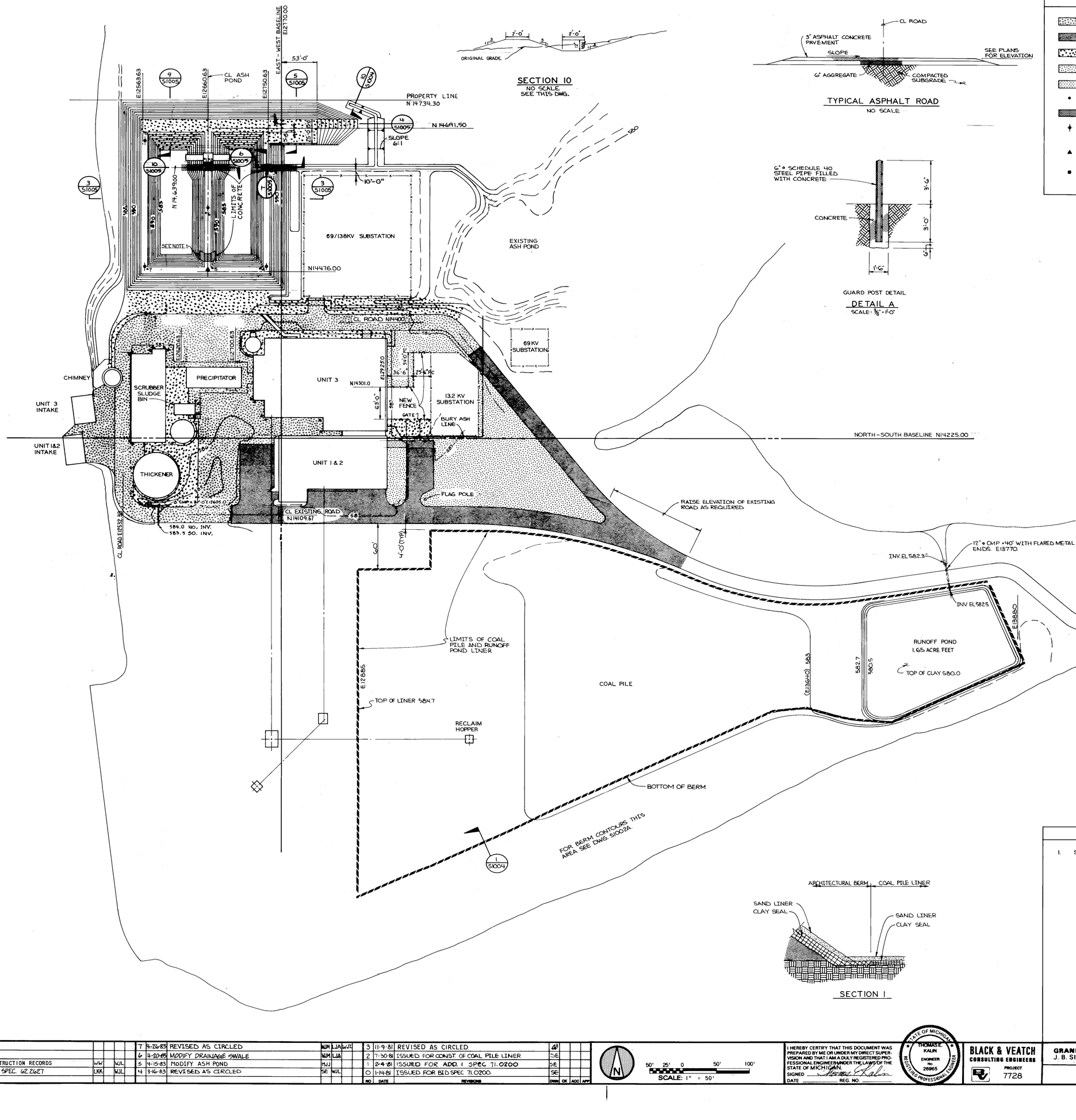
No instrumentation is present at either the East or West Ponds.

Subsequent to the Draft report the utility explained that they have had remote monitoring instrumentation in the past, but found that they were frequently inaccurate and required excessive maintenance (Appendix D, Document 11). The plant prefers to use physical inspection and observation of the ash ponds rather than monitoring instrumentation.

APPENDIX A

Document 1

Black & Veatch, Drawing No. S1004, Finish Grading and Paving Plan, 1981



SECTION 10
NO SCALE
SEE THIS DWG.

TYPICAL ASPHALT ROAD
NO SCALE

GUARD POST DETAIL

DETAIL A
SCALE: 3/8" = 1'-0"

SECTION 1

LEGEND

- ADDITIONAL ASPHALT
- REMOVE EXISTING ASPHALT AND INSTALL NEW
- WHITE CRUSHED STONE
- NEW SEEDING
- NEW SIDEWALKS
- CONCRETE FILLED PIPE FOR BUMPERS. PAINT YELLOW (SEE DETAIL A)
- CONCRETE
- SETTLEMENT MONITORING POINTS- 1½" DIAMETER GALVINIZED PIPE SET IN CONCRETE.
- SETTLEMENT POINT ON TOP OF WYE OF BOTTOM ASH LINE.
- SETTLEMENT POINT ON TOP OF TIMBER PIPE SUPPORT AT THE PAINTED NAIL.

GENERAL NOTES

1. SPLASH PAD CONSTRUCTED WITH 4" HIGH CURBS.

NO	DATE	REVISIONS	DWN	CK	ACC	APP
7	4-26-83	REVISED AS CIRCLED	WJM	LJA	WJL	
6	4-20-83	MODIFY DRAINAGE SWALE	WJM	LJA		
5	4-15-83	MODIFY ASH POND	MJJ			
4	3-16-83	REVISED AS CIRCLED	SE	WJL		
3	11-9-81	REVISED AS CIRCLED				
2	7-30-81	ISSUED FOR CONST. OF COAL PILE LINER	SE			
1	2-4-81	ISSUED FOR ADD. 1 SPEC 71.0200	SE			
0	1-14-81	ISSUED FOR BID SPEC 71.0200	SE			
9	8-19-85	CONFORMED TO CONSTRUCTION RECORDS	WW	WJL		
8	6-3-85	ISSUED FOR BID, SPEC. 62.2627	LKK	WJL		

N

50' 25' 0 50' 100'
SCALE: 1" = 50'

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 MICHIGAN.
SIGNED Thomas E. Kalin
DATE _____ REG. NO. _____

STATE OF MICHIGAN · THOMAS E. KALIN · ENGINEER · No. 26965 · REGISTERED PROFESSIONAL ENGINEER

BLACK & VEATCH
CONSULTING ENGINEERS
PROJECT 7728

GRAND HAVEN BOARD OF LIGHT AND POWER
J. B. SIMS STATION UNIT 3

FINISH GRADING AND PAVING PLAN

B&V DWG NO. S1004 REV. 9

FORM-173 A

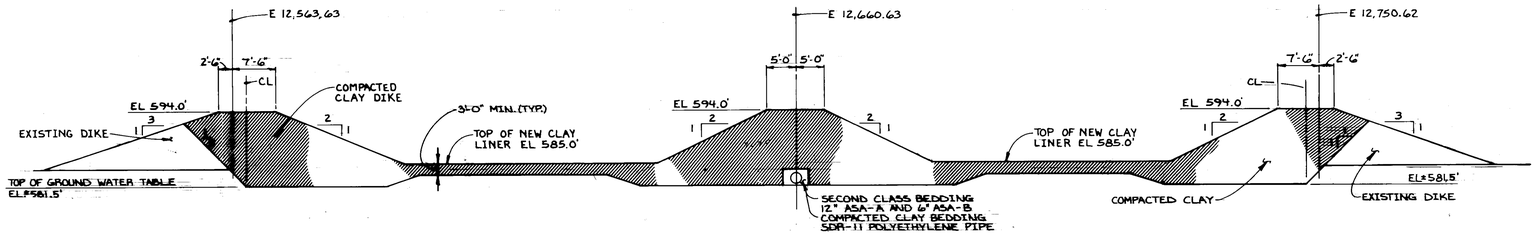
APPENDIX A

Document 2

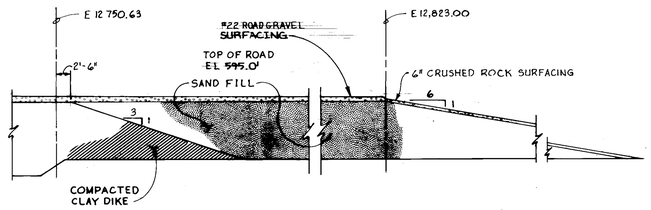
Black & Veatch, Drawing No. S1005, Finish Grade and Paving Sections and Details, 1981

SECTION 1
SEE THIS SHEET

TYP. RAMP
SECTION 2
SEE THIS SHEET



SECTION 3
SCALE: 1" = 10'
SEE DWG. S1004



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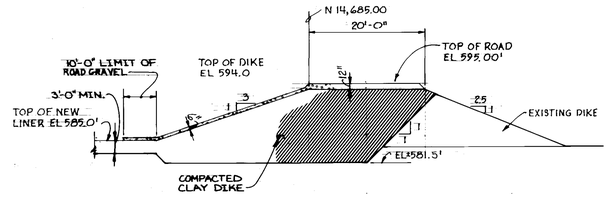
SEE DWG. S1004



SECTION 9
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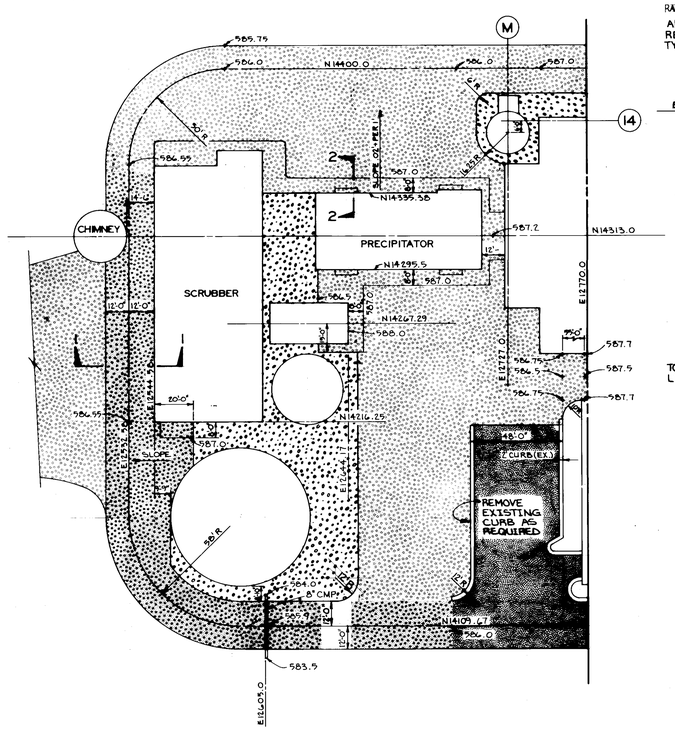
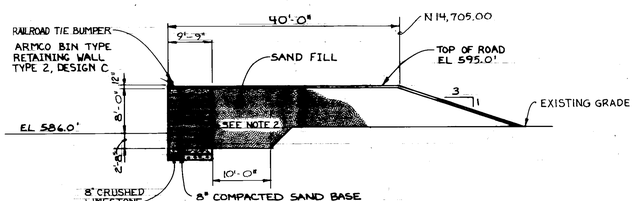
SEE DWG. S1004



PARTIAL PAVING PLAN
SCALE: 1" = 30'-0"



SECTION 5
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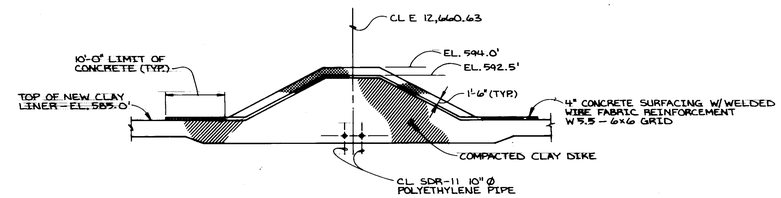
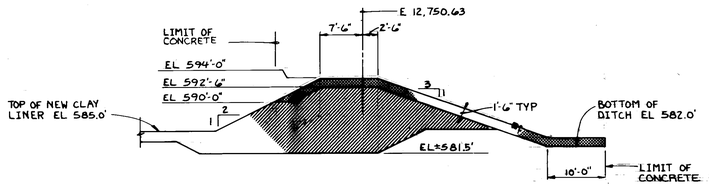
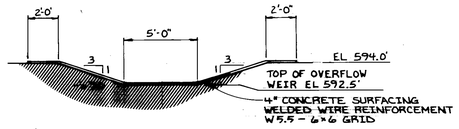
SEE DWG. S1004



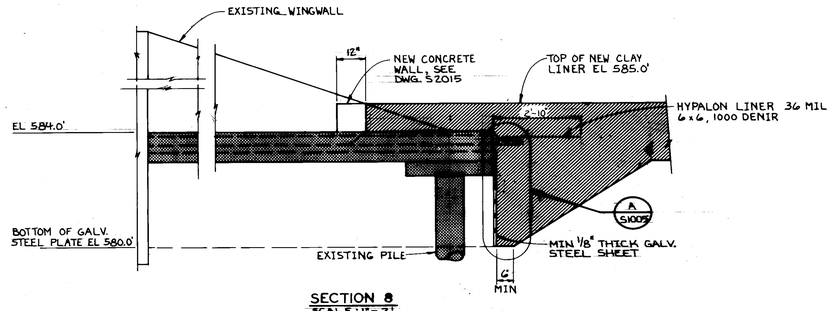
SECTION 10
SCALE: 1" = 10'
SEE DWG. S1004



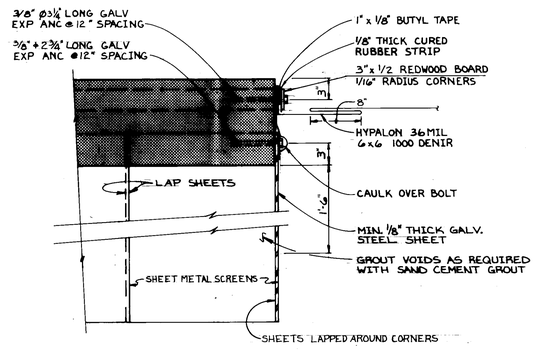
SECTION 6
SCALE: 1" = 10'
SEE DWG. S1004



SECTION 7
SCALE: 1" = 4'
SEE DWG. S1004



SECTION 8
SCALE: 1" = 2'
SEE DWG. S1004



DETAIL A
NO SCALE
SEE THIS DWG.

NOTES

1. SEE DWG. S1004 FOR LEGENDS.
2. PLACE TREVIRA GRADE 51135 GEOTEXTILE OVER INSIDE OF EXTERIOR WALL OF RETAINING WALL.

NO	DATE	REVISIONS	DWN	CK	ADD	APP
6	8-19-83	CONFORMED TO CONSTRUCTION RECORDS	KMB	WLL		
5	4-26-83	REVISED AS CIRCLED	MJH	LJA	WLL	
4	4-20-83	GENERAL REVISIONS	MJH	LJA		
3	4-15-83	GENERAL REVISIONS				
2	11-4-81	ISSUED FOR CONST. SPEC. 71.0200			KE	
1	2-4-81	ISSUED FOR ADD 1 SPEC. 71.0200	SE			
0	1-14-81	ISSUED FOR BID SPEC. 71.0200.	SE			

SCALE:

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 MICHIGAN.
SIGNED Thomas E. Kalin
DATE 11-5-81 REG. NO.

STATE OF MICHIGAN — THOMAS E. KALIN — ENGINEER — No. 26965 — REGISTERED PROFESSIONAL ENGINEER

BLACK & VEATCH
CONSULTING ENGINEERS
PROJECT 7728

GRAND HAVEN BOARD OF LIGHT AND POWER
J. B. SIMS STATION
UNIT 3

FINISH GRADE AND PAVING SECTIONS AND DETAILS

DWG NO. S1005
REV. 6

FORM 198 A

APPENDIX A

Document 3

Michigan Department of Environmental Quality Permit No. MI-0000278

PERMIT NO. MI0000728

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 *et seq*.) (the "Federal Act"), Michigan Act 451, Public Acts of 1994, as amended (the "Michigan Act"), Parts 31 and 41, and Michigan Executive Order 2011-1,

Grand Haven Board of Light and Power
1700 Eaton Drive
Grand Haven, Michigan 49417

is authorized to discharge from the **J. B. Sims Generating Station,** located at

1231 North Third Street
Grand Haven, Michigan 49417

designated as **Grand Haven BL&P-J B Sims**

to the receiving water named the Grand River, in accordance with effluent limitations, monitoring requirements, and other conditions set forth in this permit.

This permit is based on a complete application submitted on April 6, 2010 as amended through August 31, 2011.

This permit takes effect on November 1, 2012. The provisions of this permit are severable. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term in accordance with applicable laws and rules. On its effective date this permit shall supersede NPDES Permit No. MI0000728, expiring October 1, 2010.

This permit and the authorization to discharge shall expire at midnight, **October 1, 2015.** In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit an application which contains such information, forms, and fees as are required by the Department of Environmental Quality (Department) by **April 4, 2015.**

Issued _____

DRAFT
Philip Argiroff, Chief
Permits Section
Water Resources Division

PERMIT FEE REQUIREMENTS

In accordance with Section 324.3120 of the Michigan Act, the permittee shall make payment of an annual permit fee to the Department for each October 1 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. The fee shall be postmarked by January 15 for notices mailed by December 1. The fee is due no later than 45 days after receiving the notice for notices mailed after December 1.

Annual Permit Fee Classification: Industrial/Commercial Major

In accordance with Section 324.3118 of the Michigan Act, the permittee shall make payment of an annual storm water fee to the Department for each January 1 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. The fee shall be postmarked by March 15 for notices mailed by February 1. The fee is due no later than 45 days after receiving the notice for notices mailed after February 1.

CONTACT INFORMATION

Unless specified otherwise, all contact with the Department required by this permit shall be made to the Grand Rapids District Supervisor of the Water Resources Division. The Grand Rapids District Office is located at State Office Building, Fifth Floor, 350 Ottawa N.W., Unit 10, Grand Rapids, Michigan 49503-2341, Telephone: 616-356-0500, Fax: 616-356-0202.

CONTESTED CASE INFORMATION

Any person who is aggrieved by this permit may file a sworn petition with the Office of Regulatory Reinvention within the Michigan Department of Licensing and Regulatory Affairs, setting forth the conditions of the permit which are being challenged and specifying the grounds for the challenge. The Department of Licensing and Regulatory Affairs may reject any petition filed more than 60 days after issuance as being untimely.

PART I

Section A. Limitations and Monitoring Requirements

1. Final Effluent Limitations, Monitoring Point 002A

During the period beginning on the effective date of this permit and lasting until the date the wastewater tributary to outfall 002 is redirected to discharge through outfall 005, the permittee is authorized to discharge a maximum of 0.4 MGD of demineralizer water, service water, bottom ash transport water, scrubber sump water, and coal pile runoff from Monitoring Point 002A through Outfall 002 to a wetland pond contiguous with the North Channel of the Grand River. Such discharge shall be limited and monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading			Maximum Limits for Quality or Concentration				
Parameter	**Monthly**	**Daily**	**Units**	**Monthly**	**Daily**	**Units**	**Monitoring Frequency**	**Sample Type**
Flow	(report)	(report)	MGD	---	---	---	Daily	Report Total Daily Flow
Total Suspended Solids	100	170	lbs/day	30	50	mg/l	2x Month	Grab
Oil & Grease	33	50	lbs/day	10	15	mg/l	2x Month	Grab
Total Residual Oxidant (TRO)								
During Chlorination – No Bromine Use								
Discharge Mode								
Continuous (greater than 120 min/day)	---	---		---	38	µg/l	Weekly	Grab
Intermittent (less than/equal to 120 min/day)	---	---		---	200	µg/l	Weekly	Grab
During Bromine Use – the discharge of bromine shall not exceed 120 min/day								
Intermittent (less than/equal to 120 min/day)	---	---		---	50	µg/l	Weekly	Grab
TRO Discharge Time	---	---	---	---	(report)	min/day	Weekly	Report Total Discharge Time
Outfall Observation	(report)	---	---	---	---	---	Daily	Visual
Total Selenium								
Through Sep. 30, 2013	(report)	---	lbs/day	(report)	---	µg/l	Monthly	24-Hr Composite
Beginning Oct. 1, 2013	0.017	---	lbs/day	5.0	---	µg/l	Monthly	24-Hr Composite
Available Cyanide								
Through – Sep. 30, 2013	(report)	(report)	lbs/day	(report)	(report)	µg/l	Monthly	Grab
Beginning – Oct. 1, 2013	0.017	0.15	lbs/day	5.2	44	µg/l	Weekly	Grab
Acute Toxicity **(see Part I.A.1.k.)**								
Through – Sep. 30, 2013	---	---	---	---	(report)	TU_A	Quarterly	24-Hr Composite
Beginning – Oct. 1, 2013	---	---	---	---	1.0	TU_A	Monthly	24-Hr Composite
Chronic Toxicity								
Through – Sep. 30, 2013	---	---	---	(report)	---	TU_C	Quarterly	24-Hr Composite
Beginning – Oct. 1, 2013	---	---	---	1.0	---	TU_C	Monthly	24-Hr Composite
Total Mercury	(report)	---	lbs/day	(report)	---	ng/l	Monthly	Grab
	12-Month Rolling Average			**12-Month Rolling Average**				
Total Mercury	0.000083	---	lbs/day	25.0	---	ng/l	Monthly	Calculation
				Minimum Daily	**Maximum Daily**			
pH	---	---	---	6.5	9.0	S.U.	Daily	Grab

PART I

Section A. Limitations and Monitoring Requirements

a. Narrative Standard
The receiving water shall contain no turbidity, color, oil films, floating solids, foams, settleable solids, or deposits as a result of this discharge in unnatural quantities which are or may become injurious to any designated use.

b. Monitoring Location
Samples, measurements, and observations taken in compliance with the monitoring requirements above shall be taken prior to discharge to the wetland contiguous with the North Channel of the Grand River.

c. Outfall Observation
Any unusual characteristics of the discharge (i.e., unnatural turbidity, color, oil film, floating solids, foams, settleable solids, suspended solids, or deposits) shall be reported within 24 hours to the Department followed with a written report within five (5) days detailing the findings of the investigation and the steps taken to correct the condition.

d. Power Plants – PCB
Beginning upon the effective date of this permit, the permittee shall not discharge any polychlorinated Biphenyls to the receiving waters of the State of Michigan as a result of plant operation.

e. Water Treatment Additives
This permit does not authorize the discharge of water additives without approval from the Department. Approval of water additives is authorized under separate correspondence. Water additives include any material that is added to water used at the facility or to a wastewater generated by the facility to condition or treat the water. In the event a permittee proposes to discharge water additives, including an increased discharge concentration of a previously approved water additive, the permittee shall submit a request to the Department for approval. See Part I.A.8. for information on requesting water treatment additive use.

f. Analytical Method(s) and Quantification Level(s) for Total Selenium and Available Cyanide
The sampling procedures, preservation and handling, and analytical protocol for compliance monitoring for Total Selenium shall be in accordance with an EPA Approved Test Method, for Available Cyanide shall be in accordance with EPA Test Method OIA-1677. The quantification level for Total Selenium shall be 1.0 µg/l and for Available Cyanide shall be 2.0 µg/l unless higher levels are appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination. Upon approval of the Department, the permittee may use alternate analytical methods (for parameters with methods specified in 40 CFR 136, the alternate methods are restricted to those listed in 40 CFR 136).

g. Total Residual Oxidant
Total Residual Oxidant (TRO) shall be analyzed by Amperometric Titration using either Standard Method 4500-CI D, Standard Method 4500-CI E or Orion Electrode Model 97-70 (other analytical methods specified in 40 CFR 136 may be used upon approval of the Department). TRO monitoring is only required during periods of chlorine or bromine use and subsequent discharge. Limitations for the intermittent discharge of chlorine apply only when the discharge of chlorine is less than or equal to 120 minutes per day, otherwise the limitations for continuous discharge of chlorine apply. Authorization to discharge bromine with or without chlorine is limited to 120 minutes per day at the limitations specified above with the additional requirement that any discharge of chlorine is restricted to a concurrent discharge with bromine (no additional discharge of chlorine is authorized for that day).

During the intermittent discharge of chlorine without bromine ("During Chlorination - No Bromine Use" limitations given above), the daily concentration value reported for TRO shall be the average of a minimum of three (3) equally spaced grab samples taken during a chlorine discharge event, with the additional limitation that no single sample may exceed 300 ug/l.

PART I

Section A. Limitations and Monitoring Requirements

During the intermittent discharge of bromine with or without chlorine ("During Bromine Use" limitations given above), the daily concentration value reported for TRO shall be the maximum of at least three (3) equally spaced grab samples taken during a bromine discharge event (no single sample may exceed 50 ug/l).

The permittee shall enter "*G" on the Discharge Monitoring Report for the TRO discharge modes not being used.

The permittee may use dehalogenation techniques to achieve the applicable TRO limitations, using sodium thiosulfate, sodium sulfite, sodium bisulfite, or other dehalogenating reagents approved by the Department. The quantity of reagent(s) used shall be limited to 1.5 times the stoichiometric amount of applied chlorine/bromine oxidant.

h. Final Effluent Limitation for Total Mercury

The final limit for total mercury is the Discharge Specific Level Currently Achievable (LCA) based on a multiple discharger variance from the water quality-based effluent limit of 1.3 ng/l, pursuant to Rule 323.1103(9) of the Water Quality Standards. Compliance with the LCA shall be determined as a 12-month rolling average. The 12-month rolling average shall be determined by adding the present monthly average result to the preceding 11 monthly average results then dividing the sum by 12. For facilities with quarterly monitoring requirements for total mercury, quarterly monitoring shall be equivalent to 3 months of monitoring in calculating the 12-month rolling average. Facilities that monitor more frequently than monthly for total mercury must determine the monthly average result, which is the sum of the results of all data obtained in a given month divided by the total number of samples taken, in order to calculate the 12-month rolling average. If the 12-month rolling average for any month is less than or equal to the LCA, the permittee will be considered to be in compliance for total mercury for that month, provided the permittee is also in full compliance with the Pollutant Minimization Program for Total Mercury, set forth in Part I.A.9.

After a minimum of 12 monthly data points have been collected, the permittee may request a reduction in the monitoring frequency for total mercury. This request shall contain an explanation as to why the reduced monitoring is appropriate and shall be submitted to the Department. Upon receipt of written approval and consistent with such approval, the permittee may reduce the monitoring frequency for total mercury indicated in Part I.A.1 of this permit. The Department may revoke the approval for reduced monitoring at any time upon notification to the permittee.

i. Total Mercury Testing Requirements

The analytical protocol for total mercury shall be in accordance with EPA Method 1631, Revision E, “Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry”. The quantification level for total mercury shall be 0.5 ng/l, unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination.

The use of clean technique sampling procedures is **required** unless the permittee can demonstrate to the Department that an alternative sampling procedure is representative of the discharge. Guidance for clean technique sampling is contained in: EPA Method 1669, *Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels (Sampling Guidance)*, EPA-821-R96-001, July 1996. Information and data documenting the permittee's sampling and analytical protocols and data acceptability shall be submitted to the Department upon request.

PART I

Section A. Limitations and Monitoring Requirements

j. Monitoring Frequency Reduction for Total Selenium and Available Cyanide
After the submittal of twelve (12) months of data, the permittee may request, in writing, Department approval of a reduction in monitoring frequency for Total Selenium and Available Cyanide. This request shall contain an explanation as to why the reduced monitoring is appropriate. Upon receipt of written approval and consistent with such approval, the permittee may reduce the monitoring frequency indicated in Part I.A.1 of this permit. The monitoring frequency for Total Selenium and Available Cyanide shall not be reduced to less than Annually. The Department may revoke the approval for reduced monitoring at any time upon notification to the permittee.

k. Whole Effluent Toxicity Requirements
Test species shall be *Ceriodaphnia dubia*, except for one month during the final year this permit is in effect when the permittee shall also conduct a toxicity test on fathead minnows simultaneously with one of the *Ceriodaphnia dubia* monitoring events. Testing and reporting procedures shall follow procedures contained in EPA/600/4-91/002, "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (Fourth Edition)." When the effluent ammonia nitrogen (as N) concentration is greater than 3 mg/l, the pH of the toxicity test shall be maintained at a pH of 8 Standard Units. The acute toxic unit (TU_A) value and chronic toxic unit (TU_C) value for **each species tested** shall be reported on the Discharge Monitoring Report (DMR). If multiple chronic toxicity tests for the same species are performed during the month, the maximum TU_A value and monthly average TU_C value for the species shall be reported. For **each species not tested**, the permittee shall enter **"*W"** on the DMR. Completed toxicity test reports for each test conducted shall be retained by the permittee in accordance with the requirements of Part II.B.5. of this permit and shall be available for review by the department upon request. Beginning **September 1, 2013**, after 12 months of toxicity testing and upon approval of the Department, the monitoring frequency may be reduced if the test data indicate that the toxicity requirements of Rule 323.1219 of the Michigan Administrative Code are consistently being met. After one (1) year of toxicity testing and upon approval of the Department, the chronic toxicity tests may be performed using the more sensitive species identified in the chronic toxicity database. If a more sensitive species cannot be identified, the chronic toxicity tests shall be performed with both species. Toxicity test data acceptability is contingent upon the validation of the test method by the testing laboratory. Such validation shall be submitted to the Department upon request.

The permittee shall conduct a Toxicity Reduction Evaluation (TRE). The objective of the TRE shall be to reduce the toxicity of the final effluent from monitoring point 002A to $\leq$ 1.0 TU_C and $\leq$ 1.0 TU_A by January 1, 2013. The following documents are available as guidance to reduce toxicity to acceptable levels: Phase I, EPA/600/6-91/005F (chronic), EPA/600/6-91/003 (acute); Phase II, EPA/600/R-92/080 (acute and chronic); Phase III, EPA/600/R-92/081 (acute and chronic); and Publicly Owned Treatment Works (POTWs), EPA/833B-99/002. Annual progress reports shall be submitted to the Department within 30 days of the completion of the last test of each annual cycle.

Beginning October 1, 2013:

1) If monitoring shows persistent exceedance of the 1.0 TU_C limit or the 1.0 TU_A limit for effluent toxicity, the Department will determine whether the permittee must implement the toxicity control program requirements specified in 2) below.

2) Upon written notification by the Department, the following conditions apply. Within 90 days of the notification, the permittee shall implement a Toxicity Reduction Evaluation (TRE). The objective of the TRE shall be to reduce the toxicity of the final effluent from monitoring point 002A to $\leq$ 1.0 TU_C and $\leq$ 1.0 TU_A. The following documents are available as guidance to reduce toxicity to acceptable levels. Phase I, EPA/600/6-91/005F (chronic), EPA/600/6-91/003 (acute); Phase II, EPA/600/R-92/080 (acute and chronic); Phase III, EPA/600/R-92/081 (acute and chronic); and POTWs, EPA/833B-99/002. Annual progress reports shall be submitted to the Department within 30 days of the completion of the last test of each annual cycle.

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Section A. Limitations and Monitoring Requirements

2. Final Effluent Limitations, Monitoring Point 003A

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge a maximum of 0.052 MGD of boiler blowdown, contact cooling water, floor drain water after treatment from the oil/water separator, and transformer pad storm water runoff from Monitoring Point 003A and treated sanitary wastewater from Monitoring Point 005B through Outfall 003. Outfall 003 discharges to wetland pond contiguous with the South Channel of the Grand River. Such discharge shall be limited and monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading			Maximum Limits for Quality or Concentration				
Parameter	**Monthly**	**Daily**	**Units**	**Monthly**	**Daily**	**Units**	**Monitoring Frequency**	**Sample Type**
Flow	(report)	(report)	MGD	---	---	---	Daily	Report Total Daily Flow
Total Suspended Solids	13	43	lbs/day	30	100	mg/l	Weekly	Grab
Oil & Grease	4.0	7.0	lbs/day	10	15	mg/l	Weekly	Grab
Total Residual Oxidant (TRO)								
During Chlorination – No Bromine Use								
Discharge Mode								
Continuous (greater than 120 min/day)	---	---		---	38	µg/l	5x Weekly	Grab
Intermittent (less than/equal to 120 min/day)		---		---	200	µg/l	5x Weekly	Grab
During Bromine Use – the discharge of bromine shall not exceed 120 min/day								
Intermittent (less than/equal to 120 min/day)		---		---	50	µg/l	5x Weekly	Grab
TRO Discharge Time	---	---	---	---	(report)	min/day	5x Weekly	Report Total Discharge Time
Outfall Observation	(report)	---	---	---	---	---	Daily	Visual
Total Mercury	(report)	---	lbs/day	(report)	---	ng/l	Monthly	Grab
	12-Month Rolling Average			**12-Month Rolling Average**				
Total Mercury	0.0000026	---	lbs/day	6.0	---	ng/l	Monthly	Calculation
				Minimum Daily	**Maximum Daily**			
pH	---	---	---	6.5	9.0	S.U.	5x Weekly	Grab

a. Narrative Standard
The receiving water shall contain no turbidity, color, oil films, floating solids, foams, settleable solids, or deposits as a result of this discharge in unnatural quantities which are or may become injurious to any designated use.

b. Monitoring Location
Samples, measurements, and observations taken in compliance with the monitoring requirements above shall be taken prior to discharge to the wetland contiguous with the South Channel of the Grand River.

PART I

Section A. Limitations and Monitoring Requirements

c. Outfall Observation
Any unusual characteristics of the discharge (i.e., unnatural turbidity, color, oil film, floating solids, foams, settleable solids, suspended solids, or deposits) shall be reported within 24 hours to the Department followed with a written report within five (5) days detailing the findings of the investigation and the steps taken to correct the condition.

d. Power Plants – PCB
Beginning upon the effective date of this permit, the permittee shall not discharge any polychlorinated biphenyls to the receiving waters of the State of Michigan as a result of plant operation.

e. Water Treatment Additives
This permit does not authorize the discharge of water additives without approval from the Department. Approval of water additives is authorized under separate correspondence. Water additives include any material that is added to water used at the facility or to a wastewater generated by the facility to condition or treat the water. In the event a permittee proposes to discharge water additives, including an increased discharge concentration of a previously approved water additive, the permittee shall submit a request to the Department for approval. See Part I.A.8. for information on requesting water treatment additive use.

f. Total Residual Oxidant
Total Residual Oxidant (TRO) shall be analyzed by Amperometric Titration using either Standard Method 4500-Cl D, Standard Method 4500-Cl E or Orion Electrode Model 97-70 (other analytical methods specified in 40 CFR 136 may be used upon approval of the Department). TRO monitoring is only required during periods of chlorine or bromine use and subsequent discharge. Limitations for the intermittent discharge of chlorine apply only when the discharge of chlorine is less than or equal to 120 minutes per day, otherwise the limitations for continuous discharge of chlorine apply. Authorization to discharge bromine with or without chlorine is limited to 120 minutes per day at the limitations specified above with the additional requirement that any discharge of chlorine is restricted to a concurrent discharge with bromine (no additional discharge of chlorine is authorized for that day).

During the intermittent discharge of chlorine without bromine ("During Chlorination - No Bromine Use" limitations given above), the daily concentration value reported for TRO shall be the average of a minimum of three (3) equally spaced grab samples taken during a chlorine discharge event, with the additional limitation that no single sample may exceed 300 ug/l.

During the intermittent discharge of bromine with or without chlorine ("During Bromine Use" limitations given above), the daily concentration value reported for TRO shall be the maximum of at least three (3) equally spaced grab samples taken during a bromine discharge event (no single sample may exceed 50 ug/l).

The permittee shall enter "*G" on the Discharge Monitoring Report for the TRO discharge modes not being used.

The permittee may use dehalogenation techniques to achieve the applicable TRO limitations, using sodium thiosulfate, sodium sulfite, sodium bisulfite, or other dehalogenating reagents approved by the Department. The quantity of reagent(s) used shall be limited to 1.5 times the stoichiometric amount of applied chlorine/bromine oxidant.

PART I

Section A. Limitations and Monitoring Requirements

g. Final Effluent Limitation for Total Mercury

The final limit for total mercury is the Discharge Specific Level Currently Achievable (LCA) based on a multiple discharger variance from the water quality-based effluent limit of 1.3 ng/l, pursuant to Rule 323.1103(9) of the Water Quality Standards. Compliance with the LCA shall be determined as a 12-month rolling average. The 12-month rolling average shall be determined by adding the present monthly average result to the preceding 11 monthly average results then dividing the sum by 12. For facilities with quarterly monitoring requirements for total mercury, quarterly monitoring shall be equivalent to three months of monitoring in calculating the 12-month rolling average. Facilities that monitor more frequently than monthly for total mercury must determine the monthly average result, which is the sum of the results of all data obtained in a given month divided by the total number of samples taken, in order to calculate the 12-month rolling average. If the 12-month rolling average for any month is less than or equal to the LCA, the permittee will be considered to be in compliance for total mercury for that month, provided the permittee is also in full compliance with the Pollutant Minimization Program for Total Mercury, set forth in Part I.A.9.

After a minimum of 12 monthly data points have been collected, the permittee may request a reduction in the monitoring frequency for total mercury. This request shall contain an explanation as to why the reduced monitoring is appropriate and shall be submitted to the Department. Upon receipt of written approval and consistent with such approval, the permittee may reduce the monitoring frequency for total mercury indicated in Part I.A.2 of this permit. The Department may revoke the approval for reduced monitoring at any time upon notification to the permittee.

h. Total Mercury Testing Requirements

The analytical protocol for total mercury shall be in accordance with EPA Method 1631, Revision E, “Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry”. The quantification level for total mercury shall be 0.5 ng/l, unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination.

The use of clean technique sampling procedures is **required** unless the permittee can demonstrate to the Department that an alternative sampling procedure is representative of the discharge. Guidance for clean technique sampling is contained in: EPA Method 1669, *Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels (Sampling Guidance)*, EPA-821-R96-001, July 1996. Information and data documenting the permittee's sampling and analytical protocols and data acceptability shall be submitted to the Department upon request.

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Section A. Limitations and Monitoring Requirements

3. Final Effluent Limitations, Monitoring Point 005A

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge a maximum of 67 MGD of non-contact cooling water, scrubber blowdown water, demineralizer water, service water, bottom ash transport water, scrubber sump water, coal pile runoff, treated sanitary wastewater, and storm water from the scrubber roof area from Monitoring Point 005A through Outfall 005. Outfall 005 discharges to the Grand River. Such discharge shall be limited and monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading			Maximum Limits for Quality or Concentration				
Parameter	**Monthly**	**Daily**	**Units**	**Monthly**	**Daily**	**Units**	**Monitoring Frequency**	**Sample Type**
Flow	(report)	(report)	MGD	---	---	---	Daily	Report Total Daily Flow
Total Residual Oxidant (TRO)								
During Chlorination – No Bromine Use								
Discharge Mode								
Continuous (greater than 120 min/day)		---	---	---	38	µg/l	5x Weekly	Grab
Intermittent (less than/equal to 120 min/day)			---	---	200	µg/l	5x Weekly	Grab
During Bromine Use – the discharge of bromine shall not exceed 120 min/day								
Intermittent (less than/equal to 120 min/day)			---	---	50	µg/l	5x Weekly	Grab
TRO Discharge Time	---	---	---	---	(report)	min/day	5x Weekly	Report Total Discharge Time
Outfall Observation	(report)	---	---	---	---	---	Daily	Visual
Temperature								
Intake	---	---	---	(report)	(report)	℉	Daily	Reading
Discharge	---	---	---	(report)	(report)	℉	Daily	Reading
Heat Addition	---	---	---	---	660	MBTU/Hr	Daily	Calculation
Total Mercury	(report)	---	lbs/day	(report)	---	ng/l	Monthly	Grab
	12-Month Rolling Average			**12-Month Rolling Average**				
Total Mercury	0.0056	---	lbs/day	10.0	---	ng/l	Monthly	Calculation
				Minimum Daily	**Maximum Daily**			
pH	---	---	---	6.5	9.0	S.U.	5x Weekly	Grab

a. Narrative Standard
The receiving water shall contain no turbidity, color, oil films, floating solids, foams, settleable solids, suspended solids, or deposits as a result of this discharge in unnatural quantities which are or may become injurious to any designated use.

b. Monitoring Location
Samples, measurements, and observations taken in compliance with the monitoring requirements above shall be taken prior to discharge to the Grand River.

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Section A. Limitations and Monitoring Requirements

c. Outfall Observation
Any unusual characteristics of the discharge (i.e., unnatural turbidity, color, oil film, floating solids, foams, settleable solids, suspended solids, or deposits) shall be reported within 24 hours to the Department followed with a written report within five (5) days detailing the findings of the investigation and the steps taken to correct the condition.

d. Power Plants – PCB
Beginning upon the effective date of this permit, the permittee shall not discharge any polychlorinated Biphenyls to the receiving waters of the State of Michigan as a result of plant operation.

e. Water Treatment Additives
This permit does not authorize the discharge of water additives without approval from the Department. Approval of water additives is authorized under separate correspondence. Water additives include any material that is added to water used at the facility or to a wastewater generated by the facility to condition or treat the water. In the event a permittee proposes to discharge water additives, including an increased discharge concentration of a previously approved water additive, the permittee shall submit a request to the Department for approval. See Part I.A.8. for information on requesting water treatment additive use.

f. Total Residual Oxidant
Total Residual Oxidant (TRO) shall be analyzed by Amperometric Titration using either Standard Method 4500-Cl D, Standard Method 4500-Cl E or Orion Electrode Model 97-70 (other analytical methods specified in 40 CFR 136 may be used upon approval of the Department). TRO monitoring is only required during periods of chlorine or bromine use and subsequent discharge. Limitations for the intermittent discharge of chlorine apply only when the discharge of chlorine is less than or equal to 120 minutes per day, otherwise the limitations for continuous discharge of chlorine apply. Authorization to discharge bromine with or without chlorine is limited to 120 minutes per day at the limitations specified above with the additional requirement that any discharge of chlorine is restricted to a concurrent discharge with bromine (no additional discharge of chlorine is authorized for that day).

During the intermittent discharge of chlorine without bromine ("During Chlorination - No Bromine Use" limitations given above), the daily concentration value reported for TRO shall be the average of a minimum of three (3) equally spaced grab samples taken during a chlorine discharge event, with the additional limitation that no single sample may exceed 300 µg/l.

During the intermittent discharge of bromine with or without chlorine ("During Bromine Use" limitations given above), the daily concentration value reported for TRO shall be the maximum of at least three (3) equally spaced grab samples taken during a bromine discharge event (no single sample may exceed 50 µg/l).

The permittee shall enter "*G" on the Discharge Monitoring Report for the TRO discharge modes not being used.

The permittee may use dehalogenation techniques to achieve the applicable TRO limitations, using sodium thiosulfate, sodium sulfite, sodium bisulfite, or other dehalogenating reagents approved by the Department. The quantity of reagent(s) used shall be limited to 1.5 times the stoichiometric amount of applied chlorine/bromine oxidant.

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g. Final Effluent Limitation for Total Mercury

The final limit for total mercury is the Discharge Specific Level Currently Achievable (LCA) based on a multiple discharger variance from the water quality-based effluent limit of 1.3 ng/l, pursuant to Rule 323.1103(9) of the Water Quality Standards. Compliance with the LCA shall be determined as a 12-month rolling average. The 12-month rolling average shall be determined by adding the present monthly average result to the preceding 11 monthly average results then dividing the sum by 12. For facilities with quarterly monitoring requirements for total mercury, quarterly monitoring shall be equivalent to three months of monitoring in calculating the 12-month rolling average. Facilities that monitor more frequently than monthly for total mercury must determine the monthly average result, which is the sum of the results of all data obtained in a given month divided by the total number of samples taken, in order to calculate the 12-month rolling average. If the 12-month rolling average for any month is less than or equal to the LCA, the permittee will be considered to be in compliance for total mercury for that month, provided the permittee is also in full compliance with the Pollutant Minimization Program for Total Mercury, set forth in Part I.A.9.

After a minimum of 12 monthly data points have been collected, the permittee may request a reduction in the monitoring frequency for total mercury. This request shall contain an explanation as to why the reduced monitoring is appropriate and shall be submitted to the Department. Upon receipt of written approval and consistent with such approval, the permittee may reduce the monitoring frequency for total mercury indicated in Part I.A.3 of this permit. The Department may revoke the approval for reduced monitoring at any time upon notification to the permittee

h. Total Mercury Testing Requirements

The analytical protocol for total mercury shall be in accordance with EPA Method 1631, Revision E, “Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry”. The quantification level for total mercury shall be 0.5 ng/l, unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination.

The use of clean technique sampling procedures is **required** unless the permittee can demonstrate to the Department that an alternative sampling procedure is representative of the discharge. Guidance for clean technique sampling is contained in: EPA Method 1669, *Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels (Sampling Guidance)*, EPA-821-R96-001, July 1996. Information and data documenting the permittee's sampling and analytical protocols and data acceptability shall be submitted to the Department upon request.

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Section A. Limitations and Monitoring Requirements

4. Final Effluent Limitations, Monitoring Point 005A1

During the period beginning on the date the wastewater stream tributary to outfall 002 is redirected to discharge from Monitoring Point 005A1 through Outfall 005 and lasting until the expiration date of this permit, the permittee is authorized to discharge a maximum of 0.4 MGD of demineralizer water, service water, bottom ash transport water, scrubber sump water, and coal pile runoff from Monitoring Point 005A1 through Outfall 005. Outfall 005 discharges to the Grand River. Such discharge shall be limited and monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading			Maximum Limits for Quality or Concentration				
Parameter	**Monthly**	**Daily**	**Units**	**Monthly**	**Daily**	**Units**	**Monitoring Frequency**	**Sample Type**
Flow	(report)	(report)	MGD	---	---	---	Daily	Report Total Daily Flow
Total Suspended Solids	100	170	lbs/day	30	50	mg/l	2x Month	Grab
Oil & Grease	33	50	lbs/day	10	15	mg/l	2x Month	Grab

a. Narrative Standard
The receiving water shall contain no turbidity, color, oil films, floating solids, foams, settleable solids, or deposits as a result of this discharge in unnatural quantities which are or may become injurious to any designated use.

b. Monitoring Location
All samples, measurements, and observations required at monitoring point 005A1 shall be taken prior to mixing with any other wastewater. The Department may approve alternate sampling locations which are demonstrated by the permittee to be representative of the effluent.

c. Water Treatment Additives
This permit does not authorize the discharge of water additives without approval from the Department. Approval of water additives is authorized under separate correspondence. Water additives include any material that is added to water used at the facility or to a wastewater generated by the facility to condition or treat the water. In the event a permittee proposes to discharge water additives, including an increased discharge concentration of a previously approved water additive, the permittee shall submit a request to the Department for approval. See Part I.A.8. for information on requesting water treatment additive use.

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Section A. Limitations and Monitoring Requirements

5. Final Effluent Limitations, Monitoring Point 005B

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge a maximum of 0.0025 MGD of treated sanitary wastewater from Monitoring Point 005B through Outfall 005 to the Grand River or Outfall 003 via a wetland pond contiguous with the South Channel of the Grand River. Such discharge shall be limited and monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading			Maximum Limits for Quality or Concentration				
Parameter	**Monthly**	**Daily**	**Units**	**Monthly**	**Daily**	**Units**	**Monitoring Frequency**	**Sample Type**
Flow	(report)	(report)	MGD	---	---	---	Daily	Report Total Daily Flow
Biochemical Oxygen Demand (BOD_5)	0.63	0.94	lbs/day	30	45	mg/l	2x/Week	Grab
Total Suspended Solids **(see Part I.A.5.b.)**	0.63	0.94	lbs/day	30	45	mg/l	2x/Week	Grab
Fecal Coliform Bacteria	---	---	---	200	400	cts/100ml	2x/Week	Grab
Total Residual Chlorine **(see Part I.A.5.b.)**	---	---	---	---	0.038	mg/l	2x/Week	Grab
				Minimum Daily	**Maximum Daily**			
pH	---	---	---	6.5	9.0	S.U.	2x/Week	Grab

a. Narrative Standard
The receiving water shall contain no turbidity, color, oil films, floating solids, foams, settleable solids, or deposits as a result of this discharge in unnatural quantities which are or may become injurious to any designated use.

b. Monitoring Location
All samples taken at Monitoring Point 005B (wastewater treatment plant) shall be taken prior to mixing with any other wastewater. Samples for BOD_5 and Total Suspended Solids shall be taken prior to disinfection. Samples for Fecal Coliform Bacteria, Total Residual Chlorine, and pH shall be taken after disinfection. The Department may approve alternate sampling locations which are demonstrated by the permittee to be representative of the effluent.

The 005B monitoring point for Total Suspended Solids, WHEN DISCHARGING THROUGH OUTFALL 003, shall be after disinfection and prior to mixing with any other water or wastewater. Total Suspended Solids monitoring, WHEN DISCHARGING THROUGH OUTFALL 005, will continue to be prior to disinfection.

During the time when the wastewater treatment plant effluent is discharged through outfall 005, the permittee is not required to sample for Total Residual Chlorine at Monitoring Point 005B.

c. Water Treatment Additives
This permit does not authorize the discharge of water additives without approval from the Department. Approval of water additives is authorized under separate correspondence. Water additives include any material that is added to water used at the facility or to a wastewater generated by the facility to condition or treat the water. In the event a permittee proposes to discharge water additives, including an increased discharge concentration of a previously approved water additive, the permittee shall submit a request to the Department for approval. See Part I.A.8. for information on requesting water treatment additive use.

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6. Chronic Whole Effluent Toxicity Testing, Monitoring Point 005A

Compliance with this monitoring requirement is required upon completion of the project to reroute the outfall 002 wastewater through outfall 005. Testing shall be completed within one (1) year from the date of commencement of the combined discharge.

The permittee shall conduct chronic toxicity tests on each of two (2) test species once every two (2) months for a total of eight (8) tests (four on each species). Test species shall include fathead minnow **and** *Ceriodaphnia dubia*. Testing and reporting procedures shall follow procedures contained in EPA/600/4-91/002, "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (Fourth Edition)." When the effluent ammonia nitrogen (as N) concentration is greater than 3 mg/l, the pH of the toxicity test shall be maintained at a pH of 8 Standard Units. Acute toxicity and chronic toxicity data shall be included in the reporting of the toxicity test results. Toxicity test data acceptability is contingent upon the validation of the test method by the testing laboratory. Such validation shall be submitted to the Department upon request. The final report on the tests shall be submitted to the Department within 30 days after completion of the final test.

The Department will review the toxicity data submitted by the permittee to determine if the acute and chronic toxicity requirements of Rule 323.1219 of the Michigan Administrative Code are being satisfied.

a. If the data indicate persistent exceedance of the acute or chronic toxicity requirements of Rule 323.1219, upon written notification by the Department, the following conditions apply. Within 90 days of the above notification, the permittee shall implement a Toxicity Reduction Evaluation (TRE). The objective of the TRE shall be to reduce the toxicity of the final effluent from monitoring point 005A to acceptable levels ($\leq$ 1.0 acute toxic units (TU_A) and $\leq$ 3.4 chronic toxic units (TU_C)) within three (3) years of notification. The following documents are available as guidance to reduce the toxicity to acceptable levels: Phase I, EPA/600/6-91/003 (acute) and EPA/600/6-91/005F (chronic); Phase II, EPA/600/R-92/080 (acute and chronic); Phase III, EPA/600/R-92/081 (acute and chronic) and Publicly Owned Treatment Works (POTWs), EPA/833B-99/002. The TRE shall include quarterly chronic toxicity tests of the discharge from monitoring point 005A for the duration of the TRE. The tests shall be conducted and reported as specified above. Upon approval of the Department, the chronic toxicity tests may be conducted using the more sensitive species identified in the chronic toxicity database. If a more sensitive species cannot be identified, the chronic toxicity tests shall be performed with both species. Annual reports on the quarterly tests shall be submitted to the Department within 30 days of the completion of the last test of each annual cycle.

b. If the acute or chronic toxicity requirements of Rule 323.1219 are close to being exceeded, upon written notification by the Department, the permittee shall conduct quarterly chronic toxicity tests on the final effluent from monitoring point 005A for the life of the permit. The tests shall be conducted and reported as specified above. After one (1) year and upon approval of the Department, the monitoring frequency may be reduced if the test data indicate that the toxicity requirements of Rule 323.1219 are consistently being met. Upon approval of the Department, the chronic toxicity tests may be performed using the more sensitive species identified in the chronic toxicity database. If a more sensitive species cannot be identified, the chronic toxicity tests shall be performed with both species. Annual reports on the quarterly tests shall be submitted to the Department within 30 days of the completion of the last test of each annual cycle.

c. This permit may be modified in accordance with applicable laws and rules to include additional whole effluent toxicity control requirements as necessary.

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Section A. Limitations and Monitoring Requirements

7. Short Term Waste Characterization Study

As a condition of this permit, the permittee shall monitor the discharge from monitoring point(s) 005A, for the constituents, at the frequency, duration and quantification level specified below. Compliance with this special condition is required upon completion of the project to reroute the outfall 002 wastewater through outfall 005. Testing shall be completed within one (1) year from the date of commencement of the combined discharge. The results of the analysis of such monitoring shall be submitted to the Department **within 60 days** from the date of the last sampling event**.** If, upon review of the analysis, it is determined that any of the materials or constituents require limiting to protect the receiving waters in accordance with applicable water quality standards, the permit may then be modified by the Department in accordance with applicable laws and rules.

Constituent	Sample Type	Sample Frequency	Sample Duration	Analytical Method and/or Quantification Level
Total Selenium	24-Hr Composite	Monthly	One (1) Year	EPA approved Method 1.0 µg/l
Available Cyanide	Grab	Monthly	One (1) Year	OIA-1677 2.0 µg/l

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Section A. Limitations and Monitoring Requirements

8. Request for Discharge of Water Treatment Additives

In the event a permittee proposes to discharge water additives, the permittee shall submit a request to discharge water additives to the Department for approval. Such requests shall be sent to the Permits Section, Water Resources Division, Department of Environmental Quality, P.O. Box 30458, Lansing, Michigan 48909, with a copy to the Department contact listed on the cover page of this permit. Instructions to submit a request electronically may be obtained via the Internet (http://www.michigan.gov/deqnpdes; then click on Applicable Rules and Regulations which is under the Information banner and then click on Water Treatment Additive Discharge Application Instructions). Written approval from the Department to discharge such additives at specified levels shall be obtained prior to discharge by the permittee. Additional monitoring and reporting may be required as a condition for the approval to discharge the additive.

A request to discharge water additives shall include all of the following water additive usage and discharge information:

a. Material Safety Data Sheet;

b. the proposed water additive discharge concentration with supporting calculations;

c. the discharge frequency (i.e., number of hours per day and number of days per year);

d. the monitoring point from which the product is to be discharged;

e. the type of removal treatment, if any, that the water additive receives prior to discharge;

f. product function (i.e. microbiocide, flocculant, etc.);

g. a 48-hour LC_{50} or EC_{50} for a North American freshwater planktonic crustacean (either *Ceriodaphnia sp., Daphnia sp., or Simocephalus sp*.); and

h. the results of a toxicity test for one other North American freshwater aquatic species (other than a planktonic crustacean) that meets a minimum requirement of Rule 323.1057(2) of the Water Quality Standards.

Prior to submitting the request, the permittee may contact the Permits Section by telephone at 517-241-1346 or via the Internet at the address given above to determine if the Department has the product toxicity data required by items g. and h. above. If the Department has the data, the permittee will not need to submit product toxicity data.

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Section A. Limitations and Monitoring Requirements

9. Pollutant Minimization Program for Total Mercury

The goal of the Pollutant Minimization Program is to maintain the effluent concentration of total mercury at or below 1.3 ng/l. The permittee shall develop and implement a Pollutant Minimization Program in accordance with the following schedule.

On or before **October 1, 2013,** the permittee shall submit to the Department an approvable Pollutant Minimization Program for mercury designed to proceed toward the goal. The Pollutant Minimization Program shall include the following:

a. an annual review and semi-annual monitoring of potential sources of mercury entering the wastewater collection system;

b. implementation of reasonable cost-effective control measures when sources of mercury are discovered. Factors to be considered include significance of sources, economic considerations, and technical and treatability considerations.

The Pollutant Minimization Program shall be implemented upon approval by the Department.

On or before March 31 of each year following approval of the Pollutant Minimization Program, the permittee shall submit a status report for the previous calendar year to the Department that includes 1) the monitoring results for the previous year, 2) an updated list of potential mercury sources, and 3) a summary of all actions taken to reduce or eliminate identified sources of mercury.

Any information generated as a result of the Pollutant Minimization Program set forth in this permit may be used to support a request to modify the approved program or to demonstrate that the Pollutant Minimization Program requirement has been completed satisfactorily.

A request for modification of the approved program and supporting documentation shall be submitted in writing to the Department for review and approval. The Department may approve modifications to the approved program (approval of a program modification does not require a permit modification), including a reduction in the frequency of the requirements under items a. & b.

This permit may be modified in accordance with applicable laws and rules to include additional mercury conditions and/or limitations as necessary.

10. Cold Shock Prevention

Cessation of thermal inputs to the receiving water by this facility shall occur gradually so as to avoid fish mortality due to cold shock during the winter months (November through March). The basis for this requirement is to allow fish associated with the discharge-heated mixing zone for outfall 005 to acclimate to the decreasing temperature.

11. Outfall 002 Closure

Within 30 days from the effective date of this permit, the permittee shall submit to the Department an approvable closure plan for the permanent elimination of Outfall 002. The closure plan shall include characterization of any wastewater and residuals which will remain in the settling ponds after the discharge is eliminated, along with disposal methods, proposed schedule, and any other relevant information as required by the Department. Closure activities involving waste treatment residuals shall be consistent with Part II.D.7 of this permit.

Upon approval by the Department, the permittee shall immediately implement the closure activities in accordance with the approved closure plan. Any wastewater or residual disposal inconsistent with the approved plan shall be considered a violation of this permit.

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12. Storm Water Pollution Prevention Plan

The permittee is authorized to discharge storm water associated with industrial activities as defined in 40 CFR 122.26(b)(14)(i-ix). These storm water discharges shall be controlled in accordance with the requirements of this special condition. The permittee has developed and implemented a Storm Water Pollution Prevention Plan (SWPPP). The permittee shall continue implementation of the SWPPP for maximum control of significant materials (as defined in Part II.A.) so that storm water discharges will not cause a violation of the Water Quality Standards. The SWPPP shall be routinely reviewed and updated in accordance with the requirements of this section.

Storm water discharges are a violation of this permit if:

The receiving water will contain unnatural turbidity, color, oil films, floating solids, foams, settleable solids, suspended solids, or deposits as a result of this discharge; or

The permittee has not implemented an acceptable SWPPP.

a. Source Identification
To identify potential sources of significant materials that can pollute storm water and subsequently be discharged from the facility, the SWPPP shall, at a minimum, include the following:

1) A site map identifying the following: buildings and other permanent structures; storage or disposal areas for significant materials; secondary containment structures and descriptions of what is contained in the primary containment structures; storm water discharge outfalls (numbered or otherwise labeled for reference); location of storm water and non-storm inlets (catch basins, roof drains, conduits, drain tiles, retention pond riser pipes, and sump pumps) (numbered or otherwise labeled for reference) contributing to each outfall; location of NPDES permitted discharges other than storm water; outlines of the drainage areas contributing to each outfall; structural runoff controls or storm water treatment facilities; areas of vegetation (with brief description such as lawn, old field, marsh, wooded, etc); areas of exposed and/or erodible soils and gravel lots; impervious surfaces (roofs, asphalt, concrete); name and location of receiving water(s); and areas of known or suspected impacts on surface waters as designated under Part 201 (Environmental Response) of the Michigan Act;

2) A list of all significant materials that could pollute storm water. For each material listed, the SWPPP shall include each of the following descriptions:

a) ways in which each type of significant material has been or has reasonable potential to become exposed to storm water (e.g., spillage during handling; leaks from pipes, pumps, and vessels; contact with storage piles, contaminated materials, or soils; waste handling and disposal; deposits from dust or overspray, etc.);

b) an evaluation of the reasonable potential for contribution of significant materials to runoff from at least the following areas or activities: loading, unloading, and other significant material handling operations; outdoor storage, including secondary containment structures; outdoor manufacturing or processing activities; significant dust or particulate generating processes; discharge from vents, stacks and air emission controls; on-site waste treatment, storage, and disposal practices; maintenance and cleaning of vehicles, machines and equipment; sites of exposed and/or erodible soil; Sites of Environmental Contamination listed under Part 201 (Environmental Response) of the Michigan Act; waste management units and areas of concern subject to corrective action under Part 111 (Hazardous Waste Management) or Part 115 (Solid Waste Management) of the Michigan Act; areas of significant material residues; areas where animals congregate (wild or domestic) and deposit wastes; and other areas where storm water may contact significant materials;

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c) identification of the outfall(s) and the inlet(s) contributing the significant material to each outfall through which the significant material may be discharged if released;

d) a listing of significant spills and significant leaks of polluting materials that occurred at areas that are exposed to precipitation or that otherwise discharge to a point source at the facility. The listing shall include spills that occurred over the three (3) years prior to the completion of the SWPPP or latest update of the SWPPP; the date, volume and exact location of release; and the action taken to clean up the material and/or prevent exposure to storm water runoff or contamination of surface waters of the state. Any release that occurs after the SWPPP has been developed shall be controlled in accordance with the SWPPP and is cause for the SWPPP to be updated as appropriate within 14 calendar days of obtaining knowledge of the spill or loss; and

e) the permittee shall determine whether its facility discharges storm water to a water body for which the Department has established a Total Maximum Daily Load (TMDL). If so, the permittee shall assess whether the TMDL requirements for the facility's discharge are being met through the existing SWPPP controls or whether additional control measures are necessary. The permitee's assessment of whether the TMDL requirements are being met shall focus on the effectiveness, adequacy, and implementation of the permitee's SWPPP controls; and

3) A summary of existing storm water discharge sampling data (if available) describing pollutants in storm water discharges at the facility. This summary shall be accompanied by a description of the suspected source(s) of the pollutants detected.

b. Preventive Measures and Source Controls, Non-Structural
To prevent significant materials from contacting storm water at the source, the SWPPP shall, at a minimum, include the following non-structural controls:

1) A program which includes a schedule for routine preventive maintenance. The preventive maintenance program shall consist of routine inspections and maintenance of storm water management and control devices (e.g., cleaning of oil/water separators and catch basins, routine housekeeping activities, etc.) as well as inspecting and testing plant equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to the storm sewer system or the surface waters of the state. The routine inspection shall include areas of the facility in which significant materials have the reasonable potential to contaminate runoff. A written report of the inspection and corrective actions shall be maintained on file by the permittee, and shall be retained in accordance with Record Keeping, below;

2) Good housekeeping procedures to maintain a clean, orderly facility. Good housekeeping procedures shall include routine inspections that focus on the areas of the facility that have a reasonable potential to contaminate storm water runoff from the property. The routine housekeeping inspections may be combined with the routine inspections for the preventive maintenance program. A written report of the inspection and corrective actions shall be retained in accordance with Record Keeping, below;

3) Regularly scheduled comprehensive site inspections. The inspections shall include, but not be limited to, the structural controls in use at the facility and the areas and equipment identified in the preventive maintenance program and good housekeeping procedures. The inspections shall also include a review of the routine preventive maintenance reports, good housekeeping inspections reports, and any other paperwork associated with the SWPPP. The comprehensive site inspection shall be conducted by the Certified Storm Water Operator at least quarterly. The permittee may request Department approval of an alternate schedule for comprehensive site inspections. A written report of the inspection and corrective actions shall be retained in accordance with Record Keeping, below. Included in the report shall be a certification that the facility is in compliance with this permit and the SWPPP;

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4) Material handling procedures and storage requirements for significant materials. Equipment and procedures for cleaning up spills shall be identified in the SWPPP and made available to the appropriate personnel. The procedures shall identify measures to prevent the spilled materials or material residues from contaminating storm water runoff from the property. The SWPPP shall include language describing what a reportable spill or release is and the appropriate reporting requirements in accordance with Part II.C.6. and Part II.C.7. of the permit. The SWPPP may include, by reference, requirements of either a Pollution Incident Prevention Plan (PIPP) prepared in accordance with the Part 5 Rules (Rules 324.2001 through 324.2009 of the Michigan Administrative Code); a Hazardous Waste Contingency Plan prepared in accordance with 40 CFR 264 and 265 Subpart D, as required by Part 111 of the Michigan Act; or a Spill Prevention Control and Countermeasure (SPCC) plan prepared in accordance with 40 CFR 112;

5) Measures used to control soil erosion and sedimentation including identification of the areas that, due to topography, activities, or other factors, have a high potential for significant soil erosion. Gravel lots are to be included;

6) A description of the employee training program which will be implemented on an annual basis to inform appropriate personnel at all levels of their responsibility as it relates to the components and goals of the SWPPP. The SWPPP shall identify periodic dates for the employee training program. Records of the employee training program shall be retained in accordance with Record Keeping, below; and

7) Actions being taken to limit the discharge of significant materials in order to comply with TMDL requirements.

The SWPPP shall identify significant materials expected to be present in storm water discharges following implementation of non-structural preventative measures and source controls.

c. Structural Controls for Prevention and Treatment

Where implementation of the measures required by Preventive Measures and Source Controls, Non-Structural; above; does not control storm water discharges in accordance with Water Quality Standards, below, the SWPPP shall provide a description of the location, function, design criteria, and installation/construction schedules of structural controls for prevention and treatment. Structural controls may be necessary:

1) To prevent uncontaminated storm water from contacting or being contacted by significant materials, and/or

2) If preventive measures are not feasible or are inadequate to keep significant materials at the site from contaminating storm water.

Structural controls shall be used to treat, divert, isolate, recycle, reuse, or otherwise manage storm water in a manner that reduces the level of significant materials in the storm water and provides compliance with the Water Quality Standards, below.

d. Keeping SWPPPs Current

1) The permittee and/or the Certified Storm Water Operator shall review the SWPPP annually after it is developed and maintain a written report of the review in accordance with Record Keeping, below. Based on the review, the permittee or the Certified Storm Water Operator shall amend the SWPPP as needed to ensure continued compliance with the terms and conditions of this permit. The written report shall be submitted to the department on or before January 10th of each year.

2) The SWPPP developed under the conditions of a previous permit shall be amended as necessary to ensure compliance with this permit.

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3) The SWPPP shall be updated or amended whenever changes at the facility have the potential to increase the exposure of significant materials to storm water, significant spills at the facility occur, or when the SWPPP is determined by the permittee or the Department to be ineffective in achieving the general objectives of controlling pollutants in storm water discharges associated with industrial activity. Updates based on increased activity at the facility shall include a description of how the permittee intends to control any new sources of significant materials or respond to and prevent spills in accordance with the requirements of Source Identification; Preventive Measures and Source Controls, Non-Structural; and Structural Controls for Prevention and Treatment; above.

4) The Department or authorized representative may notify the permittee at any time that the SWPPP does not meet minimum requirements. Such notification shall identify why the SWPPP does not meet minimum requirements. The permittee shall make the required changes to the SWPPP within 30 days after such notification from the Department or authorized representative and shall submit to the Department a written certification that the requested changes have been made.

5) Amendments to the SWPPP shall be signed and retained on-site pursuant to Record Keeping, below.

e. Certified Storm Water Operator Requirements

A Certified Storm Water Operator certified by the Department is required by Section 3110 of the Michigan Act. The Certified Storm Water Operator shall have supervision over the facility's storm water treatment and control measures included in the SWPPP. The names and certification numbers of the Certified Storm Water Operators shall be included in the SWPPP.

If the Certified Storm Water Operator is changed or an additional Certified Storm Water Operator is added, the permittee shall provide the name and certification number of the new Certified Storm Water Operator to the Department. If a facility has multiple Certified Storm Water Operators, the names and certification numbers of the Certified Storm Water Operators shall be included in the SWPPP.

f. Signature and SWPPP Review

1) The SWPPP shall be signed by the Certified Storm Water Operator and by either the permittee or an authorized representative in accordance with 40 CFR 122.22. The SWPPP and associated records shall be retained on-site at the facility which generates the storm water discharge.

2) The permittee shall make SWPPPs, reports, log books, storm water discharge sampling data (if collected), and items required by Record Keeping, below, available upon request to the Department or authorized representative.

g. Record Keeping

The permittee shall maintain records of all SWPPP related inspection and maintenance activities. Records shall also be kept describing incidents such as spills or other discharges that can affect the quality of storm water runoff. All such records shall be retained for three (3) years.

h. Water Quality Standards

At the time of discharge, there shall be no violation of the Water Quality Standards in the receiving waters as a result of the storm water discharge. This requirement includes, but is not limited to, the following conditions:

1) In accordance with Rule 323.1050 of the Water Quality Standards, the receiving waters shall not have any of the following unnatural physical properties as a result of this discharge in quantities which are or may become injurious to any designated use: turbidity, color, oil film, floating solids, foams, settleable solids, suspended solids, or deposits;

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2) Any unusual characteristics of the discharge (i.e., unnatural turbidity, color, oil film, floating solids, foams, settleable solids, suspended solids, or deposits) shall be reported within 24 hours to the Department followed by a written report within five (5) days detailing the findings of the investigation and the steps taken to correct the condition; and

3) Any pollutant for which a level of control is specified to meet a TMDL established by the Department shall be controlled at the facility so that its discharge is reduced by/to the amount specified in the TMDL.

i. Prohibition of Non-storm Water Discharges
Discharges of material other than storm water shall be in compliance with an NPDES permit issued for the discharge. Storm water shall be defined to include the following non-storm water discharges provided pollution prevention controls for the non-storm water component are identified in the SWPPP: discharges from fire hydrant flushing, potable water sources including water line flushing, water from fire system testing and fire fighting training without burned materials or chemical fire suppressants, irrigation drainage, lawn watering, routine building wash down which does not use detergents or other compounds, pavement wash water where toxic or hazardous materials have not occurred (unless all contamination by toxic or hazardous materials have been removed) and where detergents are not used, air conditioning condensate, springs, uncontaminated groundwater, foundation or footing drains where flows are not contaminated with process materials such as solvents, and discharges from fire fighting activities. Discharges from fire fighting activities are exempted from the requirement to be identified in the SWPPP.

13. Cooling Water Intake Structures

The cooling water intake structure operated by the permittee has been evaluated using all available information relating to its location, design, construction, and capacity. At this time, the Department has determined that the cooling water intake structure represents the best technology available to minimize adverse environmental impact in accordance with Section 316(b) of the federal Clean Water Act (33 U.S.C. section 1326). The permittee shall at all times properly operate and maintain the cooling water intake structure and associated equipment to minimize adverse environmental impact. The permittee shall give advance notice to the Department of any planned changes in the location, design, operation, or capacity of the intake structure.

If the regulations under Section 316(b) of the Clean Water Act are finalized by the United States Environmental Protection Agency, or the Department determines that additional technologies or control measures are necessary to reduce the impact of impingement or entrainment, the Department may revise these requirements through modification or reissuance of the permit. Nothing in this condition shall be construed to relieve the permittee from civil or criminal penalties for previous or future fish losses.

14. Untreated or Partially Treated Sewage Discharge Requirements

In accordance with Section 324.3112a of the Michigan Act, if untreated sewage, including sanitary sewer overflows (SSO) and combined sewer overflows (CSO), or partially treated sewage is directly or indirectly discharged from a sewer system onto land or into the waters of the state, the person responsible for the sewer system shall immediately, but not more than 24 hours after the discharge begins, notify, by telephone, the Department, local health departments, a daily newspaper of general circulation in the county in which the permittee is located, and a daily newspaper of general circulation in the county or counties in which the municipalities whose waters may be affected by the discharge are located that the discharge is occurring.

The permittee shall also annually contact municipalities, including the superintendent of a public drinking water supply with potentially affected intakes, whose waters may be affected by the permittee's discharge of combined sewage, and if those municipalities wish to be notified in the same manner as specified above, the permittee shall provide such notification. Such notification shall also include a daily newspaper in the county of the affected municipality.

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At the conclusion of the discharge, written notification shall be submitted in accordance with and on the "CSO/SSO Reporting Form" available via the internet at: http://www.michigan.gov/dnre/0,1607,7-135-3313_3682_3715---,00.html, or, alternatively for combined sewer overflow discharges, in accordance with notification procedures approved by the Department.

In addition, in accordance with Section 324.3112a of the Michigan Act, each time a discharge of untreated sewage or partially treated sewage occurs, the permittee shall test the affected waters for *Escherichia coli* to assess the risk to the public health as a result of the discharge and shall provide the test results to the affected local county health departments and to the Department. The testing shall be done at locations specified by each affected local county health department but shall not exceed 10 tests for each separate discharge event. The affected local county health department may waive this testing requirement, if it determines that such testing is not needed to assess the risk to the public health as a result of the discharge event. The results of this testing shall be submitted with the written notification required above, or, if the results are not yet available, submit them as soon as they become available. This testing is not required, if the testing has been waived by the local health department, or if the discharge(s) did not affect surface waters.

Permittees accepting sanitary or municipal sewage from other sewage collection systems are encouraged to notify the owners of those systems of the above reporting and testing requirements.

15. Facility Contact

The "Facility Contact" was specified in the application. The permittee may replace the facility contact at any time, and shall notify the Department in writing within 10 days after replacement (including the name, address and telephone number of the new facility contact).

a. The facility contact shall be (or a duly authorized representative of this person):
- for a corporation, a principal executive officer of at least the level of vice president, or a designated representative, if the representative is responsible for the overall operation of the facility from which the discharge described in the permit application or other NPDES form originates,
- for a partnership, a general partner,
- for a sole proprietorship, the proprietor, or
- for a municipal, state, or other public facility, either a principal executive officer, the mayor, village president, city or village manager or other duly authorized employee.

b. A person is a duly authorized representative only if:
- the authorization is made in writing to the Department by a person described in paragraph a. of this section; and
- the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the facility (a duly authorized representative may thus be either a named individual or any individual occupying a named position).

Nothing in this section obviates the permittee from properly submitting reports and forms as required by law.

PART II

Section A. Definitions

This list of definitions may include terms not applicable to this permit.

Acute toxic unit (TU_A) means $100/LC_{50}$ where the LC_{50} is determined from a whole effluent toxicity (WET) test which produces a result that is statistically or graphically estimated to be lethal to 50% of the test organisms.

Bioaccumulative chemical of concern (BCC) means a chemical which, upon entering the surface waters, by itself or as its toxic transformation product, accumulates in aquatic organisms by a human health bioaccumulation factor of more than 1000 after considering metabolism and other physiochemical properties that might enhance or inhibit bioaccumulation. The human health bioaccumulation factor shall be derived according to R 323.1057(5). Chemicals with half-lives of less than 8 weeks in the water column, sediment, and biota are not BCCs. The minimum bioaccumulation concentration factor (BAF) information needed to define an organic chemical as a BCC is either a field-measured BAF or a BAF derived using the biota-sediment accumulation factor (BSAF) methodology. The minimum BAF information needed to define an inorganic chemical as a BCC, including an organometal, is either a field-measured BAF or a laboratory-measured bioconcentration factor (BCF). The BCCs to which these rules apply are identified in Table 5 of R 323.1057 of the Water Quality Standards.

Biosolids are the solid, semisolid, or liquid residues generated during the treatment of sanitary sewage or domestic sewage in a treatment works. This includes, but is not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment processes and a derivative of the removed scum or solids.

Bulk biosolids means biosolids that are not sold or given away in a bag or other container for application to a lawn or home garden.

Chronic toxic unit (TU_C) means $100/MATC$ or $100/IC_{25}$, where the maximum acceptable toxicant concentration (MATC) and IC_{25} are expressed as a percent effluent in the test medium.

Class B Biosolids refers to material that has met the Class B pathogen reduction requirements or equivalent treatment by a Process to Significantly Reduce Pathogens (PSRP) in accordance with the Part 24 Rules. Processes include aerobic digestion, composting, anaerobic digestion, lime stabilization and air drying.

Daily concentration is the sum of the concentrations of the individual samples of a parameter divided by the number of samples taken during any calendar day. If the parameter concentration in any sample is less than the quantification limit, regard that value as zero when calculating the daily concentration. The daily concentration will be used to determine compliance with any maximum and minimum daily concentration limitations (except for pH and dissolved oxygen). When required by the permit, report the maximum calculated daily concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the Discharge Monitoring Reports (DMRs).

For pH, report the maximum value of any individual sample taken during the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs and the minimum value of any individual sample taken during the month in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. For dissolved oxygen, report the minimum concentration of any individual sample in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

Daily loading is the total discharge by weight of a parameter discharged during any calendar day. This value is calculated by multiplying the daily concentration by the total daily flow and by the appropriate conversion factor. The daily loading will be used to determine compliance with any maximum daily loading limitations. When required by the permit, report the maximum calculated daily loading for the month in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMRs.

Department means the Michigan Department of Environmental Quality.

Detection Level means the lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated level of probability.

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Section A. Definitions

Discharge Event is a discrete occurrence during which effluent is discharged to the surface water up to 10 days of a consecutive 14 day period.

EC_{50} means a statistically or graphically estimated concentration that is expected to cause 1 or more specified effects in 50% of a group of organisms under specified conditions.

Fecal coliform bacteria monthly is the geometric mean of the samples collected in a calendar month (or 30 consecutive days). The calculated monthly value will be used to determine compliance with the maximum monthly fecal coliform bacteria limitations. When required by the permit, report the calculated monthly value in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMRs. FOR SEASONAL LAGOON DISCHARGES ONLY: If the period in which the discharge occurred was partially in each of two months, the monthly average shall be reported on the DMR of the month in which the last day of discharge occurred..

Fecal coliform bacteria 7-day is the geometric mean of the samples collected in any 7-day period. The calculated 7-day value will be used to determine compliance with the maximum 7-day fecal coliform bacteria limitations. When required by the permit, report the maximum calculated 7-day concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. FOR SEASONAL LAGOON DISCHARGES ONLY: If the seven day period was partially in each of two months, the seven day average shall be reported on the DMR of the month in which the last day of discharge occurred.

Flow Proportioned sample is a composite sample with the sample volume proportional to the effluent flow.

Grab sample is a single sample taken at neither a set time nor flow.

Geometric Mean is the average of the logarithmic values of a base 10 data set, converted back to a base 10 number.

IC_{25} means the toxicant concentration that would cause a 25% reduction in a nonquantal biological measurement for the test population.

Interference is a discharge which, alone or in conjunction with a discharge or discharges from other sources, both: 1) inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and 2) therefore, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or, of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent state or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act. [This definition does not apply to sample matrix interference.]

Land Application means spraying or spreading biosolids or a biosolids derivative onto the land surface, injecting below the land surface, or incorporating into the soil so that the biosolids or biosolids derivative can either condition the soil or fertilize crops or vegetation grown in the soil.

LC_{50} means a statistically or graphically estimated concentration that is expected to be lethal to 50% of a group of organisms under specified conditions.

Maximum acceptable toxicant concentration (MATC) means the concentration obtained by calculating the geometric mean of the lower and upper chronic limits from a chronic test. A lower chronic limit is the highest tested concentration that did not cause the occurrence of a specific adverse effect. An upper chronic limit is the lowest tested concentration which did cause the occurrence of a specific adverse effect and above which all tested concentrations caused such an occurrence.

MGD means million gallons per day.

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Section A. Definitions

Monthly monitoring frequency refers to a calendar month. When required by this permit, an analytical result, reading, value or observation must be reported for that period if a discharge occurs during that period.

Monthly concentration is the sum of the daily concentrations determined during a reporting month (or 30 consecutive days) divided by the number of daily concentrations determined. The calculated monthly concentration will be used to determine compliance with any maximum monthly concentration limitations. When required by the permit, report the calculated monthly concentration in the “AVERAGE” column under “QUALITY OR CONCENTRATION” on the DMRs. FOR SEASONAL LAGOON DISCHARGES ONLY: If the period in which the discharge occurred was partially in each of two months, the monthly average shall be reported on the DMR of the month in which the last day of discharge occurred.

For minimum percent removal requirements, the monthly influent concentration and the monthly effluent concentration shall be determined. The calculated monthly percent removal, which is equal to 100 times the quantity [1 minus the quantity (monthly effluent concentration divided by the monthly influent concentration)], shall be reported in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

Monthly loading is the sum of the daily loadings of a parameter divided by the number of daily loadings determined in the reporting month (or 30 consecutive days). The calculated monthly loading will be used to determine compliance with any maximum monthly loading limitations. When required by the permit, report the calculated monthly loading in the “AVERAGE” column under “QUANTITY OR LOADING” on the DMRs. FOR SEASONAL LAGOON DISCHARGES ONLY: If the period in which the discharge occurred was partially in each of two months, the monthly average shall be reported on the DMR of the month in which the last day of discharge occurred.

National Pretreatment Standards are the regulations promulgated by or to be promulgated by the Federal Environmental Protection Agency pursuant to Section 307(b) and (c) of the Federal Act. The standards establish nationwide limits for specific industrial categories for discharge to a POTW.

No observed adverse effect level (NOAEL) means the highest tested dose or concentration of a substance which results in no observed adverse effect in exposed test organisms where higher doses or concentrations result in an adverse effect.

Noncontact Cooling Water is water used for cooling which does not come into direct contact with any raw material, intermediate product, by-product, waste product or finished product.

Nondomestic user is any discharger to a POTW that discharges wastes other than or in addition to water-carried wastes from toilet, kitchen, laundry, bathing or other facilities used for household purposes.

Partially treated sewage is any sewage, sewage and storm water, or sewage and wastewater, from domestic or industrial sources that is treated to a level less than that required by the permittee's National Pollutant Discharge Elimination System permit, or that is not treated to national secondary treatment standards for wastewater, including discharges to surface waters from retention treatment facilities.

Pretreatment is reducing the amount of pollutants, eliminating pollutants, or altering the nature of pollutant properties to a less harmful state prior to discharge into a public sewer. The reduction or alteration can be by physical, chemical, or biological processes, process changes, or by other means. Dilution is not considered pretreatment unless expressly authorized by an applicable National Pretreatment Standard for a particular industrial category.

POTW is a publicly owned treatment works.

Quantification level means the measurement of the concentration of a contaminant obtained by using a specified laboratory procedure calculated at a specified concentration above the detection level. It is considered the lowest concentration at which a particular contaminant can be quantitatively measured using a specified laboratory procedure for monitoring of the contaminant.

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Quarterly monitoring frequency refers to a three month period, defined as January through March, April through June, July through September, and October through December. When required by this permit, an analytical result, reading, value or observation must be reported for that period if a discharge occurs during that period.

Regional Administrator is the Region 5 Administrator, U.S. EPA, located at R-19J, 77 W. Jackson Blvd., Chicago, Illinois 60604.

Significant industrial user is a nondomestic user that: 1) is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; or 2) discharges an average of 25,000 gallons per day or more of process wastewater to a POTW (excluding sanitary, noncontact cooling and boiler blowdown wastewater); contributes a process wastestream which makes up five (5) percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the permittee as defined in 40 CFR 403.12(a) on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's treatment plant operation or violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Significant Materials Significant Materials means any material which could degrade or impair water quality, including but not limited to: raw materials; fuels; solvents, detergents, and plastic pellets; finished materials such as metallic products; hazardous substances designated under Section 101(14) of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (see 40 CFR 372.65); any chemical the facility is required to report pursuant to Section 313 of Emergency Planning and Community Right-to-Know Act (EPCRA); polluting materials as identified under the Part 5 Rules (Rules 324.2001 through 324.2009 of the Michigan Administrative Code); Hazardous Wastes as defined in Part 111 of the Michigan Act; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Tier I value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier I toxicity database.

Tier II value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier II toxicity database.

Total Maximum Daily Loads (TMDLs) are required by the Federal Act for waterbodies that do not meet Water Quality Standards. TMDLs represent the maximum daily load of a pollutant that a waterbody can assimilate and meet Water Quality Standards and an allocation of that load among point sources, nonpoint sources, and a margin of safety.

Toxicity Reduction Evaluation (TRE) means a site-specific study conducted in a stepwise process designed to identify the causative agents of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity.

Water Quality Standards means the Part 4 Water Quality Standards promulgated pursuant to Part 31 of Act No. 451 of the Public Acts of 1994, as amended, being Rules 323.1041 through 323.1117 of the Michigan Administrative Code.

Weekly monitoring frequency refers to a calendar week which begins on Sunday and ends on Saturday. When required by this permit, an analytical result, reading, value or observation must be reported for that period if a discharge occurs during that period.

Yearly monitoring frequency refers to a calendar year beginning on January 1 and ending on December 31. When required by this permit, an analytical result, reading, value or observation must be reported for that period if a discharge occurs during that period.

24-Hour Composite sample is a flow proportioned composite sample consisting of hourly or more frequent portions that are taken over a 24-hour period.

PART II

Section A. Definitions

3-Portion Composite sample is a sample consisting of three equal volume grab samples collected at equal intervals over an 8-hour period.

7-day concentration is the sum of the daily concentrations determined during any 7 consecutive days in a reporting month divided by the number of daily concentrations determined. The calculated 7-day concentration will be used to determine compliance with any maximum 7-day concentration limitations. When required by the permit, report the maximum calculated 7-day concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. FOR SEASONAL LAGOON DISCHARGES ONLY: If the seven day period was partially in each of two months, the seven day average shall be reported on the DMR of the month in which the last day of discharge occurred.

7-day loading is the sum of the daily loadings of a parameter divided by the number of daily loadings determined during any 7 consecutive days in a reporting month. The calculated 7-day loading will be used to determine compliance with any maximum 7-day loading limitations. When required by the permit, report the maximum calculated 7-day loading for the month in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMRs. FOR SEASONAL LAGOON DISCHARGES ONLY: If the seven day period was partially in each of two months, the seven day average shall be reported on the DMR of the month in which the last day of discharge occurred.

PART II

Section B. Monitoring Procedures

The following standard language may contain items not applicable to this permit.

1. Representative Samples

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations promulgated pursuant to Section 304(h) of the Federal Act (40 CFR Part 136 - Guidelines Establishing Test Procedures for the Analysis of Pollutants), unless specified otherwise in this permit. Test procedures used shall be sufficiently sensitive to determine compliance with applicable effluent limitations. Requests to use test procedures not promulgated under 40 CFR Part 136 for pollutant monitoring required by this permit shall be made in accordance with the Alternate Test Procedures regulations specified in 40 CFR 136.4. These requests shall be submitted to the Chief of the Permits Section, Water Resources Division, Michigan Department of Environmental Quality, P.O. Box 30458, Lansing, Michigan, 48909-7773. The permittee may use such procedures upon approval.

The permittee shall periodically calibrate and perform maintenance procedures on all analytical instrumentation at intervals to ensure accuracy of measurements. The calibration and maintenance shall be performed as part of the permittee's laboratory Quality Control/Quality Assurance program.

3. Instrumentation

The permittee shall periodically calibrate and perform maintenance procedures on all monitoring instrumentation at intervals to ensure accuracy of measurements.

4. Recording Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information: 1) the exact place, date, and time of measurement or sampling; 2) the person(s) who performed the measurement or sample collection; 3) the dates the analyses were performed; 4) the person(s) who performed the analyses; 5) the analytical techniques or methods used; 6) the date of and person responsible for equipment calibration; and 7) the results of all required analyses.

5. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the Department.

PART II

Section C. Reporting Requirements

1. Start-up Notification

If the permittee will not discharge during the first 60 days following the effective date of this permit, the permittee shall notify the Department within 14 days following the effective date of this permit, and then 60 days prior to the commencement of the discharge.

2. Submittal Requirements for Self-Monitoring Data

Part 31 of Act 451 of 1994, as amended, specifically Section 324.3110(3) and Rule 323.2155(2) of Part 21 allows the department to specify the forms to be utilized for reporting the required self-monitoring data. Unless instructed on the effluent limitations page to conduct "Retained Self Monitoring" the permittee shall submit self-monitoring data via the Department's Electronic Environmental Discharge Monitoring Reporting (e2-DMR) system.

The permittee shall utilize the information provided on the e2-Reporting website @ **https://secure1.state.mi.us/e2rs/** to access and submit the electronic forms. Both monthly summary and daily data shall be submitted to the department no later than the **20th day of the month** following each month of the authorized discharge period(s). The permittee may be allowed to submit the electronic forms after this date if the Department has granted an extension to the submittal date.

3. Retained Self-Monitoring Requirements

If instructed on the effluent limits page to conduct retained self-monitoring, the permittee shall maintain a year-to-date log of retained self-monitoring results and, upon request, provide such log for inspection to the staff of the Water Resources Division, Michigan Department of Environmental Quality. Retained self-monitoring results are public information and shall be promptly provided to the public upon request.

The permittee shall certify, in writing, to the Department, on or before January 10th of each year, that: 1) all retained self-monitoring requirements have been complied with and a year-to-date log has been maintained; and 2) the application on which this permit is based still accurately describes the discharge. With this annual certification, the permittee shall submit a summary of the previous years monitoring data. The summary shall include maximum values for samples to be reported as daily maximums and/or monthly maximums and minimum values for any daily minimum samples.

4. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

Monitoring required pursuant to Part 41 of the Michigan Act or Rule 35 of the Mobile Home Park Commission Act (Act 96 of the Public Acts of 1987) for assurance of proper facility operation shall be submitted as required by the Department.

5. Compliance Dates Notification

Within 14 days of every compliance date specified in this permit, the permittee shall submit a written notification to the Department indicating whether or not the particular requirement was accomplished. If the requirement was not accomplished, the notification shall include an explanation of the failure to accomplish the requirement, actions taken or planned by the permittee to correct the situation, and an estimate of when the requirement will be accomplished. If a written report is required to be submitted by a specified date and the permittee accomplishes this, a separate written notification is not required.

PART II

Section C. Reporting Requirements

6. Noncompliance Notification

Compliance with all applicable requirements set forth in the Federal Act, Parts 31 and 41 of the Michigan Act, and related regulations and rules is required. All instances of noncompliance shall be reported as follows:

a. 24-hour reporting - Any noncompliance which may endanger health or the environment (including minimum and maximum daily concentration discharge limitation exceedances) shall be reported, verbally, within 24 hours from the time the permittee becomes aware of the noncompliance. A written submission shall also be provided within five (5) days.

b. other reporting - The permittee shall report, in writing, all other instances of noncompliance not described in a. above at the time monitoring reports are submitted; or, in the case of retained self-monitoring, within five (5) days from the time the permittee becomes aware of the noncompliance.

Written reporting shall include: 1) a description of the discharge and cause of noncompliance; and 2) the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and the steps taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

7. Spill Notification

The permittee shall immediately report any release of any polluting material which occurs to the surface waters or groundwaters of the state, unless the permittee has determined that the release is not in excess of the threshold reporting quantities specified in the Part 5 Rules (Rules 324.2001 through 324.2009 of the Michigan Administrative Code), by calling the Department at the number indicated on the second page of this permit, or if the notice is provided after regular working hours call the Department's 24-hour Pollution Emergency Alerting System telephone number, 1-800-292-4706 (calls from out-of-state dial 1-517-373-7660).

Within ten (10) days of the release, the permittee shall submit to the Department a full written explanation as to the cause of the release, the discovery of the release, response (clean-up and/or recovery) measures taken, and preventative measures taken or a schedule for completion of measures to be taken to prevent reoccurrence of similar releases.

8. Upset Noncompliance Notification

If a process "upset" (defined as an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee) has occurred, the permittee who wishes to establish the affirmative defense of upset, shall notify the Department by telephone within 24-hours of becoming aware of such conditions; and within five (5) days, provide in writing, the following information:

a. that an upset occurred and that the permittee can identify the specific cause(s) of the upset;

b. that the permitted wastewater treatment facility was, at the time, being properly operated; and

c. that the permittee has specified and taken action on all responsible steps to minimize or correct any adverse impact in the environment resulting from noncompliance with this permit.

In any enforcement proceedings, the permittee, seeking to establish the occurrence of an upset, has the burden of proof.

PART II

Section C. Reporting Requirements

9. Bypass Prohibition and Notification

a. Bypass Prohibition - Bypass is prohibited unless:

1) bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

2) 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 backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass; and

3) the permittee submitted notices as required under 9.b. or 9.c. below.

b. Notice of Anticipated Bypass - If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least ten (10) days before the date of the bypass, and provide information about the anticipated bypass as required by the Department. The Department may approve an anticipated bypass, after considering its adverse effects, if it will meet the three (3) conditions listed in 9.a. above.

c. Notice of Unanticipated Bypass - The permittee shall submit notice to the Department of an unanticipated bypass by calling the Department at the number indicated on the second page of this permit (if the notice is provided after regular working hours, use the following number: 1-800-292-4706) as soon as possible, but no later than 24 hours from the time the permittee becomes aware of the circumstances.

d. Written Report of Bypass - A written submission shall be provided within five (5) working days of commencing any bypass to the Department, and at additional times as directed by the Department. The written submission shall contain a description of the bypass and its cause; the period of bypass, including exact dates and times, and if the bypass has not been corrected, the anticipated time it is expected to continue; steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass; and other information as required by the Department.

e. Bypass Not Exceeding Limitations - The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of 9.a., 9.b., 9.c., and 9.d., above. This provision does not relieve the permittee of any notification responsibilities under Part II.C.10. of this permit.

f. Definitions

1) Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

2) Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

PART II

Section C. Reporting Requirements

10. Notification of Changes in Discharge

The permittee shall notify the Department, in writing, within 10 days of knowing, or having reason to believe, that any activity or change has occurred or will occur which would result in the discharge of: 1) detectable levels of chemicals on the current Michigan Critical Materials Register, priority pollutants or hazardous substances set forth in 40 CFR 122.21, Appendix D, or the Pollutants of Initial Focus in the Great Lakes Water Quality Initiative specified in 40 CFR 132.6, Table 6, which were not acknowledged in the application or listed in the application at less than detectable levels; 2) detectable levels of any other chemical not listed in the application or listed at less than detection, for which the application specifically requested information; or 3) any chemical at levels greater than five times the average level reported in the complete application (see the first page of this permit for the date(s) the complete application was submitted). Any other monitoring results obtained as a requirement of this permit shall be reported in accordance with the compliance schedules.

11. Changes in Facility Operations

Any anticipated action or activity, including but not limited to facility expansion, production increases, or process modification, which will result in new or increased loadings of pollutants to the receiving waters must be reported to the Department by a) submission of an increased use request (application) and all information required under Rule 323.1098 (Antidegradation) of the Water Quality Standards or b) by notice if the following conditions are met: 1) the action or activity will not result in a change in the types of wastewater discharged or result in a greater quantity of wastewater than currently authorized by this permit; 2) the action or activity will not result in violations of the effluent limitations specified in this permit; 3) the action or activity is not prohibited by the requirements of Part II.C.12.; and 4) the action or activity will not require notification pursuant to Part II.C.10. Following such notice, the permit may be modified according to applicable laws and rules to specify and limit any pollutant not previously limited.

12. Bioaccumulative Chemicals of Concern (BCC)

Consistent with the requirements of Rules 323.1098 and 323.1215 of the Michigan Administrative Code, the permittee is prohibited from undertaking any action that would result in a lowering of water quality from an increased loading of a BCC unless an increased use request and antidegradation demonstration have been submitted and approved by the Department.

13. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharge emanates, the permittee shall submit to the Department 30 days prior to the actual transfer of ownership or control a written agreement between the current permittee and the new permittee containing: 1) the legal name and address of the new owner; 2) a specific date for the effective transfer of permit responsibility, coverage and liability; and 3) a certification of the continuity of or any changes in operations, wastewater discharge, or wastewater treatment.

If the new permittee is proposing changes in operations, wastewater discharge, or wastewater treatment, the Department may propose modification of this permit in accordance with applicable laws and rules.

PART II

Section D. Management Responsibilities

1. Duty to Comply

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit.

It is the duty of the permittee to comply with all the terms and conditions of this permit. Any noncompliance with the Effluent Limitations, Special Conditions, or terms of this permit constitutes a violation of the Michigan Act and/or the Federal Act and constitutes grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of an application for permit renewal.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2. Operator Certification

The permittee shall have the waste treatment facilities under direct supervision of an operator certified at the appropriate level for the facility certification by the Department, as required by Sections 3110 and 4104 of the Michigan Act. Permittees authorized to discharge storm water shall have the storm water treatment and/or control measures under direct supervision of a storm water operator certified by the Department, as required by Section 3110 of the Michigan Act.

3. Facilities Operation

The permittee shall, at all times, properly operate and maintain all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures.

4. Power Failures

In order to maintain compliance with the effluent limitations of this permit and prevent unauthorized discharges, the permittee shall either:

a. provide an alternative power source sufficient to operate facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit; or

b. upon the reduction, loss, or failure of one or more of the primary sources of power to facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit, the permittee shall halt, reduce or otherwise control production and/or all discharge in order to maintain compliance with the effluent limitations and conditions of this permit.

5. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the surface waters or groundwaters of the state resulting from noncompliance with any effluent limitation specified in this permit including, but not limited to, such accelerated or additional monitoring as necessary to determine the nature and impact of the discharge in noncompliance.

PART II

Section D. Management Responsibilities

6. Containment Facilities

The permittee shall provide facilities for containment of any accidental losses of polluting materials in accordance with the requirements of the Part 5 Rules (Rules 324.2001 through 324.2009 of the Michigan Administrative Code). For a Publicly Owned Treatment Work (POTW), these facilities shall be approved under Part 41 of the Michigan Act.

7. Waste Treatment Residues

Residuals (i.e. solids, sludges, biosolids, filter backwash, scrubber water, ash, grit, or other pollutants or wastes) removed from or resulting from treatment or control of wastewaters, including those that are generated during treatment or left over after treatment or control has ceased, shall be disposed of in an environmentally compatible manner and according to applicable laws and rules. These laws may include, but are not limited to, the Michigan Act, Part 31 for protection of water resources, Part 55 for air pollution control, Part 111 for hazardous waste management, Part 115 for solid waste management, Part 121 for liquid industrial wastes, Part 301 for protection of inland lakes and streams, and Part 303 for wetlands protection. Such disposal shall not result in any unlawful pollution of the air, surface waters or groundwaters of the state.

8. Right of Entry

The permittee shall allow the Department, any agent appointed by the Department or the Regional Administrator, upon the presentation of credentials:

a. to enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect process facilities, treatment works, monitoring methods and equipment regulated or required under this permit; and to sample any discharge of pollutants.

9. Availability of Reports

Except for data determined to be confidential under Section 308 of the Federal Act and Rule 2128 (Rule 323.2128 of the Michigan Administrative Code), all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department and the Regional Administrator. As required by the Federal Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Act and Sections 3112, 3115, 4106 and 4110 of the Michigan Act.

PART II

Section E. Activities Not Authorized by This Permit

1. Discharge to the Groundwaters

This permit does not authorize any discharge to the groundwaters. Such discharge may be authorized by a groundwater discharge permit issued pursuant to the Michigan Act.

2. POTW Construction

This permit does not authorize or approve the construction or modification of any physical structures or facilities at a POTW. Approval for the construction or modification of any physical structures or facilities at a POTW must be by permit issued under Part 41 of the Michigan Act.

3. Civil and Criminal Liability

Except as provided in permit conditions on "Bypass" (Part II.C.9. pursuant to 40 CFR 122.41(m)), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not such noncompliance is due to factors beyond the permittee's control, such as accidents, equipment breakdowns, or labor disputes.

4. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee may be subject under Section 311 of the Federal Act except as are exempted by federal regulations.

5. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Federal Act.

6. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other Department of Environmental Quality permits, or approvals from other units of government as may be required by law.

APPENDIX A

Document 4

Public Notice, August 27, 2012, Permit No. MI0000278, Grand Haven BL&P - JB Sims

PUBLIC NOTICE

Date: August 27, 2012
Permit No. MI0000728
Grand Haven BL&P-J B Sims

The Michigan Department of Environmental Quality (Department) proposes to reissue a discharge permit to: the Grand Haven Board of Light and Power for the J. B. Sims Generating Station located at 1231 North 3rd Street, Grand Haven, Michigan 49417. The applicant operates a steam-electric power generating plant and provides electric power to the surrounding Grand Haven community. The applicant discharges noncontact cooling water, contact cooling water, boiler blowdown, coal pile runoff, scrubber seal water, process wastewater, coal pile storm water runoff, and treated sanitary wastewater to the Grand River (Outfall 005), a wetland contiguous with the North Channel of the Grand River (Outfall 002), and a wetland contiguous with the South Channel of the Grand River (Outfall 003), in the SE1/4, NE1/4, Section 20, Town 8N, Range 16W, Ottawa County.

The draft permit includes the following modifications to the previously-issued permit: Monitoring Point 002A: The draft permit contains new reporting requirements and final effluent limitations for Total Selenium, Available Cyanide, Acute Toxicity, and Chronic Toxicity. Monitoring data demonstrates these parameters have the reasonable potential to exceed applicable water quality standards. A final effluent limitation of 25.0 ng/l, 6.0 ng/l, and 10.0 ng/l for Total Mercury has been added to the draft permit for Monitoring Points 002A, 003A, and 005A, respectively. These limitations are the Discharge-Specific Levels Currently Achievable based on a multiple discharger variance from the water quality-based effluent limit of 1.3 ng/l, pursuant to Rule 323.1103(9) of the Michigan Water Quality Standards. A new internal monitoring point (005A1) has been included in the draft permit. The permittee will be redirecting the treated wastewater currently discharged through Outfall 002 to discharge through Outfall 005. A special condition regarding closure of Outfall 002, a short-term waste characterization study, and a chronic whole effluent toxicity test special condition have also been added to the draft permit.

Comments or objections to the draft permit received by September 26, 2012, will be considered in the final decision to issue the permit. Persons desiring information regarding the draft permit, procedures for commenting, or requesting a hearing should contact Jeff Fischer, Permits Section, Water Resources Division, Department of Environmental Quality, P.O. Box 30458, Lansing, Michigan 48909, telephone: 517-335-4188, e-mail: fischerj1@michigan.gov.

Copies of the public notice, fact sheet, and draft permit may be obtained via the Internet (http://www.michigan.gov/deq - on the left side of the screen click on Water, Surface Water, and NPDES Permits; then click on 'Permits on Public Notice,' which is under the Permits banner) or at the Water Resources Division, Grand Rapids District Office, State Office Building, Fifth Floor, 350 Ottawa, NW, Unit 10, Grand Rapids, Michigan 49503-2341, telephone: 616-356-0208.

The Discharge-Specific Levels Currently Achievable for Total Mercury were developed in accordance with the Department's approved Multiple Discharger Variance (MDV). A copy of the MDV may be obtained via the Internet at (http://www.michigan.gov/deqnpdes - click on 'Applicable Rules and Regulations') or at the District Office.

APPENDIX A

Document 5

Fact Sheet, Permit No. MI0000278

FACT SHEET

PERMITTEE/FACILITY NAME: Grand Haven Board of Light and Power-J. B. Sims Generating Station

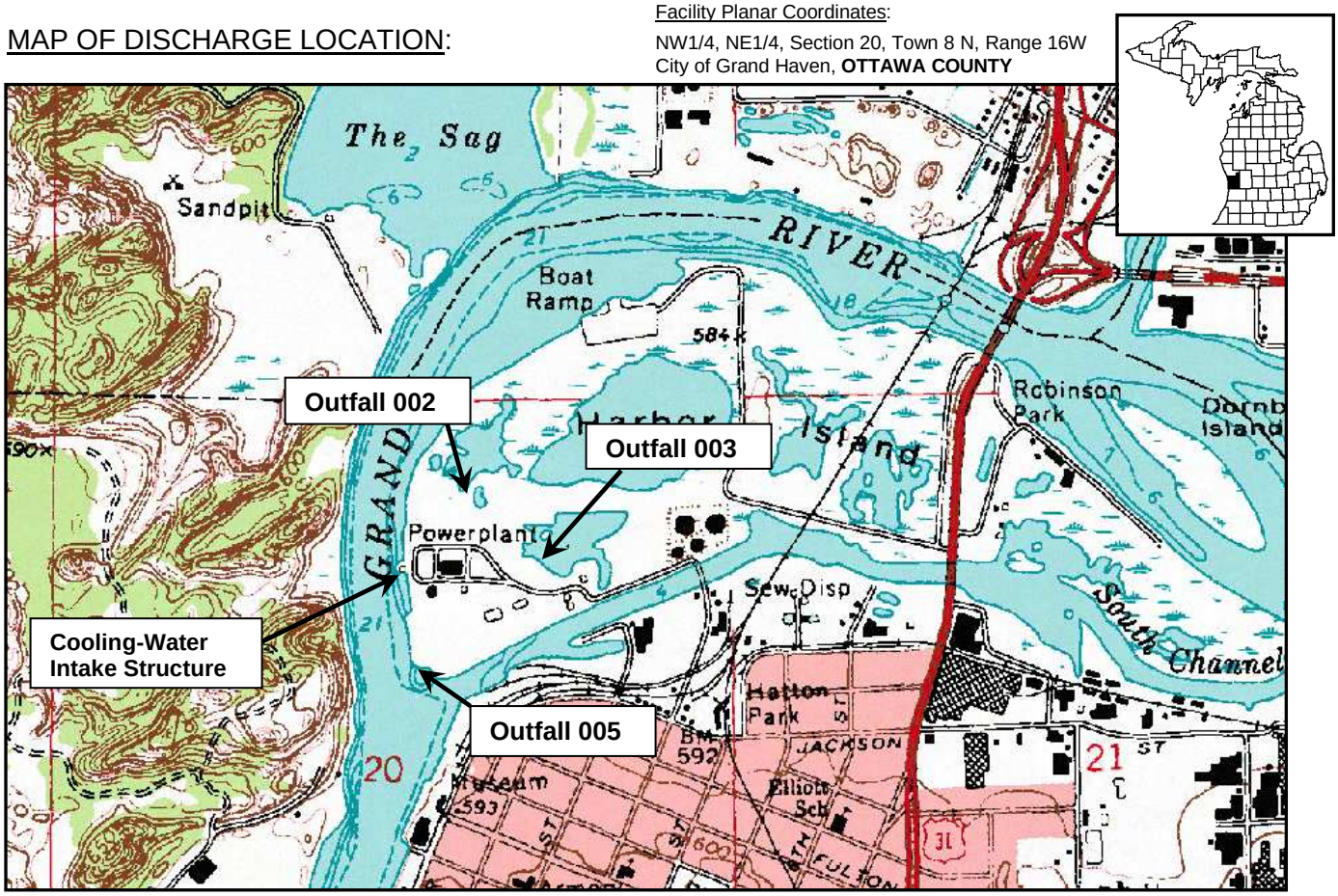
COUNTY: OTTAWA

DESCRIPTION OF EXISTING WASTEWATER TREATMENT FACILITIES:

The J.B. Sims Generating Station is a steam-electric power plant. Outfall 002 discharges scrubber sump water, bottom ash transport water, service water, demineralized wastewater, and coal pile runoff to a wetland contiguous to the North Channel of the Grand River. Treatment consists of settling and neutralization prior to discharge. Outfall 003 discharges boiler blowdown, contact cooling water, treated floor drain water, storm water, and occasionally, treated sanitary wastewater to a wetland contiguous to the South Channel of the Grand River. Noncontact cooling water, scrubber blowdown, miscellaneous stormwater from the roof, and treated sanitary wastewater are discharged through Outfall 005 to the Grand River.

MAP OF DISCHARGE LOCATION:

Facility Planar Coordinates:
NW1/4, NE1/4, Section 20, Town 8 N, Range 16W
City of Grand Haven, **OTTAWA COUNTY**



RECEIVING WATER:

The Grand River including the wetland pond is protected for agricultural uses, navigation, industrial water supply, public water supply in areas with designated public water supply intakes, warm-water fish, other indigenous aquatic life and wildlife, partial body contact recreation, total body contact recreation (May through October), and fish consumption.

The receiving stream flows used to develop effluent limitations are a 95 percent exceedance flow of 1010 cfs for the North Channel and 53 cfs for the South Channel of the Grand River. A harmonic mean flow of 2650 cfs and a 90-day, 10-year low flow of 1050 cfs were used for the North Channel of the Grand River. The harmonic mean flow of 130 cfs and the 90-day, 10-year low flow of 55 cfs were used for the South Channel of the Grand River.

MIXING ZONE:

For toxic pollutants, the volume of the Grand River used in assuring that effluent limitations are sufficiently stringent to meet Water Quality Standards is 25 percent of the applicable design flows of the receiving stream.

For other pollutants, the volume of the Grand River used in assuring that effluent limitations are sufficiently stringent to meet Water Quality Standards is the applicable design flows of the receiving stream.

EXISTING EFFLUENT QUALITY: (from DMR data dated January 2009 through October 2010)

Parameter	Minimum Daily	Maximum Monthly	Maximum Daily	Units
Monitoring Point 002A:				
Flow	---	0.39	0.39	MGD
Total Suspended Solids	---	17.5	25.5	mg/l
Oil & Grease	---	5.1	5.8	mg/l
Total Residual Oxidant (TRO)		*ND	*ND	µg/l
TRO Discharge Time	---	---	1440	min/day
Total Mercury	---	82	---	ng/l
pH	6.5	---	9.0	S.U.
Monitoring Point 003A:				
Flow	---	0.019	0.041	MGD
Total Suspended Solids	---	26.8	44.5	mg/l
Oil & Grease	---	6.0	23.0	mg/l
TRO	---	---	28.9	µg/l
TRO Discharge Time	---	---	1440	min/day
Total Mercury	---	70	---	ng/l
pH	6.9	---	9.0	S.U.
Monitoring Point 005A:				
Flow	---	54.6	61.1	MGD
TRO	---	---	29	µg/l
TRO Discharge Time	---	---	120	min/day
Temperature				
Intake	---	78	81	℉
Discharge	---	92	99	℉
Heat Addition	---	---	462	mbtu/hr
Total Mercury	---	26	---	ng/l
pH	7.4	---	8.6	S.U.

Parameter	Minimum Daily	Maximum Monthly	Maximum Daily	Units
Monitoring Point 005B:				
Flow	---	0.0007	0.0024	MGD
BOD_5	---	10.8	26.5	mg/l
Total Suspended Solids	---	9.6	18.2	mg/l
Total Residual Chlorine	---	*ND	*ND	µg/l
pH	6.8	---	8.6	S.U.
		Maximum 7-day Average		
Fecal Coliform Bacteria	---	25	102	cts/100ml

*ND – Non-Detect/below method detection

PROPOSED EFFLUENT LIMITATIONS: (see draft permit)

BASIS FOR PROPOSED EFFLUENT LIMITATIONS:

Based on this facility's application for an NPDES discharge permit, the Michigan Department of Environmental Quality proposes to issue the applicant a permit to discharge, subject to effluent limitations and certain other conditions within the permit. (**Monitoring Points 002A & 003A**) Effluent limitations for total suspended solids, and oil & grease are based on Federal Effluent Limit Guidelines. The effluent limit for pH is a water quality standard. The effluent limitations for total residual oxidant (TRO) and TRO discharge time, Total Selenium, Available Cyanide, Acute Toxicity, and Chronic Toxicity are Water Quality Based Effluent Limitations. The effluent limit for total mercury is the Level Currently Achievable based on a Multiple Discharger Variance. Monitoring requirements for flow and outfall observation are based on Permit Writer's Judgment. (**Monitoring Point 005A**) The effluent limit for pH is a water quality standard. The effluent limitations for total residual oxidant (TRO) and TRO discharge time are based on water quality based effluent limitations. The effluent limit for total mercury is the Level Currently Achievable based on a Multiple Discharger Variance. Effluent monitoring requirements for total mercury, flow, and outfall observation are based on Permit Writer's judgment. Effluent monitoring requirements for temperature (summer & winter) are based on Water Quality Concerns. The effluent limitation for heat addition is a water quality based effluent limitation. **(Monitoring Point 005A1)** Effluent limitations for total suspended solids, and oil & grease are based on Federal Effluent Limit Guidelines. (**Monitoring Point 005B**) Effluent limitations for total suspended solids and BOD_5 are based on federal secondary treatment standards. Effluent limitations for pH and fecal coliform bacterial are water quality standards. The effluent limitation for total residual chlorine is a water quality based effluent limitation. Effluent monitoring requirements for flow are based on Permit Writer's Judgment.

ADDITIONAL INFORMATION

New Monitoring Point:

A new monitoring point (005A1) has been added to the draft permit. This monitoring point was created in response to a request by the permittee to redirect the treated wastewater currently discharged through Outfall 002, which go to a wetland contiguous with the Grand River, to discharge through Outfall 005 which discharges directly to the Grand River. The wastewater tributary to the current Outfall 002 is of a type that is regulated by federal categorical standards. Federal rules require compliance with these effluent limitations prior to commingling with any other wastewater. Additional conditions related to this proposal have also been included in the draft permit, specifically, an outfall closure plan special condition with specific requirements related to final closure of Outfall 002 and remediation of the associated treatment ponds, and a short term waste characterization study to provide information on parameters of concern.

Cooling Water Intake Structure Information:

The J.B. Sims Generating Station is located on the east shore of the Grand River approximately 1.5 miles upstream of Lake Michigan in Grand Haven Township of Ottawa County, Michigan. Prior to 1983, J.B. Sims consisted of two coal-fired steam generating units, each rated at 10 megawatts (MW). These units (Units 1 and 2) are not longer in operation. Presently, J.B. Sims only operates Unit 3, which is a coal-fired steam turbine generating unit with a net generating capacity of 65 MW.

The current Unit 3 Cooling Water Intake Structure (CWIS) consists of three (3) submerged cylindrical wedgewire screens (66-inch diameter by 18-ft long) arranged in a straight line parallel to the river current. Each screen has a slot size width of 2-mm. Each screen is T-mounted from the bottom, 2.8-ft up from the concrete support that extends approximately 20-ft into the river from the shoreline. The average depth of the Grand River at the wedgewire screen location is 18.0-ft. Unit 3 has two circulating pumps with a combined rated capacity of 45,700 gallons per minute (gpm). The through-screen velocity estimate for the maximum pump design flow of 45,700 gpm is 0.348 feet per second (ft/sec). The maximum design intake flow for the J.B. Sims Generating Station is 66 million gallons per day (MGD), which represents 2.4% of the mean annual flow of the Grand River.

REGISTER OF INTERESTED PERSONS

Any person interested in a particular application, or group of applications, may leave his/her name, address, and telephone number as part of the file for an application. The list of names will be maintained as a means for persons with an interest in an application to contact others with similar interests.

PUBLIC COMMENT

Comments or objections to the draft permit received between _____, and _____, will be considered in the final decision to issue the permit.

If submitted comments indicate significant public interest in the application or if useful information may be produced, the Michigan Department of Environmental Quality, at its discretion, may hold a public hearing on the application. Any person may request the Michigan Department of Environmental Quality to hold a public hearing on the application. The request should include specific reasons for the request, indicating which portions of the application or draft permit constitutes the need for a hearing.

Public notice of a hearing will be provided at least thirty (30) days in advance. The hearing will normally be held in the vicinity of the discharge. The Michigan Department of Environmental Quality will consider comments made at the hearing when making its final determinations on the permit. Further information regarding the draft permit, and procedures for commenting or requesting a public hearing may be obtained by contacting Jeff Fischer, Permits Section, Water Resources Division, Department of Environmental Quality, P.O. Box 30458, Lansing, Michigan, 48909, telephone: 517-335-4188, email: fischerj1@michigan.gov.

APPENDIX A

Document 6

Request for Proposal, Repair and Relining of East Ash Pond, August 1996

REQUEST FOR PROPOSAL

SUBJECT: Repair and Relining of East Ash Pond

Dear Potential Bidder:

Sealed bids will be received by the Board of Light & Power, City of Grand Haven, Michigan, at 1700 Eaton Drive, on or before 11:00a.m., local time, Aug 20, 1996 at which time and place the bids will be publicly opened and read for furnishing supervision, labor, equipment, and materials for relining the J.B. Sims Unit III east ash pond as detailed in the scope of work.

The Grand Haven Board of Light & Power is requesting a proposal for restoration of the clay lining of one of the large ash ponds located at the J. B. Sims Generating Station. These ponds are used operationally as part of the ash removal process and also receive some FGD (scrubber) and neutralized demineralizer wastes. After settling, water is reused in various plant processes. The east ash pond is being emptied of its ash/sludge mixture by Board personnel, but it is anticipated that some material will need to "pushed" to the south east corner where it can be lifted out by Board crane. Disposal of this material will be on site. At that time the repair and relining is expected to take place.

The Board of Light & Power's Sims Generating Station is a 65 MW coal-fired power plant located on Harbor Island in Grand Haven, Michigan.

SCOPE OF WORK- EAST ASH POND REPAIR/RELINING

1. Assist BLP personnel in removing last material from pond by pushing it to south east corner for removal by crane.
2. Grade the sides and bottom of pond (can be concurrent with removal of above).
3. Install approximately one (1) foot of compacted, impermeable clay to the pond sides. Areas near top of pond (access roadway) will need more that one foot of material due to water and elemental erosion. This will have to be estimated by inspection during preparation of bid.
4. Place approximately two (2) feet thick of same clay to bottom of pond.
5. Rebuild damaged area on south berm and match width of adjacent berm in west ash pond. This will need to be built out approximately 2-5 feet.
6. Fit clay to existing concrete structures and spillways. Lifts to be appropriate to the final thickness desired and condition of clay to be used.
7. A stone cover of approximately 4-6 inches will be required for access and maintenance activities. Roadway slag (such as 22A) would be sufficient for this use.
8. Provide final drawings showing dimensions, grades,and slopes of completed pond.

If you are interested in performing these services for the Board of Light & Power, please provide us with a proposal and estimated cost to complete the scope of work. Ideally the proposal will include an expected outline of costs following the Scope as detailed above. If you need additional information about this project, please contact Mr. Fred Stille, Maintenance Supervisor or Gordon Groenevelt, Production Manager at the J.B.Sims Generating Station, (616)842-6355.

PLEASE NOTE-- The sucessful bidder will be required to provide a certificate of insurance showing coverage as detailed in the attached "Insurance Requirements". Any exceptions taken to these requirements must be noted on the bid form.

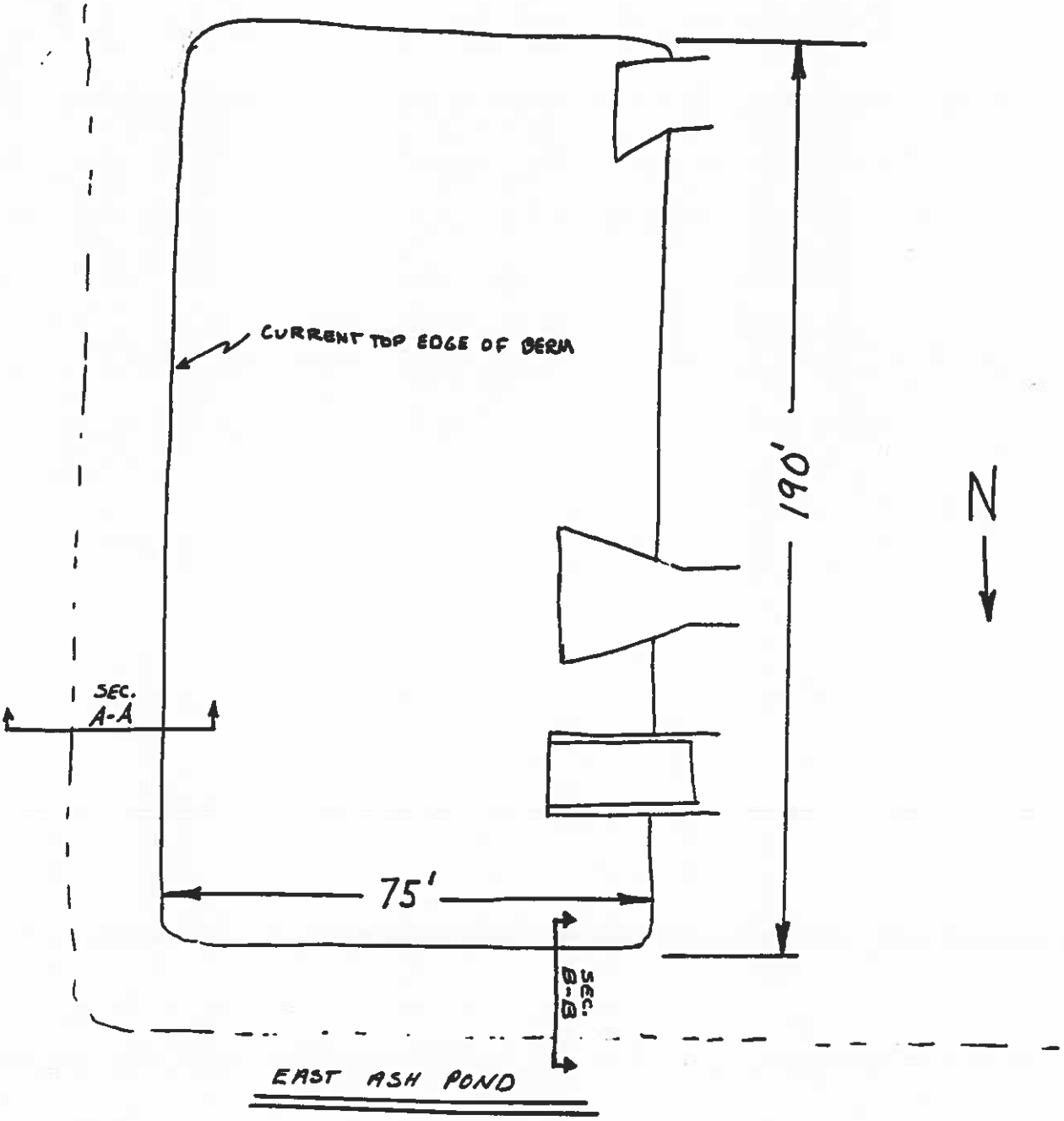
The Board of Light & Power reserves the right to reject any or all proposals, to waive any irregularities and/or informalities and make an award in any manner, consistent with law, deemed to be in the best interest of the Board of Light & Power, City of Grand Haven.

Sincerely,
BOARD OF LIGHT & POWER

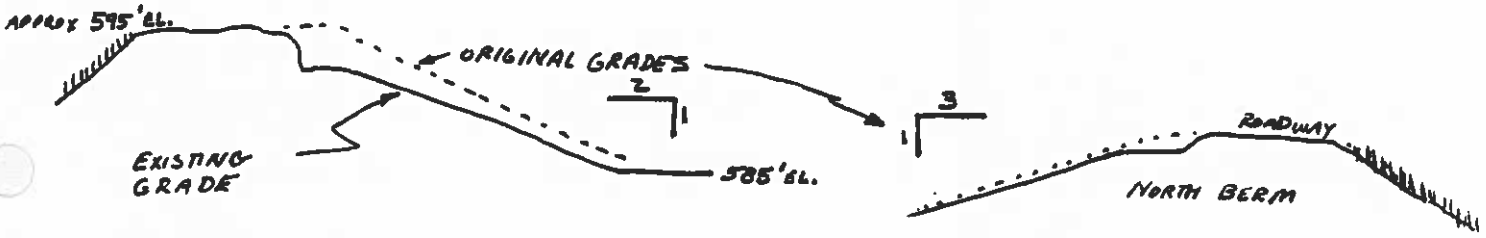
Jonathan Hofman
Administrative Assistant

[C:\AMIDATA\EASHPNDO.SAM]

7/96 CLL



— APPROXIMATE DIMENSIONS



SECTION A-A

SECTION B-B

(DRAWINGS NOT TO SCALE)

BID LIST POND RELINING

Great Lakes Construction, Inc.
14372 172nd Avenue
Grand Haven, MI 49417

Schmidt Brothers Excavating, Inc.
13919 128th Avenue
Grand Haven, MI 49417

Tiles Excavating
16958 144th Ave.
Nunica, MI 49448

Wachter Excavating, Inc.
16580 144th Ave.
Spring Lake, MI 49456

Heyboer Excavating, Inc.
17340 Hayes
Grand Haven, MI 49417

S.F. Raymer Co.
1349 Comstock Street
P.O. Box 409
Marne, MI 49435-0409

APPENDIX A

Document 7

Final As-Built Drawing – East Retention Pond, October 1996

DRIESENGA & ASSOCIATES, INC.
Consulting Engineering & Testing Services

Offices in:
Holland
Muskegon
Grand Rapids

TRANSMITTAL

TO: Grand Haven Board of Light & Power
1700 Eaton Drive
Grand Haven, MI 49417

ATTN: Fred Stille - Maintenance Supervisor

DATE: October 8, 1996

PROJECT: Retention Pond - 96231

WE ARE TRANSMITTING ___X___ HEREWITH _____ UNDER SEPARATE COVER

QUANTITY	DESCRIPTION
One (1)	Final As-Built Drawing - East Retention Pond

ISSUED FOR:

_____ REVIEW & COMMENT _____ APPROVAL _____ INFORMATION

_____ CONSTRUCTION ___X___ YOUR FILE _____ AS REQUESTED

REMARKS

Please contact me if you need additional information.

DISTRIBUTION

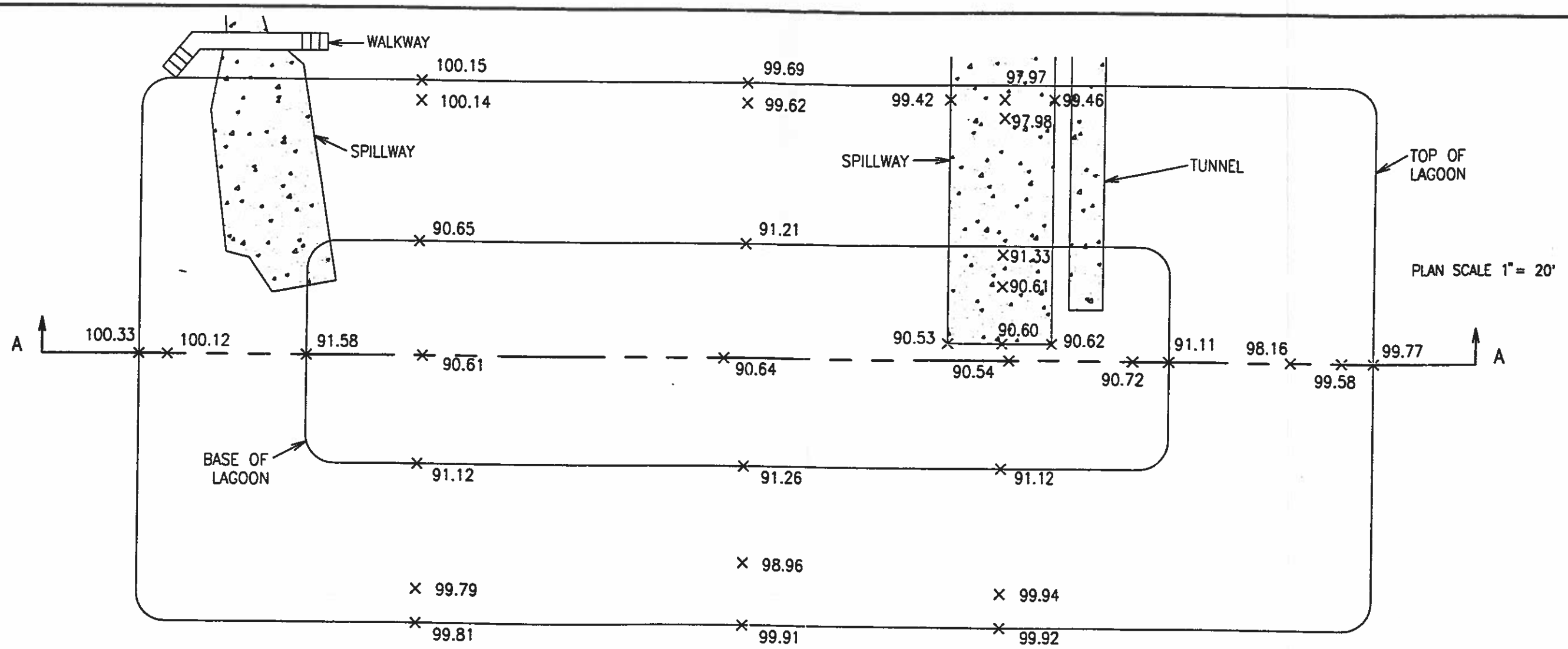
Sam Raymer - S.F. Raymer Company
File - 96231

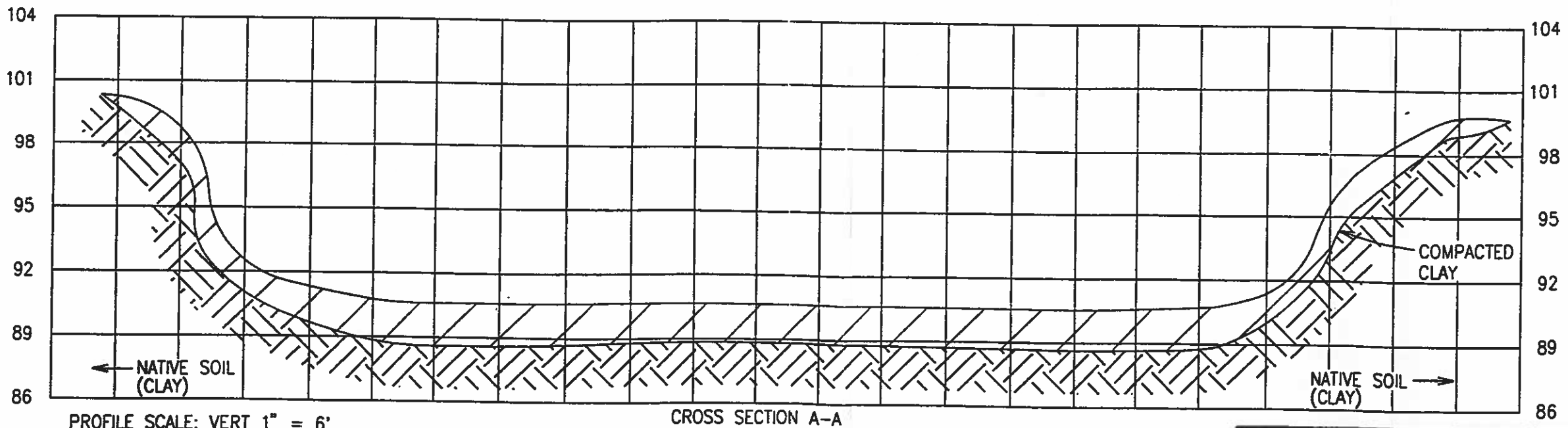
DRIESENGA & ASSOCIATES, INC.

BY: James A. Henning

James A. Henning, P.E.
Project Manager

570 E. 16th Street, Suite 400 ▪ Holland, Michigan 49423 ▪ 616.396.0255 ▪ Fax 616.396.0100
e-mail: drieseng@freenet.macatawa.org ▪ Internet: http://www.macatawa.org/~drieseng/





PROFILE SCALE: VERT 1" = 6'
HORZ 1" = 20'

CROSS SECTION A–A

SITE MAP AND PROFILE – EAST ASH POND

Client Name: GRAND HAVEN BOARD OF LIGHT & POWER Site Name: J.B. Sims Generating Station Grand Haven, Michigan	FIGURE 1
DRIESENGA & ASSOCIATES, INC. Consulting Engineering & Testing Services	96231
	10/9/96

APPENDIX B

Document 8

Dam Inspection Check List East Pond

Site Name:	**J.B. Sims Power Plant**	Date:	**8/22/12**
Unit Name:	**East 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)?	N/A		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)?	N/A		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?	N/A	
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?	N/A	
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?	N/A	
11. Is there significant settlement along the crest?		X	Over widespread areas?	N/A	
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?	N/A	
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?	N/A	
14. Clogged spillways, groin or diversion ditches?	N/A		Around the outside of the decant pipe?	N/A	
15. Are spillway or ditch linings deteriorated?	N/A		22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?	N/A		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	Not discussed with Utility
2,3,5,6,8	Information not provided by Utility at this time
9	There are utility poles along the northern embankment

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit Not Applicable **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: Settling of bottom ash.

Nearest Downstream Town Name: Grand Haven, MI

Distance from the impoundment: Approximately 1500 feet

Location:

Latitude	43	Degrees	4	Minutes	16.38	Seconds	**N**
Longitude	-86	Degrees	14	Minutes	3.70	Seconds	**W**

State Michigan **County** Ottawa

	Yes	No
Does a state agency regulate this impoundment?	☐	☒

If So Which State Agency?

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.

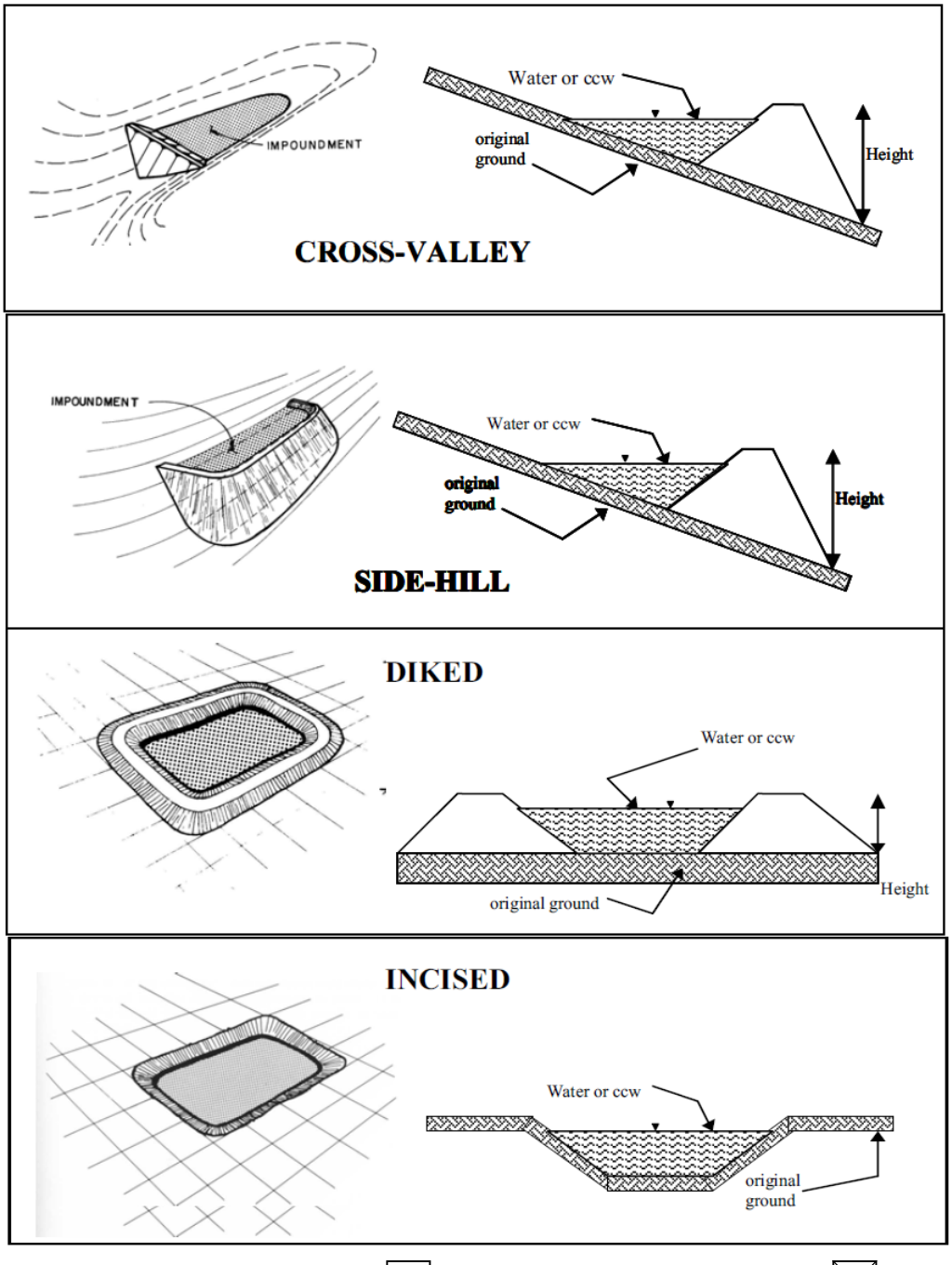
☒ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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:

Due to the close proximity to both the Grand River as well as the JB Sims Power Plant, itself, a failure of this pond poses a **significant hazard potential**. If this pond were to fail, wet bottom ash would flow uncontrolled to one or more of the following locations: JB Sims Power Plant structures, the Grand River, adjacent property owner to the North. The East and West ponds are connected via a shared spillover allowing water levels to stabilize, therefore, failure of the one pond, could potentially drain the adjacent pond as well. A failure would also most likely drain down the northern embankment. The property line is at the toe of the northern embankment, so discharge would potentially pollute the adjacent property.

CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	Not available at this time	**Embankment Material**	Compacted clay
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**

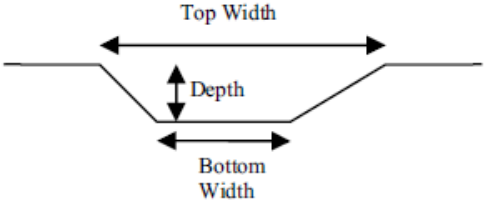
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

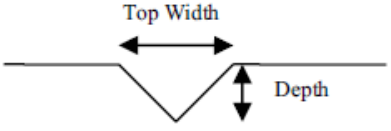
average bottom width (ft)

top width (ft)

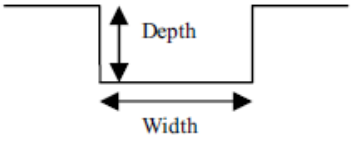
TRAPEZOIDAL



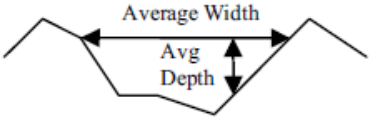
TRIANGULAR



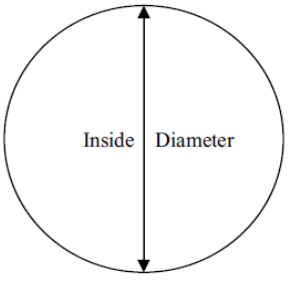
RECTANGULAR



IRREGULAR



☐ **Outlet**



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 **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.

Site was constructed atop land once used as a municipal landfill.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

Some documentation has been acquired at this point, but not enough to make any substantial conclusions regarding the foundation preparation of the ponds.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

No.

APPENDIX B

Document 9

Dam Inspection Check List West Pond

Site Name:	**J.B. Sims Power Plant**	Date:	**8/22/12**
Unit Name:	**West 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)?	N/A		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)?	N/A		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?	N/A	
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?	N/A	
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?	N/A	
11. Is there significant settlement along the crest?		X	Over widespread areas?	N/A	
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?	N/A	
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?	N/A	
14. Clogged spillways, groin or diversion ditches?	N/A		Around the outside of the decant pipe?	N/A	
15. Are spillway or ditch linings deteriorated?	N/A		22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?	N/A		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	Not discussed with Utility
2,3,5,6,8	Information not provided by Utility at this time
9	There are utility poles along the northern embankment
23	Ponded water was seen at both the Southwestern (downstream) toe as well as a section along the Western toe

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit Not Applicable **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: Settling and neutralization of bottom ash.

Nearest Downstream Town Name: Grand Haven, MI

Distance from the impoundment: Approximately 1500 feet

Location:

Latitude	43	Degrees	4	Minutes	16.32	Seconds	**N**
Longitude	-86	Degrees	14	Minutes	5.20	Seconds	**W**

State Michigan **County** Ottawa

	Yes	No
Does a state agency regulate this impoundment?	☐	☒

If So Which State Agency?

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.

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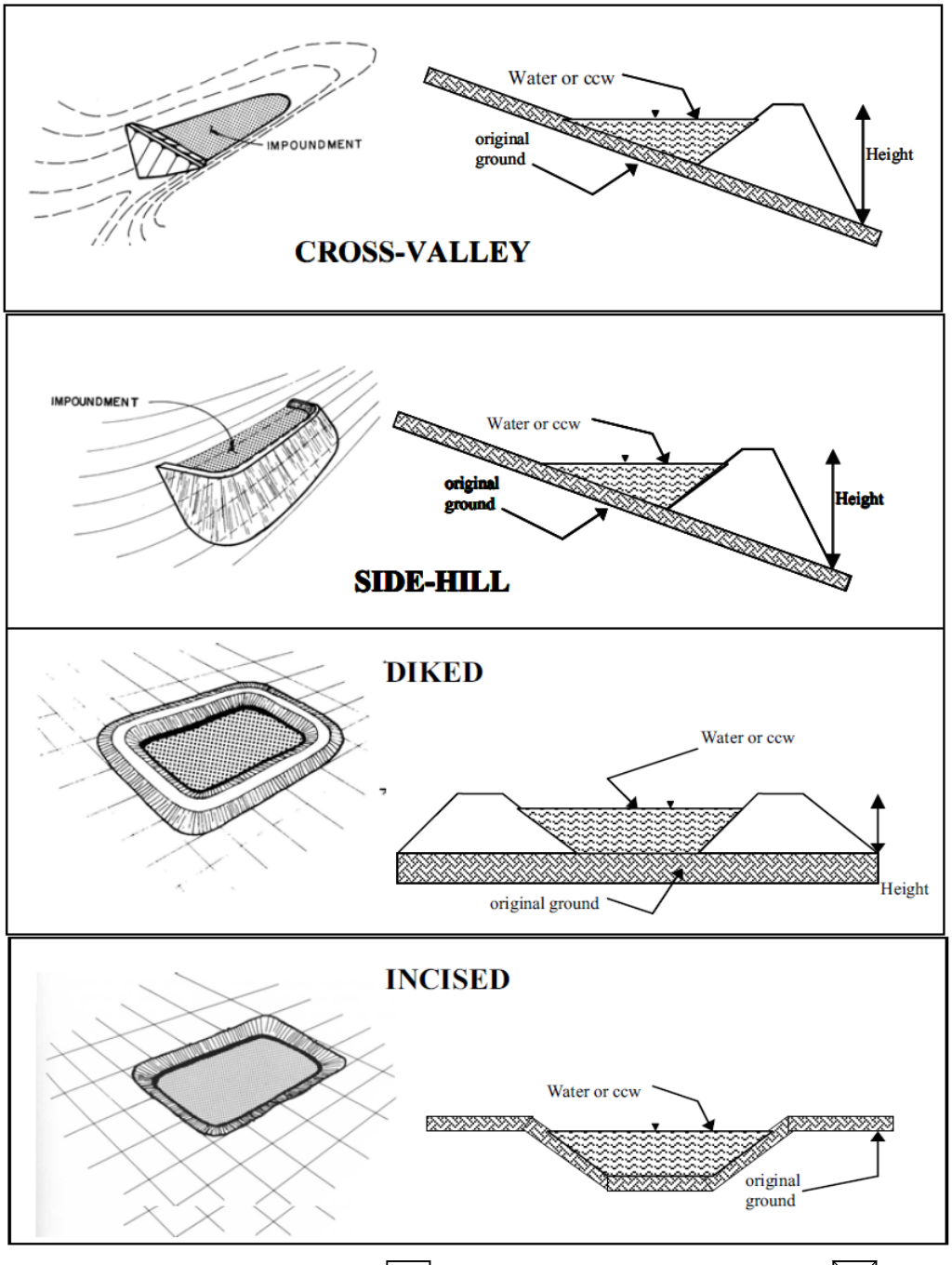
CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill ☒ Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	Not available at this time	**Embankment Material**	Compacted clay
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**

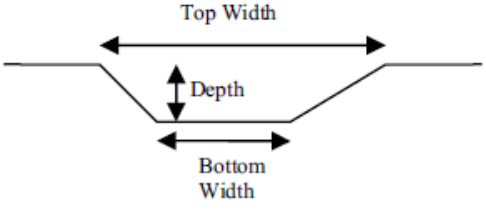
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

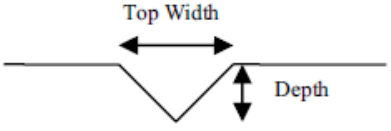
average bottom width (ft)

top width (ft)

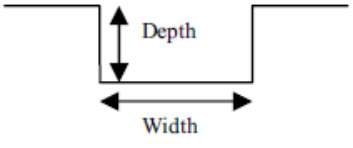
TRAPEZOIDAL



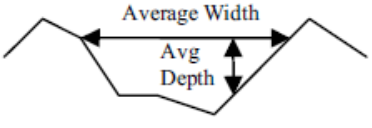
TRIANGULAR



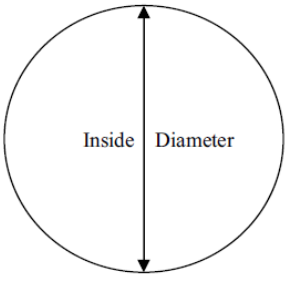
RECTANGULAR



IRREGULAR



☐ **Outlet**



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 **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.

Site was constructed atop land once used as a municipal landfill.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

Some documentation has been acquired at this point, but not enough to make any substantial conclusions regarding the foundation preparation of the ponds.

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

No.

APPENDIX C

Document 10

Additional Photographs

Photo 1. Looking S from W Pond's SW embankment at fly ash loader _JB Sims Power Plant _082212

Photo 2. Looking N at E and W Ponds _JB Sims Power Plant_082212

Photo 3. Looking NE at primarily E Pond _JB Sims Power Plant_082212

Photo 4. Looking NW at primarily W Pond _JB Sims Power Plant_082212

Photo 5. Looking down from Power Plant (SW) at Gypsum Bunker _JB Sims Power Plant_082212

Photo 6. W Pond's SW corner (gypsum seen misplaced in storage pile in top right corner; not typically stored here) _JB Sims Power Plant _082212

Photo 7. Looking S from Plant at Grand River _JB Sims Power Plant_082212

Photo 8. Looking SE at spillover from E to W Pond and vice versa _JB Sims Power Plant _082212

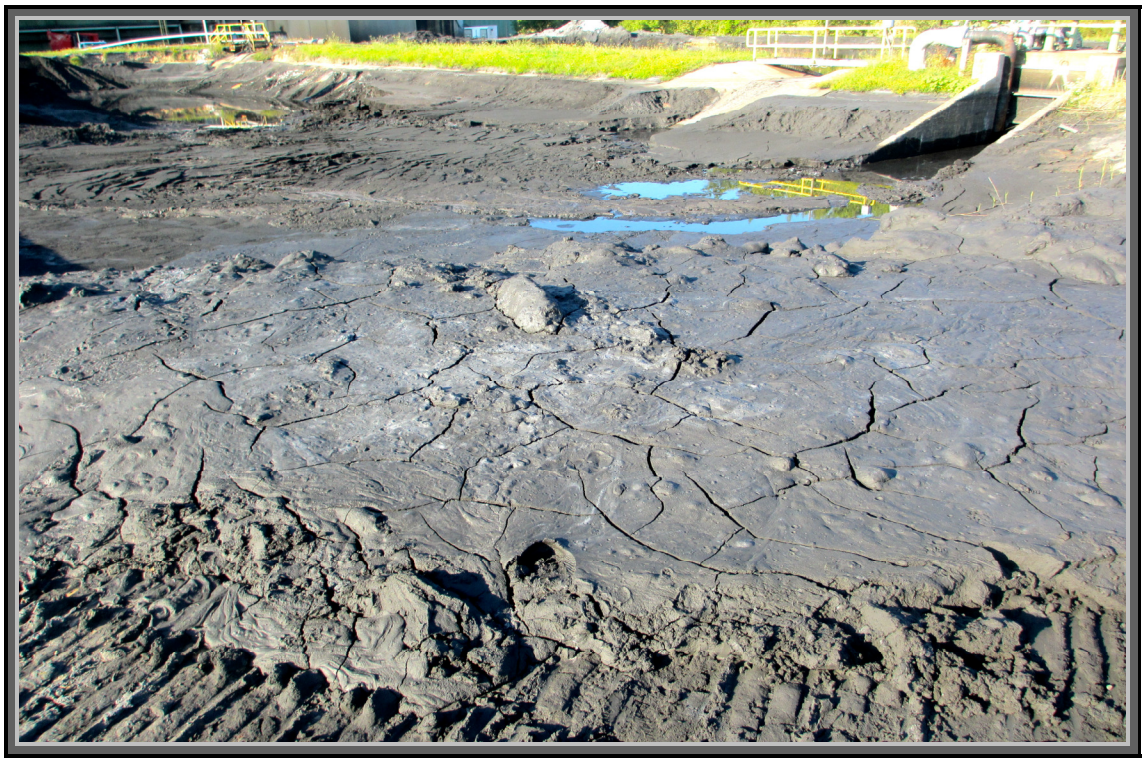


Photo 9. Wet bottom ash on NE corner of E Pond (note indentation of my footprint) _JB Sims Power Plant_082212

Photo 10. Looking S from Plant at Grand River _JB Sims Power Plant_082212

APPENDIX D

Document 11

Information Received from Grand Haven Board of Light and Power Subsequent to Draft Report

Board of Light and Power
1700 Eaton Drive
Grand Haven, Michigan 49417
616/846-9200
Fax 616/846-3114

General Manager
Annette S. Allen

December 6, 2013

Mr. Stephen Hoffman
US Environmental Protection Agency (5304P)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Mr. Hoffman,

This letter is in response to the October 2012 Draft Coal Combustion Residue Impoundment Round 12 – Dam Assessment Report, for JB Sims Power Plant (Site 04), produced by EPA's contractor Dewberry & Davis LLC ("Dewberry"). Grand Haven Board of Light & Power (GHBLP) appreciates the opportunity to comment on the draft report. The GHBLP is concerned that the report does not present an accurate depiction of the current status of the Sims plant ponds, and hopes that this letter and the additional documents that accompany it will assist you in having corrections made prior to finalizing the report.

Ponded Water

In the draft report, Dewberry repeatedly expresses concern about visible ponded water on the JB Sims site and adjacent to the West Pond. While the contractors were on site, we attempted to make clear that this ponded water was the result of recent rain fall, which due to the clay soil on the site does not infiltrate, but ponds and evaporates slowly – often over the course of many days. The ponding issue is discussed in several places in the draft report, and appears to be largely the basis for the draft report's conclusion that the condition of the ponds are "poor." See, Section 5.1, which concludes that, "The overall assessment of the dam was that it was in poor condition due to unexplained ponding downstream of the West Pond embankments." (Emphasis added). Dewberry's comment that the ponding was "unexplained" is baffling and internally inconsistent, given that the caption on Photo 5.3.3e, p. 5-13 of the draft report, notes that "plant personnel said that this [ponding along the toe of West Pond at west and southwest locations] is from rain and a surface that is not very permeable." It is therefore difficult to see how the report can state that the ponding was "unexplained."

Another inconsistency related to the ponding issue is the report's statement that "there were no recent significant rain events prior to Dewberry's site visit." See, p. 5-13 of the draft report. It is unclear what the basis for this statement is, and it is unsupported by the experience of the staff on the site, who report significant recent rainfall. The site visit was conducted August 22, 2012. Official precipitation records for the area show that 1.44 inches of rain had fallen since the beginning of the month, with 1.39 of it in the two weeks preceding the site visit. Daily rainfall records for those days are as follows:

August 16 0.32 inches
August 15 Trace
August 13 0.12 inches
August 10 0.70 inches
August 9 0.25 inches
August 8 Trace

(Data from wunderground.com.) As site personnel explained to Dewberry during their visit, the amount of clay that is in the soils of the area in question results in a considerable amount of storm water ponding. This ponded storm water remains for days following a rain event until it finally evaporates. The presence of ponded storm water on the site was therefore neither unexplained, nor a sign of any structural weakness or defect in the pond embankments.

The pond area undergoes regular maintenance efforts, and since the site visit the plant has re-sloped and repaved the roadway to the south of the ponds as part of its regular maintenance, in part to redirect storm water. These efforts appear to have been successful. Since the paving modifications, there has been no evidence of storm water ponding in the area in question.

The following pictures were taken on November 1, 2013, one day after receiving 1.07 inches of rain. As evident in the pictures, the upgrading and sloping efforts have considerably improved the ponding of storm water that was previously observed in the middle of the driveway west of the ponds.

We feel that the explanation that was clearly provided to Dewberry during their site visit, together with this additional information we have provided to you about re-grading and paving efforts, should eliminate any concerns that the ponding of storm water on the site indicates any weakness or defect in the pond embankments. On the contrary, the presence of ponded storm water indicates the impervious nature of the clay on the site, and should provide assurance that the ponds are well sealed.

Spillway

Another concern raised by Dewberry is the current lack of a spillway for the East Pond that is identified on original construction documents. That spillway was originally constructed, but later removed when it was determined that it posed a risk to the utility substation and was no longer needed due to the spillway between the East and West Ponds and the manner in which these ponds are operated.

The ponds are not ordinarily used simultaneously, but instead one is drained and cleaned while the other is being filled. Thus, if a large rain event were to occur that resulted in a potential for overflow of the active pond, the spillway between the ponds would be used to reduce the level of that pond by allowing water to pass into the other, empty pond. In the extremely unlikely event that this effort proved insufficient to handle the volume of water, the ponds contain pumps and discharge pipes, and the plant's NPDES permit allows discharge from the plant into the river at a rate of 0.4 MGD to control the water level. This would, on an emergency basis, allow the plant to relieve pressure on the ponds if that should become necessary.

However, it is worth noting as the draft report itself observes, that there have never been any spills, unpermitted releases, or other performance related problems with the ponds or embankments over the last 10 years. See Section 3.3 of the draft report. In fact, to my knowledge there has never been a spill, unpermitted release, or other performance problem with either of the ponds in the entire history of plant operations. This despite the West Michigan

lakeshore area having had two 100-year storm events in the last three years. See, http://www.mlive.com/news/grand-rapids/index.ssf/2009/06/100_year_rainstorm_floods_mich.html. We would further note that a designated facility staff person walks the ponds daily. That surveillance, coupled with the 24/7 surveillance cameras discussed below which can be used to view the ponds closely during heavy rain events, enables the plant to monitor and respond to water level changes in a timely fashion. We therefore strongly feel that concerns in the report about the removal of the original spillway are exaggerated, and provide no basis for lowering the rating of the ponds with respect to safety or stability.

Site Security and Monitoring Measures

Dewberry's draft report expresses concern about the adequacy of the surveillance and monitoring program at the site. See Section 9.0. While at the time of Dewberry's visit GHBLP lacked a written surveillance procedure, there were already in place equipment and measures to ensure adequate surveillance of the site and monitoring of the ponds. At least one individual per shift is required to physically inspect the ponds seven days per week. While at the time of the Dewberry visit the facility did not have a written "checklist" for the individual doing the inspection, one is now in process of being drafted and will soon be implemented. Furthermore, the Dewberry report overlooks the presence and use made of the facility's surveillance camera system. This system provides control room operators the ability to monitor the ponds from the control room of the plant on a 24-hour-per-day, 7-day-per-week basis. Lighting around the ponds has been specifically designed for observation at night and the security cameras have the capability to view even in low-light areas.

Dewberry's draft report notes that there is no instrumentation present at the ponds for monitoring water levels. The plant has, in the past, had remote monitoring instrumentation, but found that these instruments were frequently inaccurate and required excessive maintenance. In the end, the above-described regular physical inspections of the ponds, together with the improved lighting and use of cameras, were found to provide better information on the state of the ponds and the water levels. The fact that the facility's ponds since their inception have had a spotless record of operation, as noted above and in the Dewberry draft report, again suggests that Dewberry's concerns about the surveillance and monitoring program are misplaced.

Additional Documentation and Maintenance

Dewberry expressed concerns about a lack of written operational and maintenance procedures. See, *e.g.*, Section 8.0 of the draft report. GHBLP acknowledges these concerns, while at the same time noting that this is a problem with paperwork and not with actual operations. To address these concerns, GHBLP has already begun to implement written procedures that capture the operational and maintenance practices undertaken at the plant. Certain of these procedures that have already been codified are included in the supplementary documents attached to these comments, including pond inspection forms. Additional documents are being developed.

It is worth noting that even as this documentation is being developed, the plant's routine maintenance efforts continue. As an example, as part of the routine and continuing maintenance efforts at the plant, since the August 22, 2012 assessment GHBLP has drained, inspected and dressed various spots in the ponds with clay to ensure that adequate clay thickness is maintained.

In fact, the facility has on record expenditures of $24,353 for pond upgrades (primarily additional clay) over the period from 1999 to 2013. It is also worth noting that the exterminator contract that the plant maintains for pest control involves rodent control on the berms of the ponds.

If Dewberry or other representatives of EPA would like to return to our facility in order to see the features discussed in this response, we would welcome the opportunity to show them to you. We believe that open communication is essential to the production of a fair and accurate report. To that end, feel free to contact me if you would like to schedule a visit, or if you would like further information with respect to any of the topics in our comments. Again, the GHBLP appreciates the opportunity to comment on this report prior to it being finalized.

Sincerely,

Paul Cederquist

Paul Cederquist
Environmental Compliance Manager
Grand Haven Board of Light & Power
616 607 1292
pcederquist@ghblp.org

cc: Tim Lundgren, Esq., Varnum Law Firm
Annette Allen , GHBLP
Jeff Chandler, GHBLP

6656429_1.docx

Enclosures

J.B. Sims Ash Pond Inspection Form

DAILY

Date:

Inspector(s):

Approximate Time of Inspection:

East Pond

	Yes	No	Acceptable	Needs Improvement
Adequate pool elevation?				
Pond currently in use?				
Is embankment currently under construction?				
Trees growing on embankment?				
Cracks or scrapes on crest?				
Cracks or scrapes on slope?				
Sloughing or bulging on slopes?				
Major erosion or slope deterioration?				
Evidence of burrowing animals				

West Pond

	Yes	No	Acceptable	Needs Improvement
Adequate pool elevation?				
Pond currently in use?				
Is embankment currently under construction?				
Trees growing on embankment?				
Cracks or scrapes on crest?				
Cracks or scrapes on slope?				
Sloughing or bulging on slopes?				
Major erosion or slope deterioration?				
Evidence of burrowing animals				

Additional Comments:

J.B. Sims Ash Pond Inspection Form

Monthly

Note: Inspection to be conducted by a manager or management appointed personnel

	Yes	No	Date
Evidence of erosion in spillways			
Date of Repair if needed:			
Evidience of erosion on pond walls			
Date of Repair if needed:			

Additional Comments:

From: Paul Cederquist <PCederquist@ghblp.org>
Sent: Friday, December 13, 2013 3:27 PM
To: Hoffman, Stephen
Cc: Annette Allen; Jeff Chandler; Lundgren, Timothy J.
Subject: FW: GHBLP Ash Pond Documents

Mr. Hoffman,

Attached is the ash pond construction file I have recently been able to acquire and would appreciate if you could add it to the response letter I emailed last Friday and the hard copy that arrived via FedEx to you on the following Monday, the 9th of December. Grand Haven Board of Light & Power has been working diligently to obtain as much information as possible to help educate you and your office hopefully providing a better understanding of the J.B. Sims site. If you have any questions please do not hesitate to ask.

Paul Cederquist
Environmental Compliance Manager
Grand Haven Board of Light & Power
616 607 1292

CITY OF GRAND HAVEN, MICHIGAN
BOARD OF LIGHT AND POWER
J. B. SIMS STATION, UNIT 3

ASH POND CONSTRUCTION

FILE 7728.71.0200

Black & Veatch
Engineers-Architects

BLACK & VEATCH
OF MICHIGAN
CONSULTING ENGINEERS

TEL. (913) 967-2000
TELEX 42-6263

1500 MEADOW LAKE PARKWAY
MAILING ADDRESS: P.O. BOX NO. 8405
KANSAS CITY, MISSOURI 64114

City of Grand Haven, Michigan
Board of Light and Power
J. B. Sims Station, Unit 3

August 19, 1983
File: 7728.71.0200.01
Ref.: Ash Pond
Construction

Grand Haven Board of Light and Power
650 Harbor Avenue
Grand Haven, Michigan 49417

Attention: Mr. Jack J. Buckner
General Manager

Gentlemen:

This report is a summary of design and construction activities associated with the bottom ash pond for the J. B. Sims Unit 3 project. The report provides a detailed historical account of design and construction work on the pond, and includes a cost summary for work related to construction improvements.

The Board should be aware of the improved pond's flexibility of use and operation. This pond system is consistent with the overall high-quality design and construction of the total project. With the pond improvements, Unit 3 should provide economical and reliable power to the Board's customers for many years to come.

The cost associated with the pond improvement was adequately covered by the overall project contingency fund. This fund was specifically established to account for such events, which are sometimes encountered on a project of this magnitude and complexity. This event did not cause the overall project to go over budget. The project was constructed for the amount budgeted at the initiation of engineering and included in the bond prospectus.

Black & Veatch is confident that the improved pond will provide long-term reliable and efficient service. This confidence is reinforced by our knowledge of the extra engineering that went into the design and construction management for the improvement.

We will be available for further discussion if the Board should feel it is appropriate.

Very truly yours,

BLACK & VEATCH

Thomas E. Kalin
Project Manager

elw
Enclosure

TABLE OF CONTENTS

LIST OF APPENDICES

CITY OF GRAND HAVEN, MICHIGAN
BOARD OF LIGHT AND POWER
J. B. SIMS STATION, UNIT 3

ASH POND CONSTRUCTION

1.0 INTRODUCTION

The design of the J. B. Sims Unit 3 project includes a two-cell bottom ash pond. The pond dikes were originally constructed with a sandy material and the pond bottom and interior slopes of the dikes were covered with 1 foot of compacted clay to seal the pond and control seepage. When the pond was initially filled with water, piping was noted around the ash water reclaim structure. Repair of the piping problem proved to be less than satisfactory. Subsequently, it was noted that the pond was leaking along the perimeter.

The piping and leakage was caused by differential settlement. The reclaim structure is supported on piles, and settlement of the pond interior dike and bottom caused a separation of the clay lining which resulted in piping between the pond cells. Leakage to the outside of the dikes was caused by differential settlement between the pond bottom and dikes.

Several different design alternatives for pond repair and modification were evaluated in detail. It was concluded that the pond should be rebuilt with dikes constructed totally of compacted clay with a 3-foot thick clay bottom. Drainage piping was modified to accommodate anticipated settlements. The new construction started on April 11, 1983. The ash pond was placed in service on July 25, 1983.

The following sections of this report contain a summary of design criteria and modifications, weekly construction progress reports, and construction quality assurance. Appendix A is a System Description for the Bottom Ash Handling and Storage System which described pond operation. Appendix B contains construction photographs for pond modification and repair. Appendix C is a detailed cost report.

2.0 DESIGN IMPROVEMENTS AND MODIFICATIONS

This section presents a description of the design criteria improvements and modifications to the Bottom Ash Handling and Storage System for Unit 3 at the J. B. Sims Station.

2.1 DESIGN CRITERIA

The design criteria for the bottom ash storage ponds were based on the results of the review of the previous pond experience, geotechnical investigations, analyses, and operational requirements.

(1) Operating Level. Maximum pond operating level of Elevation 592.0 feet.

(2) Seepage Control. Seepage control measures shall withstand the anticipated settlements across the pond area. The seepage control measures shall withstand the anticipated differential settlements between the embankments, piping, and pile-supported structures.

(3) Reclaim Operations. The pond shall be designed for ash reclaim operations. The design shall consider access for mobile reclaim equipment and loading operations.

(4) Piping. Piping shall withstand settlement across the pond area and differential settlement between the embankments and pile-supported structures.

2.2 DETAILED DESIGN

2.2.1 Seepage Control

The primary concern of the seepage control system for the storage pond is maintaining the integrity of the system during settlement of the ponds. The original 1-foot thick clay liner system did not withstand the differential

settlements resulting in cracks through the liner and separation of the liner at structure interfaces. The resulting leakage led to piping of the embankment materials along the ASA-B drain pipe, under the reclaim structure, and through the interior dike.

The seepage control methods evaluated consisted of the following.

(1) Stabilization of the pond foundation to minimize settlement of the pond area and reconstructing the clay liner.

(2) Reduction in the pond load by modifying the Bottom Ash Storage and Handling System to reduce the anticipated settlements.

(3) Perimeter slurry wall cutoff.

(4) Synthetic liner.

(5) Clay dikes with clay basin liner.

Considerable costs would be incurred to eliminate the anticipated settlements. Additional construction time would be required to eliminate this settlement prior to reconstruction of the pond. The limited construction schedule and extra costs of stabilization of the foundation in addition to the costs of reconstructing the pond eliminated this option from further consideration.

The option of reducing the pond load would reduce the operational flexibility and ash storage capacity of the facility. The limited size of the ponds eliminated this option from further consideration.

The evaluations of the options for sealing the ponds concluded that the clay dike and basin liner option would best fulfill the operational, schedule, and design constraints. The main advantages of a clay dike section are the ability to maintain seepage control integrity through foundation settlement, resistance to piping failures, and the elimination of operational constraints on the storage system. Special seepage control

measures were included at interfaces between the clay dikes, liner, and structures as follows.

(1) The basin liner thickness was increased to 3 feet to provide assurance against cracking of the liner due to general pond settlement.

(2) A cutoff wall was constructed around the reclaim structure to prevent a recurrence of piping under the structure due to separation of the subgrade and the base of the pile-supported reclaim structure. Existing voids under the structure were grouted to minimize the load on the cutoff wall.

(3) A synthetic liner was attached to the reclaim structure and extended into the basin clay liner. The synthetic liner was designed such that the integrity of the seal between the reclaim structure and basin liner would be maintained during differential settlements.

(4) Bentonite was packed into gaps between the reclaim structure and the clay embankments. The high swelling characteristic of this material will help prevent seepage immediately adjacent to the reclaim structure wall.

(5) The ASA-A and ASA-B drain lines were encased in clay for a length of 30 feet to prevent a recurrence of the piping problem along these lines at the reclaim structure.

2.2.2 Piping

The piping design was modified to eliminate the following problems associated with the original design.

(1) Shearing of the ASA-A and ASA-B drain lines due to differential movements between the reclaim structure and dike.

(2) Erosion of the dike at pipe discharges.

(3) Improper drainage of the ASA-B drain line to the existing ash pond.

The original design of the drain lines consisted of fiberglass pipe, rigidly encased in the reclaim structure walls embedded at the base of the embankments. The moment and shear loads placed on these drain lines due to the differential settlements at the face of the reclaim structure resulted in the failure of both lines. The pond design modifications eliminate this problem as follows.

(1) Flexible high-density polyethylene pipe (HDPE) has been substituted for the section of the fiberglass piping of the ASA-A and ASA-B drain lines at the reclaim structure. The pipe material is sufficiently flexible to accommodate the anticipated deflection without failure of the pipe.

(2) The shear load on the HDPE pipes at the structure wall has been minimized or eliminated by supporting the soil load on an oversized heavy steel culvert, providing sufficient room for movement without loading the HDPE pipe. The culvert has been filled with a bentonite slurry to prevent piping of material into the culvert.

The potential for erosion of the dike embankment from pipe discharges and failure of the seepage control measures have been reduced due to the following design modifications.

(1) The interior dike is constructed entirely of clay. Therefore, surface erosion will not result in the seepage problem associated with a relatively thin surface liner.

(2) Clay is less susceptible to erosion than sand.

(3) Two discharge lines with large discharge rates, the ash water makeup and air separator (fly ash exhauster), have been relocated to discharge directly into the ash water reclaim structure.

During construction of the ASA-B drain line, it was noted that this line was not draining to the existing ash pond. The drainage system was modified so that the intended drainage from the new bottom ash storage pond is routed to the existing ash pond.

2.2.3 Reclaim Operations

The pond layout was modified to improve the ash reclaim operations. The ash truck loading operation was somewhat limited by access to the ponds, restricted by piping in the area of the reclaim operation, and required longer hauls by the front-end loader. Ash truck hauling operations were required to pass through the main plant area. Loading operations were located on the south side of the ponds over and between the piping supporting the pond operation with a high potential for damage.

The efficiency and safety of the reclaim operations was improved by the new pond layout. The reclaim operations were relocated to the north side of the pond, removing its impact on the main plant areas. The reclaim operations are not restricted by pond piping, minimizing the possibility of damage and interruption of normal pond operations.

The operation of the pond for reclaim operations has been improved by increasing the width of the north dike crest, ease of access to the dike, and construction of a loading platform for trucks. The entire north dike crest is reserved entirely for reclaim operations. The loading platform permits mobile equipment to load haul trucks from the dike crest and limits ash spillage outside the pond limits. The width of the dike crests does not restrict the maneuverability of the reclaim equipment. Gravel surfacing was provided on all roadways, access ramps, and the interior slope of the north dike in order to provide a stable work surface for the mobile equipment.

2.2.4 Overflow Spillways

The modifications to the pond include concrete-lined overflow spillways to channel any excess water to the existing ash pond in a controlled manner to prevent erosion failure of the dikes. The original design did not provide adequately for controlling excess flow into the ponds. Overfilling of the ponds due to failure of the automatic level control could result in overtopping of the dikes.

2.3 MODIFICATION SUMMARY DRAWING REFERENCE

The following lists drawings summarizing the modifications.

Category	Item	Drawing
Seepage Control	Dike Cross Section	Drawing S1005 Section 3
	Reclaim Structure Cutoff Wall	Drawing S1005 Section 8 Detail A
		Drawing S2015 Section 1 Sections 2 and 2A
	Synthetic Liner--Clay Joint	Drawing S1005 Section 8 Detail A
		Drawing 2015 Section 1 Sections 2 and 2A
	HDPE Pipe Encasement	Drawing S1005 Section 10
Piping	ASA-A Drain Settlement Detail	Drawing A2004 Section 6 Detail A
	ASA-B Drain Settlement Drawing Detail	A2004 Section 6 Detail C
	ASA-G, ASA-F Pipe Relocation	Drawing A2002 Drawing A2004 Detail D Section 7 Detail E Section 8
	ASA-B Drainage	Drawing S1004

Category	Item	Drawing
Reclaim Operation	Layout	Drawing S1004
	Retaining Wall	Drawing S1005 Section 5
	Access Ramp	Drawing S1005 Section 4 Section 9
Overflow Spillway	Layout	Drawing S1004
	Center Dike	Drawing S1005 Section 10
	Exterior Dike	Drawing S1005 Section 6
	Cross Sections	Drawing S1005 Section 7

3.0 WEEKLY CONSTRUCTION PROGRESS

This section contains construction progress information for the weekly periods of April 11 through July 19, 1983.

Monday, April 11 through Friday, April 15

Weather Delays	None.
Progress	
Earthwork	Neutralized pond wastes and began dewatering.
	Began removing center dike.
Structures	None.
Piping	Removed heat trace, insulation and electrical conduit at discharge pipes.
	Removed valves at discharge points and bottom ash line.
Problems	Scrubber wastes had to be pumped into ponds due to scrubber thickener problems. Thus, the pond wastes had to be neutralized and pumped out again delaying the pond repair.

Monday, April 18 through Friday, April 22

Weather Delays	None.
Progress	
Earthwork	Dewatered ponds.
	Continued removing sand dikes.
Structures	Removed splash pad at the south end of the central dike.
Piping	Installed temporary piping to Units 1 and 2 pond.
	Excavated at the point of the Abco pipe leak.
Problems	None.

Monday, April 25 through Friday, April 29

Weather Delays	None.
Progress	
Earthwork	Continued excavation of pond dikes and basin.
Structures	None.
Piping	Underground temporary ash lines were placed into service.
Problems	Underground Abco pipe pulled apart which shut down ash system. Hertel repaired break.

Monday, May 2 through Friday, May 6

Weather Delays	None.
Progress	
Earthwork	Completed the major earthwork removal of the ponds. Clay placement to begin on Monday, May 9.
Structures	None.
Piping	None.
Problems	None.

Monday, May 9 through Saturday, May 14

Weather Delays	Saturday, May 14, rainy weather hampered and eventually shut down construction operations for the day.
Progress	
Earthwork	Completed excavation of localized high spots in the pond bottoms.
	Began constructing compacted clay liner over the base of the ponds.
Structures	Installed the sheet steel cutoff wall around the ash water reclaim structure.
	Began hand compaction of clay around the ash water reclaim structure.
	Began installation of the Hypalon membrane around the ash water reclaim structure.
Piping	None.
Problems	Problems associated with hand compaction were first observed. Trouble in achieving specified densities were attributed to high clay moisture contents.
	Rain on Saturday, May 14, hampered and eventually shut down construction operations for the day.

Monday, May 16 through Friday, May 20

Weather Delays	Rain and the resulting wet clay conditions prevented any clay work to take place Thursday, May 19, and Friday, May 20.
Progress	
Earthwork	Continued placing clay over the base of the ponds.
	Started placing clay along the east and south dikes.
Structures	Completed Hypalon attachment to the structure.
	Continued backfill and hand compaction of clay around the structure to the approximate elevation of 583.5 feet.
	Drilled grout hole through the concrete slab of the ash water reclaim structure in preparation for pressure grouting.
Piping	Raised the existing piping at the south end of the pond (ASA-C, DRA-B, CCCA, ASA-G, and ASA-F) to plan grade. Piping had settled since it was originally installed (approximately 11.5 inches).
	Hand compacted sand under and around the raised piping.
Problems	Cool temperatures caused difficulty in seaming the Hypalon. Solved by the application of artificial heat.
	Mud was witnessed pumping through 3 feet of clay. The area was excavated and found to be a localized problem and backfilled.
	Rain prevented any clay work to be performed on Thursday, May 19, and Friday, May 20.

Monday, May 23 through Friday, May 27

Weather Delays	Due to rainy weather and the resulting wet conditions, no clay placement took place the week of May 23 through May 27.
Progress	
Earthwork	None.
Structures	Installed additional grout pipes and pressure grouted beneath the ash water reclaim structure.
	Completed the hypalon membrane seaming.
Piping	None.
Problems	Inclement, rainy weather shut down clay placement for the week of May 23 through May 27.

Tuesday, May 31 through Friday, June 3

Weather Delays	Rain prevented clay work to be continued on the following dates: Tuesday, May 31; Wednesday, June 1; Thursday a.m., June 2; and Friday, June 3.
Progress	
Earthwork	Continued building west and south dikes.
	Compacted clay on the pond floor to an approximate elevation of 585 feet.
Structures	Compacted clay around the ash water reclaim structure.
	Lapped Hypalon membrane to allow for settlement and compacted clay over it.
Piping	None.
Problems	Rain throughout the week prevented clay work to be done on Tuesday, May 31; Wednesday, June 1; Thursday (a.m.), June 2; and Friday, June 3.

Monday, June 6 through Saturday, June 11

Weather Delays	None.
Progress	
Earthwork	Placed and compacted clay along the west, east, and south dikes.
Structures	Continued hand compaction around the reclaim structure.
Piping	Excavated and began installation of the 12-inch diameter ASA-A Abco pipe and hand compacted backfill behind the pipe installation. Enlarged openings in the ash water reclaim structure to accommodate the polyethylene pipe flanges.
Problems	Compaction problems were incurred and attributed to the high water content of the clay borrow. Varying clay moistures at the borrow site presented occasional problems in obtaining compactable clay.

Monday, June 13 through Friday, June 17

Weather Delays	None.
Progress	
Earthwork	Continued placing clay along the east, west, and south dike.
Structures	Formed in the stop log walls on the east and west ends of the ash water reclaim structure.
	Layed out, excavated, and prepared the subbase for the bin retaining wall.
Piping	Excavated and installed the ASA-B, 6-inch diameter polyethylene pipe from the north side of the structure.
	Grouted in place the 6-inch diameter and 12-inch diameter polyethylene pipes and placed culverts around pipes.
	Hand compaction of clay around the polyethylene pipes.
	Clay was compacted in place along the center dike. Hand compaction techniques being used above the piping and near the structure.
	Mixed the bentonite slurry and allowed to hydrate through the weekend.
Problems	Some compaction problems resulting from occasional high moisture clay.

Monday, June 20 through Saturday, June 25

Weather Delays	None.
Progress	
Earthwork	Brought the south, east, and west dikes to grade (594 feet) and dressed the slopes.
	Brought the center dike to an elevation of 584 feet.
	Began construction of the north dike.
Structures	Began assembly and installation of the bin retaining wall.
	Continued hand compaction of clay around the ash water reclaim structure.
Piping	Placed the bentonite slurry and hand compacted clay around the culverts.
	Excavated for and began the installation of the 6-inch diameter ASA-G and the 10-inch ASA-F pipes.
	Excavated for the heat trace conduit and the water level probe conduit.
Problems	Some compaction problems resulting from high moisture clay.

Monday, June 27 through Friday, July 1

Weather Delays	Monday, June 27, rain hampered clay work and conduit installation.
Progress	
Earthwork	Continued building the north dike.
	Continued construction of the access ramp.
Structures	Finished assembly of the bin retaining wall, installed the filter fabric, and began backfilling with granular material.
Piping	Began installation of 1-1/2-inch diameter and 2-inch diameter electrical conduit through center dike trench.
	Insulated 10-inch diameter ASA-F steel pipe.
	Backfilled center dike pipe trench using hand-compaction techniques.
	Continued welding the 10-inch steel pipe.
Problems	None.

Tuesday, July 5 through Friday, July 8

Weather Delays	None.
Progress	
Earthwork	Continued construction of the north dike and access ramp.
Structures	Completed backfill of the bin retaining wall.
	Formed in the thrust blocks for the 12-inch diameter ASA-A pipes and the 6-inch Bondstrand drain line.
	Layed out and began forming the overflow weir on the east dike.
Piping	Continued installation of the 6-inch diameter bottom ash line and support pedestals.
	Installed the timber pipe supports near the structure and the 6-inch diameter ASA-G and 10-inch diameter ASA-F piping over the supports and into the ash water reclaim structure. Timber supports were backfilled.
Problems	None.

Monday, July 11 through Friday, July 15

Weather Delays	None.
Progress	
Earthwork	Shaped the slopes of the north dike.
	Cross sections were taken by surveyor to obtain final clay volume.
Structures	Excavated, formed, and poured the overflow weirs on the east and center dike. Also, the splash pad at the south end of the center dike.
	Installed settlement monitoring points.
Piping	Excavated and installed the remaining 6-inch diameter Bondstrand ASA-B drain line.
	Poured thrust blocks for the ASA-A and ASA-B pipe.
Problems	None.

Monday, July 18 through Tuesday, July 19

Weather Delays	None.
Progress	
Earthwork	Began placing topsoil on the exterior slopes of the pond dikes.
	Placed road gravel on the access ramp and the working area atop the north dike.
	Moistened and rolled the clay bottom of the ponds to seal the shrinkage cracks.
Structures	Installed screens and stop log gates.
	Compacted clay around overflow weirs after stripping the forms.
	Poured center section and the west slope of the center dike overflow weir.
Piping	Installed heat trace and insulation around the piping at the location of the center dike overflow weir and backfilled.
Problems	None.

4.0 CONSTRUCTION QUALITY ASSURANCE

Construction inspection was maintained full time during the majority of the reconstruction of the ash ponds to assure the proper implementation of the design improvements. The scope of the quality assurance work is detailed below.

4.1 EARTHWORK

Proper compaction necessary to prevent seepage, piping, and to maintain the structural integrity of the ponds during the anticipated settlements was tightly controlled throughout the job. The specified compaction requirement for the clay fill was 90 per cent of the maximum density as determined by ASTM D698. Soils inspection was provided continuously throughout the ash pond earthwork by Soils & Structures, Inc. A nuclear density meter was used to monitor the density of the compacted clay and to establish an average compaction effort required to achieve the specified density. Density tests were taken at random intervals or whenever low compaction was suspected. The soils technician worked under the direction of the B&V Resident Engineer.

Immediately before flooding the ponds, the pond floors were moistened and rolled in order to seal any shrinkage cracks which had formed. The ponds were flooded immediately after rolling.

4.2 PIPING

Inspection of the ash pond piping installations centered around the following areas of importance.

4.2.1 Pipe Embedment

The plastic piping used for the ash pond construction is flexible piping. The major portion of supporting strength for flexible piping is the lateral pressure exerted by the soil on the sides of the pipe. Thus, proper compaction of the embedment (below and adjacent to the pipe) is an important part of the pipe installation. All pipe construction was inspected for properly compacted embedment composed of clean sands to assure lateral and vertical support and to guard against the dangers of puncture from foreign objects.

Pipe construction at or below the ground water table presents additional installation considerations. In order to assure adequate support from the subbase, these pipe trenches were overexcavated, dewatered, and backfilled with compacted sand before pipe installation.

4.2.2 Hand Compaction Around and Above Piping

This phase of inspection assured that no piece of heavy machinery was allowed to move over or near the piping before proper cover was placed by hand compaction techniques. Requiring proper soil cover over the piping before allowing machine compaction eliminated concerns of fractured, crushed, or disjointed piping. These types of problems which would only become evident at the time the ponds were put into service would cause significant repair costs due to the location of the piping; therefore, great care was exercised using continuous inspection and hand-compaction techniques.

4.2.3 Free Movement of Settlement Connections

Due to the nature of the existing site soils, the pipe connections to the pile-supported, ash water reclaim structure must be able to accommodate settlement. The improved pipe connection designs were uncommon installations

and were constructed with close regard for detail. The construction inspection during these piping connections assured the following:

(1) Proper alignment and grade of the 12-inch diameter ASA-A polyethylene pipes and the 6-inch diameter ASA-B polyethylene pipes.

(2) Correct installation of the 24-inch and 30-inch diameter steel culverts encasing the 12-inch diameter ASA-A and the 6-inch diameter ASA-B piping.

(3) Chipping of the concrete lip along the ash water reclaim structure to allow free settlement of the 30-inch diameter culverts.

(4) Monitoring the mixing, hydration, and placement of the bentonite slurry.

4.3 SEEPAGE CONTROL

Construction was monitored as it relates to controlling water flow through the clay or flow between the clay and adjacent structures. To control seepage around structures, hand compaction techniques were used to obtain the specified compaction. To eliminate water from piping along and under the reclaim structure and along the polyethylene pipes, three measures were taken.

(1) Backfilled the polyethylene pipes in compacted clay.

(2) Installed a Hypalon (plastic sheet) seepage cutoff.

(3) Placed dry bentonite (in the shrinkage cracks) between the ash water reclaim structure wall and the clay dike.

4.4 PRESSURE GROUTING AND SEEPAGE BARRIER

Pressure grouting procedures were monitored to assure that the voids under the ash water reclaim structure caused by earlier settlements were filled with grout. To prevent piping under the ash water reclaim structure, a sheet pile cutoff wall was constructed around the base of the reclaim structure.

APPENDIX A

SYSTEM DESCRIPTION FOR ASH HANDLING AND STORAGE SYSTEM

CITY OF GRAND HAVEN, MICHIGAN
BOARD OF LIGHT AND POWER
J. B. SIMS STATION UNIT 3

SYSTEM DESCRIPTION FOR BOTTOM ASH HANDLING AND STORAGE SYSTEM

1.0 SYSTEM DESCRIPTION

1.1 FUNCTION

The function of the Bottom Ash Storage and Handling System is to provide means for the removal and storage of the following wastes.

(1) Bottom ash.

(2) Pulverizer rejects.

(3) Neutralization basin wastes.

(4) Bottom ash hopper overflow water.

(5) Fly ash exhauster water.

(6) Scrubber thickener emergency drains.

The system is designed to operate on a closed cycle with water reclaim from the ash pond.

Two ash ponds are included in the system. The ash ponds are operated in a cyclic manner with the active pond receiving ash and other waste streams while the inactive pond is being cleaned of ash accumulated from previous use.

1.2 GENERAL DESCRIPTION AND DESIGN BASIS

The bottom ash ponds are used for the temporary storage of bottom ash, pulverizer rejects and various wastewaters. Decanted water is reclaimed from the ponds for subsequent use and recycle to the plant. Two high-pressure ash water pumps are used for sluicing bottom ash and to operate the fly ash exhauster. Two low-pressure ash water pumps provide ash hopper cooling water and other miscellaneous services. Two ash hopper overflow pumps direct water to the ash ponds.

1.2.1 Ash Ponds

Two ash ponds are located north of the plant. The ponds have a common center dike. An ash water reclaim structure is located in the center dike near the north end of the ponds. The reclaim structure is designed so that water can be reclaimed from either pond. The dike for both ponds have a top elevation of 594 feet and a bottom elevation of 585 feet. The water storage volumes for each pond with a two-foot and four-foot freeboard are as follows.

Pond	Storage Volume, ft^3	
	2 ft freeboard	4 ft freeboard
3A (East Pond)	68,000	43,000
3B (West Pond)	77,000	49,000

The ponds were sized to make maximum use of the area available to the north of the plant. Sizing also included considerations for the temporary storage of material in the scrubber thickener should it be required that the thickener be emptied under emergency conditions.

Each pond should contain approximately 140 days of ash production when the unit is operated under average annual load conditions assuming that the ponds are operated with a four-foot freeboard (water level 590 feet) and that 70 per cent of the pond water storage volume can be effectively used for ash storage.

1.2.2 Ash Water Pumps and Ash Hopper Overflow Pumps

Two high-pressure ash water pumps provide sluice water for bottom ash removal and operation of the fly ash exhauster. Two low-pressure ash water pumps provide water for bottom ash hopper cooling and other miscellaneous services. The high-pressure and low-pressure pumps take suction from the ash water reclaim located in the center dike of the ash ponds. Two ash hopper overflow pumps take suction from the ash hopper overflow tank and direct the wastewater to the ash ponds.

During normal operation, one low-pressure ash water pump operates continuously to supply ash hopper cooling and seal trough makeup. One high-pressure ash water pump is operated intermittenly as required to sluice bottom

ash and pulverizer rejects to the pond and to transport fly ash to the storage silo. The second high-pressure and second low-pressure pump serve as backup for the operating pumps.

To assure adequate suction pressure for the low-pressure ash water pump, fly ash transport operations should be interrupted when sluicing bottom ash and pulverizer rejects to the pond. This does not present an operational problem for the fly ash system since it is designed to allow approximately 50 per cent downtime at full load maximum ash collection rates.

2.0 COMPONENT DESCRIPTION

2.1 ASH POND CONSTRUCTION

The ash ponds are constructed with clay dikes and a three-foot thick clay bottom. The tops of the dikes are at 594 feet elevation and the top of the clay bottom is at 585 feet elevation resulting in a maximum pond depth of nine feet.

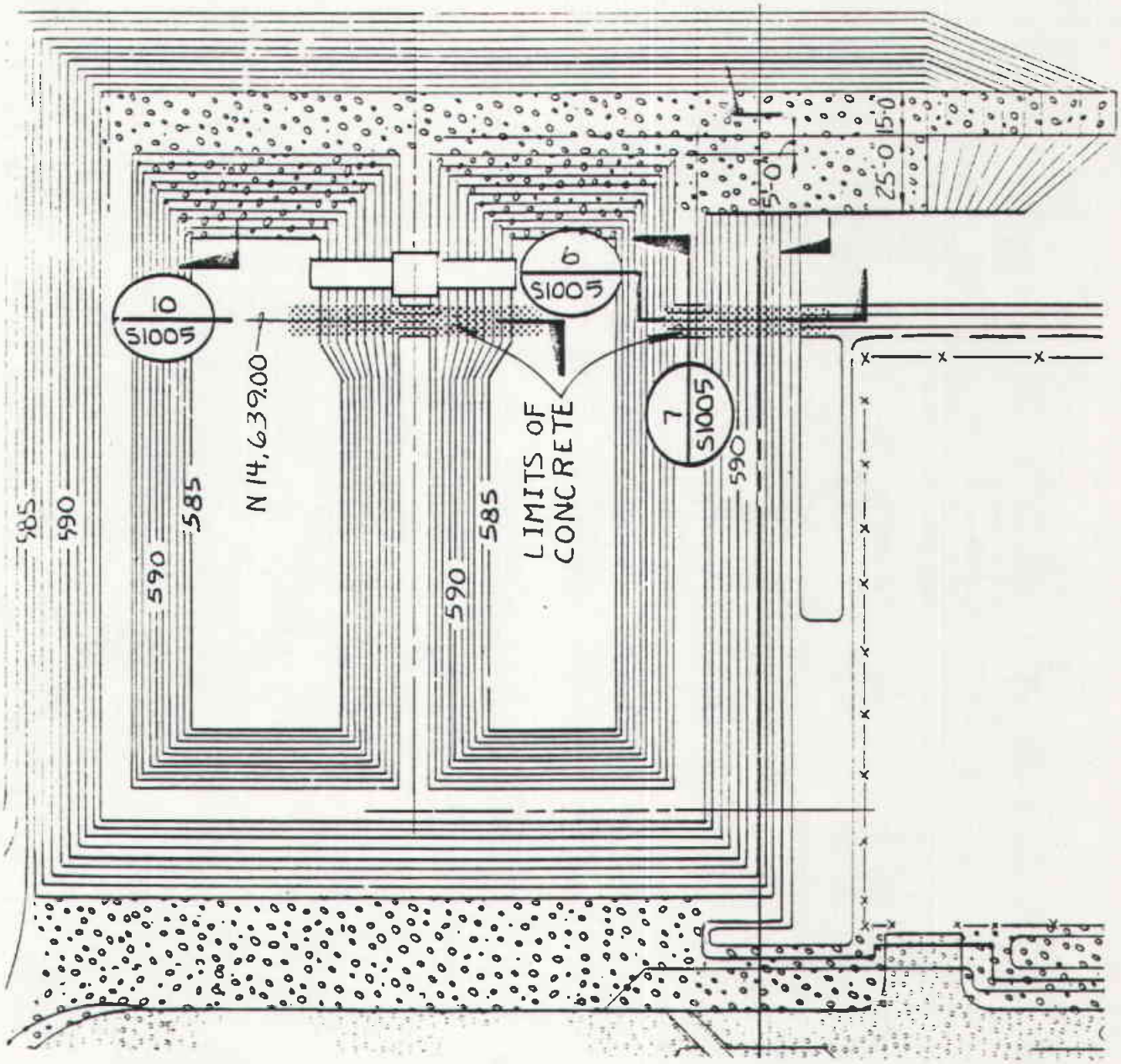
The interior (center) dike is constructed with 2H to 1V side slope on both sides and is 10 feet wide at the top. Exterior dikes on the west, east and north sides are constructed with 2H to 1V interior slopes and 3H to 1V exterior slopes and are 10 feet wide at the top. The interior of the north dike has a slope of 3H to 1V and is covered with 12 inches of riprap or waste rock to protect the clay slope while removing ash from the pond. The top of the north dike is 20 feet wide and an ash loading area 20 feet by 60 feet is located adjacent to the north dike. The loading area includes a truck loading dock for transport of ash off-site. A ramp with 6H to 1V slope is provided at the north dike for access to the top of the dike. The exteriors of the west, north and east dikes are covered with four inches of top soil and seeded for erosion control.

Figure 2-1 shows a general arrangement drawing for the pond and ash loading areas.

2.2 RECLAIM STRUCTURE

Water is reclaimed through the reclaim structure and is piped back to the power plant for reuse. The reclaim structure is located in the center dike near the north end of the ponds and is designed to serve both ponds. A division wall in the center of the reclaim structure restricts water flow between ponds.

The reclaim structure includes a drain pipe extending through the north dike so that drain water from Ash Pond 3A or 3B can be directed to the existing Units 1 and 2 ash storage area. Water is reclaimed from either side of the structure through a 12-inch pipe buried in the center dike that extends back to the power plant.



Note: Taken From B&V Drawing S1004

ASH PONDS

FIGURE 2-1

Ash pond makeup water and fly ash exhauster water is introduced at the reclaim structure. Other waste streams enter the pond on the south end of the center dike. Piping of waste streams to the ponds is equipped with valving that allows the streams to be directed to either pond. Ash sluice water enters the pond on the south end.

2.3 ASH WATER PUMPS AND PIPING

The bottom ash system includes two high-pressure ash water pumps which take suction from the reclaim structure. Each pump is designed for 1,325 gpm at 440 feet. The high-pressure ash water pumps provide the intermittent water requirements of the bottom ash and pulverizer rejects sluicing system. The pumps also provide motive water for the fly ash system vacuum exhauster. The ash sluice and exhauster water is directed to the active ash pond.

The bottom ash system includes two low-pressure pumps designed for 320 gpm at 140 feet which takes suction from the reclaim structure. These pumps provide continuous seal and cooling water for the ash hopper and miscellaneous intermittent low-pressure water services. Overflows from the ash hopper are collected in a tank and pumped to the active ash pond.

The planned operational water level of 590 feet elevation will require that both the high-pressure and low-pressure pumps be primed prior to operation. The pumps will be primed by using the condenser water box priming unit to draw water from the suction piping into the pumps. A guage glass and vacuum priming float valve is installed at the high point of each pump casing. Normally, the condenser waterbox and ash water pumps will be maintained full of water by the vacuum priming unit and operator action is not required to prime the pumps. However, if an excessive amount of air is being pulled from any piece of equipment served, the vacuum priming unit will not be able to hold the prime in the pumps. Therefore, it is important to look at the guage glass to verify that a pump is primed before starting. After the pump is started, it will maintain prime without aid from the vacuum priming unit.

It is necessary to avoid excessive pump runout flows caused by worn sluice nozzles or orifices. Adequate suction pressure exists to run a single high-pressure pump in excess of its rating; however, low-pressure pump flow must not exceed the pump rating. Flow rates should be checked occasionally by monitoring pump differential pressure.

3.0 OPERATING PROCEDURES

The following provides recommended operating procedures for the bottom ash storage and handling system. Actual operating experience with the system will allow the development of more specific procedures. The intent of the following paragraphs is to set forth a suggested operating procedure from which a more specific procedure can be developed by the Boards operating personnel as they gain actual operating experience with the system.

Because of settling associated with the initial pond construction, it is recommended that the bottom ash ponds by initially operated at a nominal water level of 590 feet. With a 594 feet elevation at the top of the new clay dikes and a pond bottom elevation of 585 feet, the ponds will have a maximum depth of 9 feet. Operation at a nominal water level of 590 feet will provide a water depth of five feet. Settlement of the dikes will be monitored during operation. The Board may choose to operate the ponds at a higher water level after settlement has ceased or the rate of settlement has decreased significantly. Maximum suggested nominal water level is 592 feet which will provide a two-foot freeboard.

3.1 INITIAL OPERATION

Pond 3A should be prepared to receive ash by installing three 15-inch stop logs in the reclaim structure and the pond filled to 590 feet. With three stop logs in place, there will be approximately 15 inches of water over the upper stop log when the pond water level is 590 feet.

Stop logs should be installed in the reclaim structure on the inactive pond side and the water level maintained at a relatively low level so that significant storage volume is available for use in the event that it is determined that the scrubber thickener should be emptied to the pond.

3.2 NORMAL OPERATION

Prior to operation of the ash water pumps, it must be verified that the pumps are primed as discussed in Section 2. Bottom ash may then be sluiced to the south end of Ash Pond 3A. The ash pipe will be set so that the ash deposit start near the south dike. Ash will build up along the south dike

and eventually protrude from the pond water surface. The ash pipe should then be extended to the north to allow a reasonably uniform filling of the pond from south to north.

The sluice water will be reclaimed and pumped back to the plant for reuse. It is anticipated that bottom ash will be sluiced once per day during normal unit operation. Based on the load model contained in the PROJECT DESIGN MANUAL and the typical properties of the Indiana Coal actually purchased for Unit 3, the average daily bottom ash production rate will be approximately 230 ft^3/day. Each pond should contain approximately 140 days of average ash production assuming that 70 per cent of the pond water storage volume at 590 feet can be effectively used for ash storage.

Pond filling with ash must be carefully monitored so that the ponds are not filled to the extent that the ash reclaim water has a significant solids content. An inventory of ash in the ponds should be maintained to determine filling rates and estimate time to fill the active pond. Sounding could be made to plot a filling profile for the ponds. After the ponds have been filled several times, the operating staff will have more specific knowledge of pond filling rates and actual useable ash storage volumes for each pond.

3.3 POND CHANGEOVER

When the active ash pond has been filled to the maximum practical extent, the ash discharge and other waste discharges will be directed to the "empty" pond, Pond 3B. The pond will be prepared to receive ash by establishing the nominal 590 feet water level prior to receiving ash. Stop logs will be in place and the pond may receive ash. Filling of Ash Pond 3B will continue as described above for Ash Pond 3A operation.

3.4 INACTIVE POND CLEANING

The filled ash pond, Pond 3A, should remain undisturbed for approximately one week to allow maximum settling of solid. The pond should then be drained in preparation for removal and transport of bottom ash to off-site permanent storage. The pond will be drained to the Units 1 and 2 ash storage area. The discharge permit for the Units 1 and 2 ash storage area has a limitation of not more than 110,000 gallons per day. Discharge to the existing Unit 1

and 2 ash storage area will be by gravity drain from the reclaim structure. Initial drainage from Pond 3A should be to a level equal to the top of the upper stop log. Stop logs should be removed one at a time with complete drainage intervals between removal of subsequent stop logs. After the last stop log is removed, the pond should be allowed to drain for one to two days before ash removal is initiated.

Ash will be removed from the pond with a front-end loader and placed in a truck positioned along side the ash loading area.

The inside slopes of the south dikes for both Ash Ponds 3A and 3B will have a 3H to 1V slope with a protective layer of rock over the clay dike. The front-end loader operation must be carefully controlled so as to not damage the three-foot thick clay lining which seals the bottom of the ash ponds. Protection of the liner should not be a particular problem since it should be obvious if the loader "gets into" the clay. The operator must be constantly aware of the potential damage to the bottom and interior dikes, and should plan to leave sufficient (approximately 6-inches) ash in the pond bottom. A scouring of the interior of the ash pond is not necessary or prudent. The operator must be made aware that his job is to remove bulk quantities of ash while protecting the pond bottom and dikes.

3.5 OPERATING OBSERVATION

The interior of the cleaned pond should be examined for evidence of settling. The water filled active and reserve ash ponds should be examined along the exterior toe of the dikes for evidence of leakage or water seepage from the pond interiors. The dikes should be examined on a daily basis for the first few months of operation and then weekly thereafter. Elevation monuments are provided on the pond dikes at each corner and center of the north-south dikes for measurements to determine settling rates. Observation of the pond dike during the first months of operation will give an early indication of the rate of settlement to be expected. Should significant settlement occur, additional clay can be placed on the dikes.

1. Excavation showing existing discharge piping in the south end of interior pond. Temporary piping visible in the background.

2. Existing discharge piping showing approximately 11.5" of differential settlement.

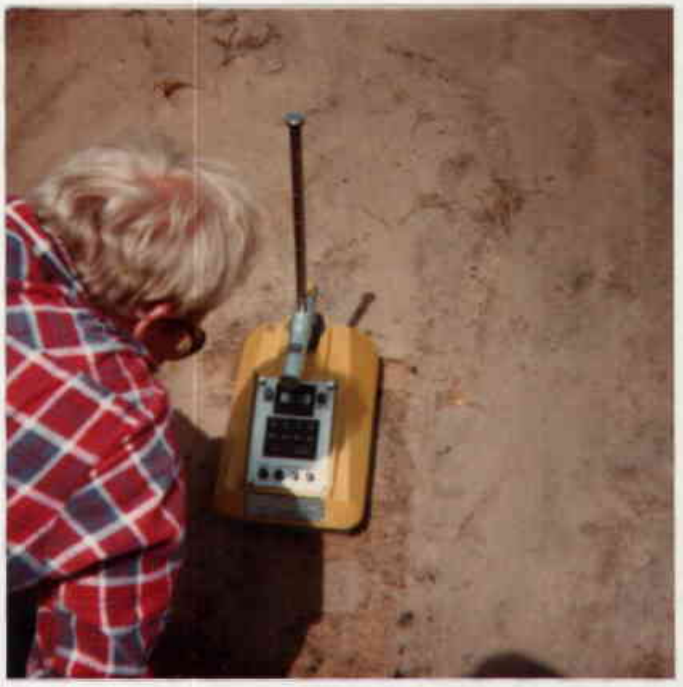
3. Temporary piping leading to Units 1 & 2 ash pond.

4. Initial lifts of clay over east pond bottom.

5. Sheet steel cutoff wall in place at reclaim structure.

6. North side of the ash water reclaim structure with cutoff wall bolted in place.

7. Spreading the initial lift of clay onto the southwest quadrant of the ash ponds.



8. Density test using a nuclear density meter.

9. Hand compaction of sand backfill along the north side of the ash water reclaim structure. Sand backfill providing stable subgrade for clay liner adjacent to the structure.

10. Hand compaction of clay around the ash water reclaim structure.

11. Raising the existing piping in the south end of the ash ponds.

12. Tamping sand under the piping after raising to plan grade.

13. Close proximity of the ground water table to the bottom of the clay lining.

14. Beginning construction of the east dike.

15. Coring through the concrete slab of the ash water reclaim structure for pressure grouting of voids beneath slab.

16. Compacting clay around the reclaim structure.

17. Installing additional bolts through the sheet steel cutoff wall.

18. Fitting the hypalon to the reclaim structure.

19. Placing the butyl strip during the hypalon attachment.

20. Bolting in place the redwood boards.

21. Hand compaction around the reclaim structure. Plywood is used to protect the hypalon during compaction.

22. Cleaning the hypalon prior to solvent welding a corner seam.

23. Cleaning the hypalon prior to seaming.

24. Heat lamps and pads used to supply artificial heat during the hypalon seaming process.

25. Installation of a hypalon hood at the corners of the ash water reclaim structure.

26. Preparing hypalon for seaming of a hood by cleaning the hypalon with trichoretylene.

27. Completed hypalon hood.

23. Pressure grouting under the ash water reclaim structure.

29. Water flowing from a grout tube caused by grout being pumped in at another location.

30. Mud forced through three feet of compacted clay from soft subsoil.

31. Excavation of mud pumping area revealed that it was a localized problem and the area was backfilled.

32. Constructing the east dike. End of May

33. Clay placement along the west dike. End of May

34. Hypalon membrane lapped and ready for burial.

35. 12" Ø ASA-A Abco pipe set in trench through the center dike.

36. Hand compaction of clay around piping at the south end of the ponds.

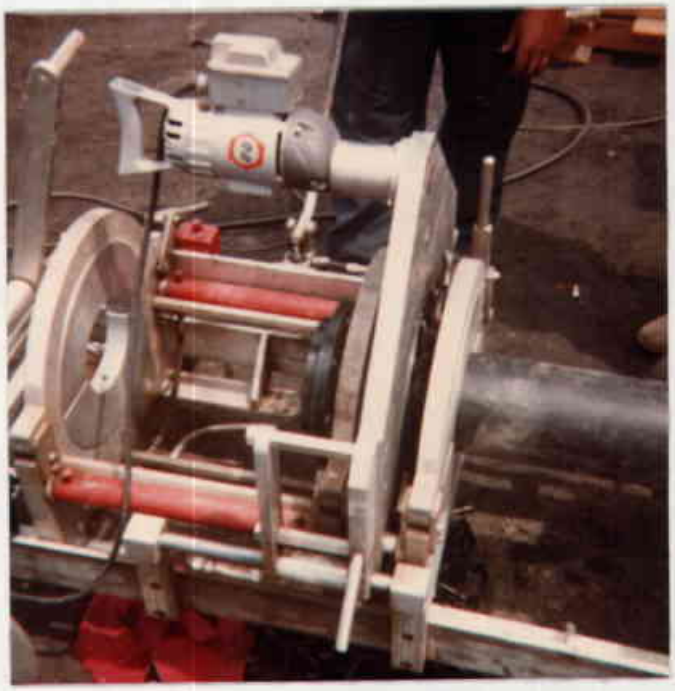
37. Hand compaction of clay along the ASA-A pipe trench.

38. Chipping away the concrete lip on the south side of the ash water reclaim structure to allow free settlement of the 30" Ø culverts surrounding the 12" Ø ASA-A polyethylene piping.

39. Enlarging the openings in the south side of the reclaim structure to allow direct insertion of the 12" Ø polyethylene pipes.

40. West pond construction - Early June

41. East pond construction.
Early June



42. Welding the flanges on the polyethylene piping.

43. Beginning construction of the bin retaining wall.

44. Bin-Wall construction, Mid June.

45. East pond construction progress, Mid June

46. West pond construction progress. Mid June

47. Connection of 12" Ø ABCO pipe into two 12" Ø polyethylene pipes. ASA-A line.

48. Sand backfill being placed around the ABCO piping. Clay backfill was used around the polyethylene piping.

49. Placing the 30" Ø culverts in the pipe trench on the south side of the reclaim structure.

50. 12" Ø polyethylene pipes extending into the reclaim structure.

51. 12" Ø polyethylene piping grouted in place. The holes in the culverts are to be used to pump in bentonite slurry.

52. Culvert ends capped with celotex and plywood to allow free movement of the culvert around 12" Ø polyethylene pipes.

53. Installation of the 6" Ø ASA-B drain line to the north of the ash water reclaim structure.

54. Re-steel set in place for the stop log wall at the west end of the structure.

55. Grooming the inside slope of the east dike.

56. Combining water and bentonite to form a slurry with a specific gravity between 1.03 and 1.05.

57. Pouring bentonite into a temporary hydration pond.

58. A diaphram pump and come-alongs were used to mix bentonite prior to placement.

59. Pumping bentonite slurry into the backfilled culverts.

60. Welding the culvert caps after the bentonite slurry was placed.

61. Excavating the pipe trench for the 10" Ø steel ASA-F piping and the 6" Ø bondstrand ASA-G piping.

62. 6" Ø ASA-G piping being installed

63. 10" Ø steel ASA-F piping through the center dike

64. Heat trace conduit installation at the south end of the center dike.

65. 10" ASA-F and 6" ASA-G piping installation at the ash water reclaim structure.

66. Hand compaction of granular backfill in the bin retaining wall

67. East pond construction progress. Late June

68. West pond construction progress. Late June

69. Shrinkage between the ash water reclaim structure and the clay dike. Cracks were filled with dry bentonite.

70. Bottom ash line installation at the south end of the center dike.

71. Grading for the east dike overflow wier.

72. Completing backfill of the bin retaining wall and trimming off excess filter fabric.

73. Installing timber pipe supports at the south side of the reclaim structure.

74. Piping installation at the south side of the reclaim structure

75. Final grading for the east dike overflow wier.

76. Forming up the center dike overflow wier.

77. Pouring the center dike overflow wier

78. Heat tracing and insulating the piping through the center dike at the location of the overflow wier.

79. Piping insulated and heat traced at the south side of the reclaim structure.

80. East pond construction Mid July

81. West pond construction progress. Mid July

82. Ash truck loading area with road gravel surfacing.

83. 6" ASA-B bond strand drain line exit point. Picture is oriented along the north dike toe.

84. East pond partially filled with water and ready for use.

APPENDIX C
COST REPORT

APPENDIX C

COST REPORT

The following costs were incurred during modification of the ash pond.

Field Resident Engineering

Manday - 57

Expenses - $3,075.05

Field Testing

Firm - Soil and Structures

Cost - $10,354.67

Clay Material

Firm - Dykehouse

Cost - $61,797.50

General Contractor

Firm - Utley-James, Inc.

Total Final Cost - $452,143.36

Note: The following letter summarizes the above cost. All backup materials for the amounts shown for Subcontractors and Utley-James are contained in Change Orders 11, 13 and 14.

cc: D.S. Lindberg - w/o att.
G. Eaton - w/o att.
R. Robbins - w/o att.

Utley-James, Inc.
P.O. Box 1100 ▫ Pontiac, Michigan 48056 ▫ Phone: (313) 566-4070

AUG 17 1983

GRAND HAVEN, MICH.
B&V OF MICHIGAN
PROJECT 7728
File: 71.0200.01

P. J. Adam
F. C. Wallace
E. Rain
D. P. Castor
R. G. Chapman
A. L. Compean
K. F. Eberle
R. D. Hubbell
M. J. Huggins
D. M. Lefebvre
M. L. Noel
C. J. Ulery
R. H. Wright
R. HUBBELL w/enc.

August 15, 1983

Black & Veatch
1500 Meadow Lake Parkway
Kansas City, MO. 64114

Attn: Roger Mawby

RE: J.B. SIMS - UNIT 3
GRAND HAVEN, MI
SPECIFICATION #7728.71.0200
ASH POND REPAIR WORK
OUR F.O. #43

Gentlemen:

We hereby submit our final cost summary of the Ash Pond Repair Work on the above subject job.

Subcontractor	Final Cost Total
Elzinga & Volkers	$ 327,863.74
Hertel Plumbing & Heating	91,125.37
Harlo Corporation	6,130.86
Jackson Power	448.00
Sub-Total	425,567.97
General Contractor 5% Mark-Up	21,278.39
Work by General Contractor's Forces (Including Mark-Up)	5,297.65
Total Final Cost	$ 452,143.36

All back up for the above time and material work is attached for your review. Please forward a contract change order to cover the additional repair cost not covered by previous change orders #11 and #13.

If you have any questions or comments, please advise.

Very truly yours,

UTLEY-JAMES, INC.

Mike Kettlewell

Mike Kettlewell
Project Engineer

MK/jfg

Attachment

APPENDIX D

Document 12

Comments Received from the EPA subsequent to Draft Report

On January 13, 2013, Mr. Paul Cederquist of Grand Haven Board of Light & Power alerted EPA that they are currently obtaining quotes to do a complete stability analyses study on each of the ash ponds assessed.