



October 2016

Dynegy Midwest Generation, LLC
15260 North State Route 78
Havana, IL 62644

**RE: History of Construction
USEPA Final CCR Rule, 40 CFR § 257.73(c)
Havana Power Station
Havana, Illinois**

On behalf of Dynegy Midwest Generation, LLC, AECOM has prepared the following history of construction for the East Ash Pond at the Havana Power Station in accordance with 40 CFR § 257.73(c).

BACKGROUND

40 CFR § 257.73(c)(1) requires the owner or operator of an existing coal combustion residual (CCR) surface impoundment that either (1) has a height of five feet or more and a storage volume of 20 acre-feet or more, or (2) has a height of 20 feet or more to compile a history of construction by October 17, 2016 that contains, to the extent feasible, the information specified in 40 CFR § 257.73(c)(1)(i)–(xii).

The history of construction presented herein was compiled based on existing documentation, to the extent that it is reasonably and readily available (see 80 Fed. Reg. 21302, 21380 [April 17, 2015]), and AECOM's site experience. AECOM's document review included record drawings, geotechnical investigations, operations and maintenance plan, etc. for the East Ash Pond at the Havana Power Station.

HISTORY OF CONSTRUCTION

§ 257.73(c)(1)(i): The name and address of the person(s) owning or operating the CCR unit; the name associated with the CCR unit; and the identification number of the CCR unit if one has been assigned by the state.

Owner: Dynegy Midwest Generation, LLC

Address: 1500 Eastport Plaza Drive
Collinsville, IL 62234

CCR Unit: East Ash Pond (Cells 1 to 4), IDNR Dam ID No. IL50420, IL50483

§ 257.73(c)(1)(ii): The location of the CCR unit identified on the most recent USGS 7¹/₂ or 15 minute topographic quadrangle map or a topographic map of equivalent scale if a USGS map is not available.

The location of the East Ash Pond (Cells 1 to 4) has been identified on an USGS 7-1/2 minute topographic quadrangle map in **Appendix A**.

§ 257.73(c)(1)(iii): A statement of the purpose for which the CCR unit is being used.

The East Ash Pond is being used to store and dispose of bottom ash, fly ash, and spray dryer absorber (SDA) waste and to clarify non CCR process water prior to discharge in accordance with the station's NPDES permit (Permit No. IL0001571).

§ 257.73(c)(1)(iv): The name and size in acres of the watershed where the CCR unit is located.

The East Ash Pond is located in the Matanzas Lake Watershed with a 12-digit Hydrologic Unit Code (HUC) of 071300031002 and a drainage area of 22,398 acres (USGS, 2016).

§ 257.73(c)(1)(v): A description of the physical and engineering properties of the foundation and abutment materials on which the CCR unit is constructed.

The foundation materials consist of native alluvial materials. The physical properties of the native alluvial materials are described as poorly graded sand and sand with silt with a relative density of very loose to medium dense. An available summary of the engineering properties of the foundation materials is presented in **Table 1** below. The engineering properties are based on previous geotechnical explorations and laboratory testing.

Table 1. Summary of Foundation Material Engineering Properties

Material	Unit Weight (pcf)	Effective (drained) Shear Strength Parameters	
		c' (psf)	Φ' (°)
Native Alluvial Foundation	115	0	30

The East Ash Pond is an enclosed impoundment with embankments and does not have abutments.

§ 257.73(c)(1)(vi): A statement of the type, size, range, and physical and engineering properties of the materials used in constructing each zone or stage of the CCR unit; the method of site preparation and construction of each zone of the CCR unit; and the approximate dates of construction of each successive stage of construction of the CCR unit.

Physical properties for the embankment construction materials are described as poorly graded sand, poorly graded sand with silt, and silty sand with a relative density of medium dense to very dense. An available summary of the engineering properties of the construction materials is presented in **Table 2** below. The engineering properties are based on previous geotechnical explorations and laboratory testing.

Table 2. Summary of Embankment Construction Material Engineering Properties

Material	Unit Weight (pcf)	Effective (drained) Shear Strength Parameters	
		c' (psf)	Φ' (°)
High Strength Embankment Fill	120	0	40
Low Strength Embankment Fill	120	0	30
Clay Liner	115	50	29

The East Ash Pond consists of four joined cells (Cells 1 to 4) constructed in three phases. The East Ash Pond Cells 1 and 4 are lined with a 3-foot thick compacted clay layer. A typical cross section profile of the East Ash Pond Cells 1 and 4 liner system is shown on drawing CE-HAV1-C17 presented in **Appendix B**. The East Ash Pond Cell 2 is lined with a 45-mil polypropylene liner underlain by a 1-foot thick compacted clay layer. A typical cross section profile of the East Ash Pond Cell 2 liner system is shown on drawing E-HAV1-C113 presented in **Appendix B**. As designed, the East Ash Pond Cell 3 is lined with a 45-mil polypropylene liner underlain by an 8-ounce nonwoven geotextile underlain by a 1-foot thick compacted clay layer. A typical cross section profile of the East Ash Pond Cell 3 liner system is shown on drawing E-HAV1-C167 presented in **Appendix B**. A description of the physical properties for the clay liner construction materials is not reasonably and readily available. An available summary of the assumed engineering properties of the clay liner construction

materials is presented in **Table 2** above. The engineering properties are based on previous geotechnical explorations and laboratory testing.

Site preparation and construction of the East Ash Pond were completed in accordance with the applicable construction specification (see §257.73(c)(1)(xi) below).

The approximate dates of construction of each successive stage of construction of the East Ash Pond are provided in **Table 3** below.

Table 3. Approximate dates of construction of each successive stage of construction.

Date	Event
1992-1993	Construction of East Ash Pond Cell 1 and Cell 4
1998	Construction of East Ash Pond Cell 2 and addition of overflow spillway to Cell 4
2003	Construction of East Ash Pond Cell 3

§ 257.73(c)(1)(vii): At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection, in addition to the normal operating pool surface elevation and the maximum pool surface elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment, and any identifiable natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation.

Drawings that contain items pertaining to the requested information for the East Ash Pond (Cells 1 to 4) are listed in **Table 4** below. Items marked as "Not Available" are items not found during a review of the reasonably and readily available documentation.

Table 4. List of drawings containing items pertaining to the information requested in § 257.73(c)(1)(vii).

	Cell 1	Cell 2	Cell 3	Cell 4
Dimensional plan view (all zones)	CE-HAV1-C1	E-HAV1-C110	E-HAV1-C164, E-HAV1-C166	CE-HAV1-C1
Dimensional cross sections	CE-HAV1-C17, CE-HAV1-C2 to C12	E-HAV1-C113, E-HAV1-C119 to C122	E-HAV1-C167	CE-HAV1-C17
Foundation Improvements	CE-HAV1-C17	E-HAV1-C113	E-HAV1-C167	CE-HAV1-C17
Drainage Provisions	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Spillways and Outlets	CE-HAV1-C41	E-HAV1-C114, E-HAV1-C115	E-HAV1-C169-1 to 4	E-HAV1-C114, E-HAV1-C115
Diversion Ditches	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Instrument Locations	Not Applicable	E-HAV1-C113	E-HAV1-C167	Not Applicable
Slope Protection	CE-HAV1-C17	E-HAV1-C113	E-HAV1-C167	CE-HAV1-C17
Normal Operating Pool Elevation	CE-HAV1-C17	E-HAV1-C113	E-HAV1-C167	CE-HAV1-C17
Maximum Pool Elevation	CE-HAV1-C17	Not Available	Not Available	CE-HAV1-C17
Approximate Maximum Depth of CCR in 2016	25 feet	39 feet	37 feet	4 feet

All drawings referenced in **Table 4** above can be found in **Appendix B**.

Based on the review of the drawings listed above, no natural or manmade features that could adversely affect operation of the East Ash Pond (Cells 1 to 4) due to malfunction or misoperation were identified.

§ 257.73(c)(1)(viii): A description of the type, purpose, and location of existing instrumentation.

Existing instrumentation at the East Ash Pond consists of two (2) staff gauges. One staff gauge is located in Cell 2 and the other is located in Cell 3. The purpose of the staff gauges is to measure the water level within the impoundment. A location map of the existing instrumentation is presented in **Appendix B**.

§ 257.73(c)(1)(ix): Area-capacity curves for the CCR unit.

The area-capacity curves for the East Ash Pond (Cells 1 to 4) are presented in **Figures 1** through **4** below. “Area-capacity curves”, as defined by 40 CFR § 257.53, “means graphic curves which readily show the reservoir water surface area, in acres, at different elevations from the bottom of the reservoir to the maximum water surface, and the capacity or volume, in acre-feet, of the water contained in the reservoir at various elevations.”

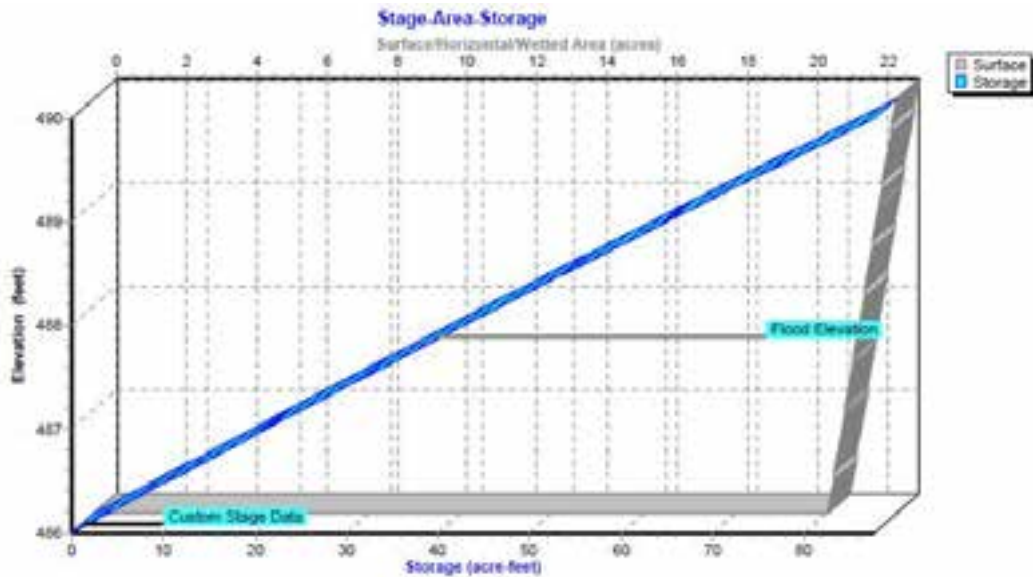


Figure 1. Area-capacity curve for East Ash Pond Cell 1

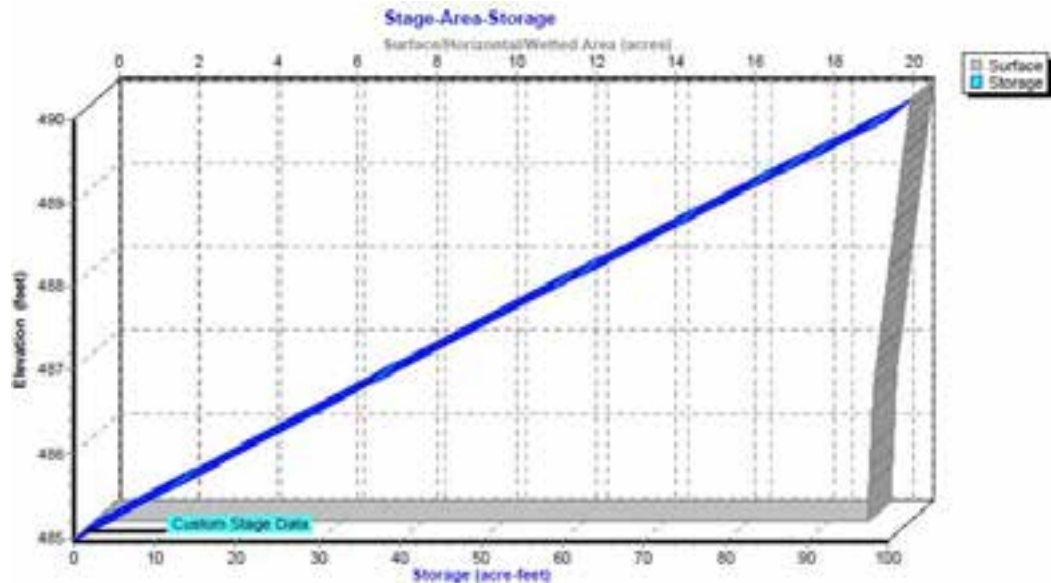


Figure 2. Area-capacity curve for East Ash Pond Cell 2

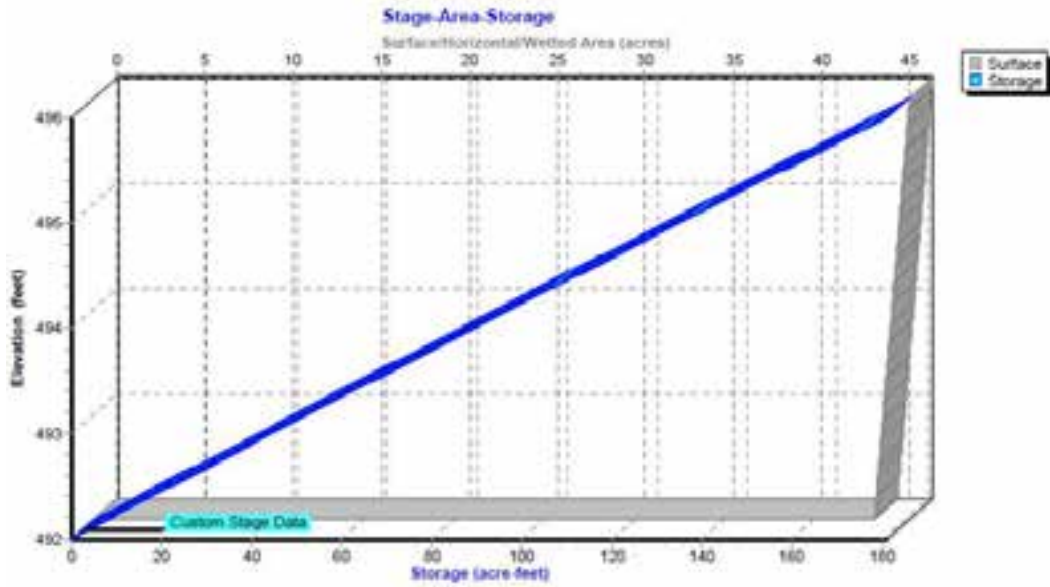


Figure 3. Area-capacity curve for East Ash Pond Cell 3

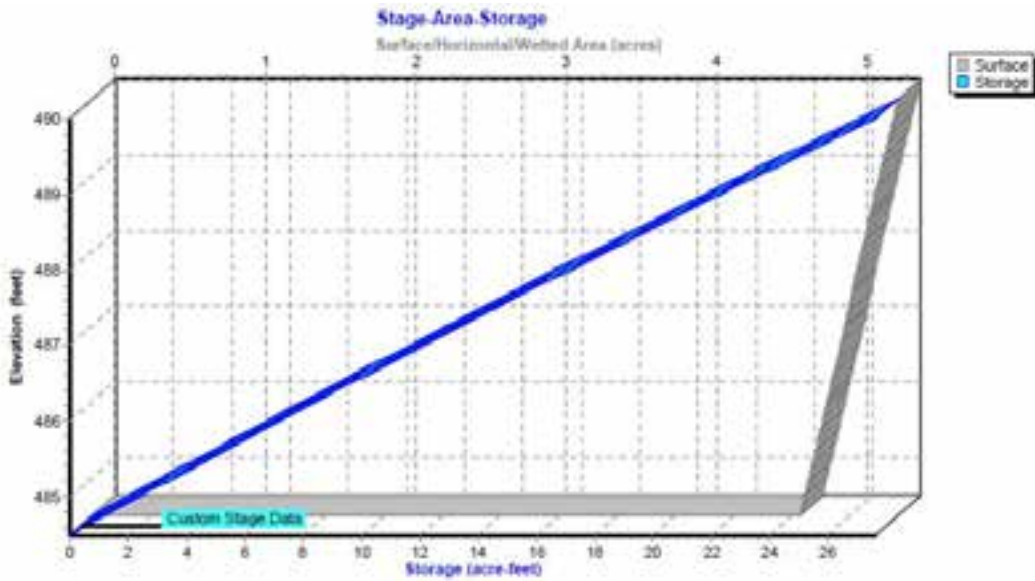


Figure 4. Area-capacity curve for East Ash Pond Cell 4

The area-capacity curves shown were taken from the pond modeling analysis. Actual pond capacity is limited to the approximate berm elevation listed in **Table 5**. Any information above berm elevation should be disregarded.

§ 257.73(c)(1)(x): A description of each spillway and diversion design features and capacities and calculations used in their determination.

The East Ash Pond Cell 1 contains a 30-inch diameter (dia.) corrugated metal pipe (CMP) drop inlet spillway and two (2) 12-inch dia. ductile iron pipe (DIP) culverts. All three outlets are connected to the East Ash Pond Cell 4. In 2016, the discharge capacity of East Ash Pond Cell 1 was evaluated using HydroCAD 8.50 software modeling a Probable Maximum Precipitation (PMP) storm event with a SCS Type II rainfall distribution. The results of the HydroCAD 8.50 analysis are presented below in **Table 5**.

The East Ash Pond Cell 2 contains a 36-inch dia. DIP drop inlet spillway that is connected to the East Ash Pond Cell 4. The East Ash Pond Cell 2 also contains a 20-foot wide overflow emergency spillway that drains into the East Ash Pond Cell 4. In 2016, the discharge capacity of East Ash Pond Cell 2 was evaluated using HydroCAD 8.50 software modeling a PMP storm event with a SCS Type II rainfall distribution. The results of the HydroCAD 8.50 analysis are presented below in **Table 5**.

The East Ash Pond Cell 3 contains a 36-inch dia. DIP drop inlet spillway that is connected to the East Ash Pond Cell 4. The East Ash Pond Cell 3 also contains a 20-foot wide overflow concrete emergency spillway that drains into the East Ash Pond Cell 4. In 2016, the discharge capacity of East Ash Pond Cell 3 was evaluated using HydroCAD 8.50 software modeling a PMP storm event with a SCS Type II rainfall distribution. The results of the HydroCAD 8.50 analysis are presented below in **Table 5**.

The East Ash Pond Cell 4 contains a stop log discharge structure with 6-foot-wide pre-cast concrete stop logs. The structure drains into a 36-inch dia. reinforced concrete pipe (RCCP) that carries water to the Illinois River. The East Ash Pond Cell 4 also contains a 20-foot wide overflow concrete emergency spillway that drains on the downstream face of Cell 4. In 2016, the discharge capacity of East Ash Pond Cell 4 was evaluated using HydroCAD 8.50 software modeling a PMP storm event with a SCS Type II rainfall distribution. The results of the HydroCAD 8.50 analysis are presented below in **Table 5**.

Table 5. Results of HydroCAD 8.50 analyses

	Cell 1	Cell 2	Cell 3	Cell 4
Approximate Minimum Berm Elevation ¹ (ft)	488.0	488.0	494.0	488.0
Approximate Emergency Spillway Elevation ¹ (ft)	N/A	488.0	493.0	487.0
Starting Pool Elevation ¹ (ft)	486.0	485.0	492.0	484.5
Peak Elevation ¹ (ft)	487.1	486.8	492.9	486.7
Time to Peak (hr)	13.3	15.3	11.1	14.1
Surface Area (ac)	21.5	19.6	44.7	5.0
Storage ² (ac-ft)	24.1	36.2	37.8	10.8

Note: 1. Elevations are based on NAVD88 datum
 2. Storage given is from Starting Pool Elevation to Peak Elevation.

§ 257.73(c)(1)(xi): The construction specifications and provisions for surveillance, maintenance, and repair of the CCR unit.

The construction specifications for the East Ash Pond Cells 1 and 4 are located in *Specifications for a New Ash Disposal Facility; East-Pond 1 Havana Power Plant*. The construction specifications for the East Ash Pond Cell 2 are located in *Specifications for East Ash Pond Cell #2 Phase 2 Havana Power Station*. The construction specifications for the East Ash Pond Cell 3 are located in *Specifications for East Ash Pond Cell #3 Havana Power Station*. The above mentioned construction specifications are presented in **Appendix C**.

The provisions for surveillance, maintenance, and repair of the East Ash Pond are located in *Havana Power Station East Ash Pond System Class 1 Dam Operations and Maintenance Plan* presented in **Appendix D**.

The operations and maintenance plan for the East Ash Pond is currently being revised by Dynegy Midwest Generation, LLC.

§ 257.73(c)(1)(xii): Any record or knowledge of structural instability of the CCR unit.

There is no record or knowledge of structural instability of the East Ash Pond at the Havana Power Station.

LIMITATIONS

The signature of AECOM's authorized representative on this document represents that to the best of AECOM's knowledge, information and belief in the exercise of its professional judgment, it is AECOM's professional opinion that the aforementioned information is accurate as of the date of such signature. Any recommendation, opinion or decisions by AECOM are made on the basis of AECOM's experience, qualifications and professional judgment and are not to be construed as warranties or guaranties. In addition, opinions relating to environmental, geologic, and geotechnical conditions or other estimates are based on available data and that actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

Sincerely,



Claudia Prado
Project Manager



Victor Modeer, P.E., D.GE
Senior Project Manager

REFERENCES

United States Environmental Protection Agency (USEPA). (2015). *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule*. 40 CFR Parts 257 and 261, 80 Fed. Reg. 21302, 21380 April 17, 2015.

United States Geological Survey (USGS). (2016). The National Map Viewer. <http://viewer.nationalmap.gov/viewer/>. USGS data first accessed in March of 2016.

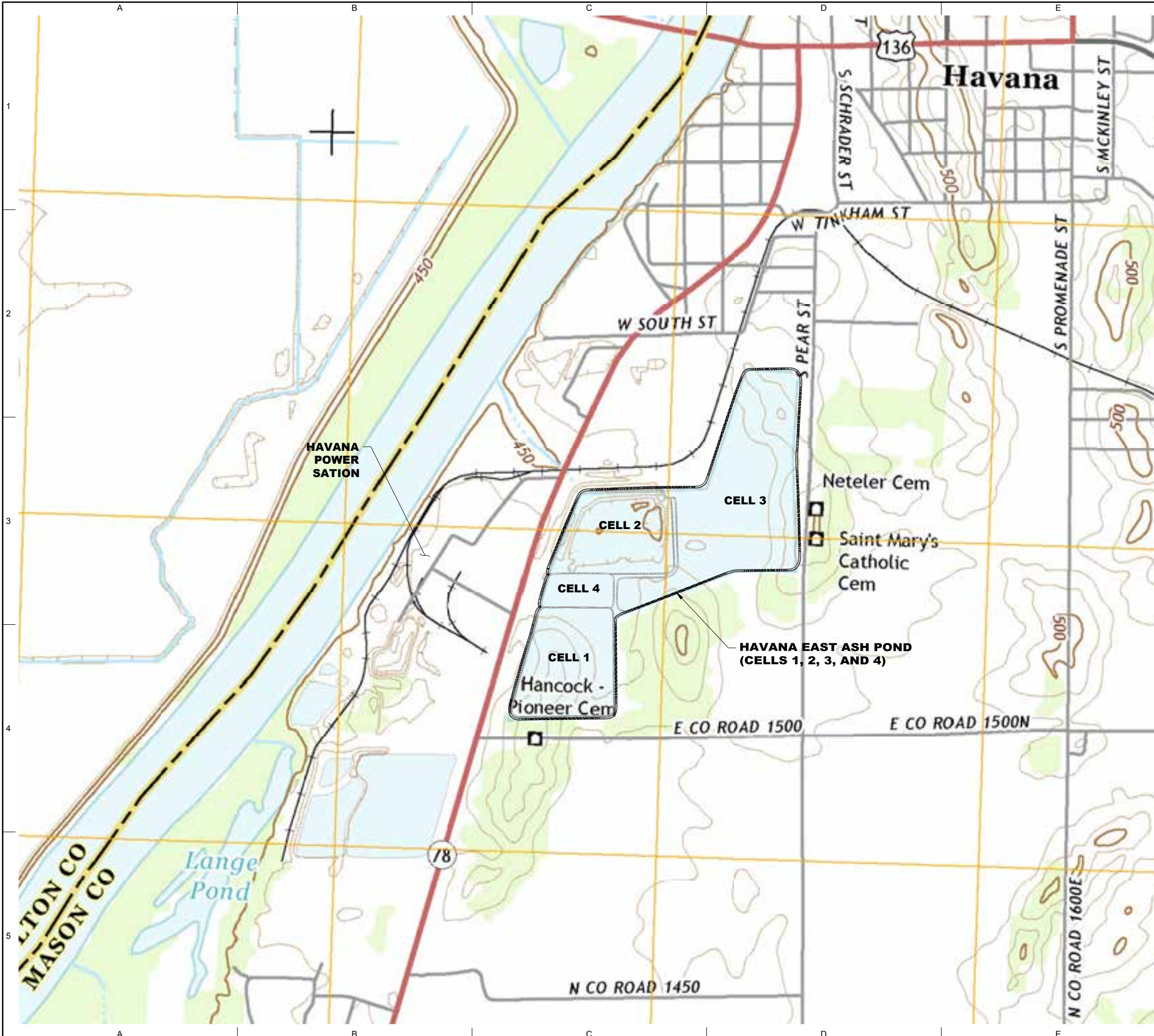
APPENDICES

- Appendix A: History of Construction Vicinity Map
- Appendix B: Havana Power Station Drawings
- Appendix C: Havana East Ash Pond Construction Specifications
- Appendix D: Havana Power Station East Ash Pond System Class 1 Dam Operations and Maintenance Plan



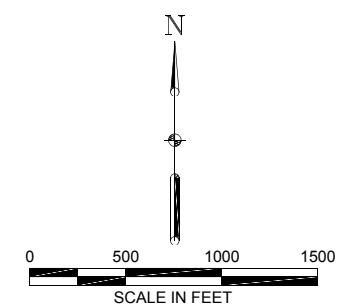
Appendix A: History of Construction Vicinity Map

AECOM DRAWING PATH: P:\Projects\Geotech\60428794_DynegyCCR\13_Construction\History\04_Technical Production\1_Havana\References\Vicinity_Location_Map_References\Figures\C-01_History_of_Construction_Vicinity_Map_(Havana)_2.dwg



LEGEND
 CCR UNITS

SOURCE:
 MAP PROVIDED FROM ELECTRONIC
 USGS DIGITAL RASTER GRAPHIC 7.5
 MINUTE TOPOGRAPHIC MAP OF
 HAVANA, ILLINOIS, REVISED 2015.



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Dynegy Midwest Generation,
 LLC
 15260 North State Route 78
 Havana, IL 62644

**HISTORY OF
 CONSTRUCTION**
 HAVANA POWER STATION
 HAVANA, ILLINOIS

ISSUED FOR BIDDING _____ DATE BY _____

ISSUED FOR CONSTRUCTION _____ DATE BY _____

REVISIONS		
NO.	DESCRIPTION	DATE
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DRAWN BY:	DJD
DESIGNED BY:	DJD
CHECKED BY:	MN
DATE CREATED:	2016-04-13
PLOT DATE:	
SCALE:	1" = 500'
ACAD VER:	2014

SHEET TITLE
 HISTORY OF
 CONSTRUCTION
 VICINITY MAP

Appendix B: Havana Power Station Drawings

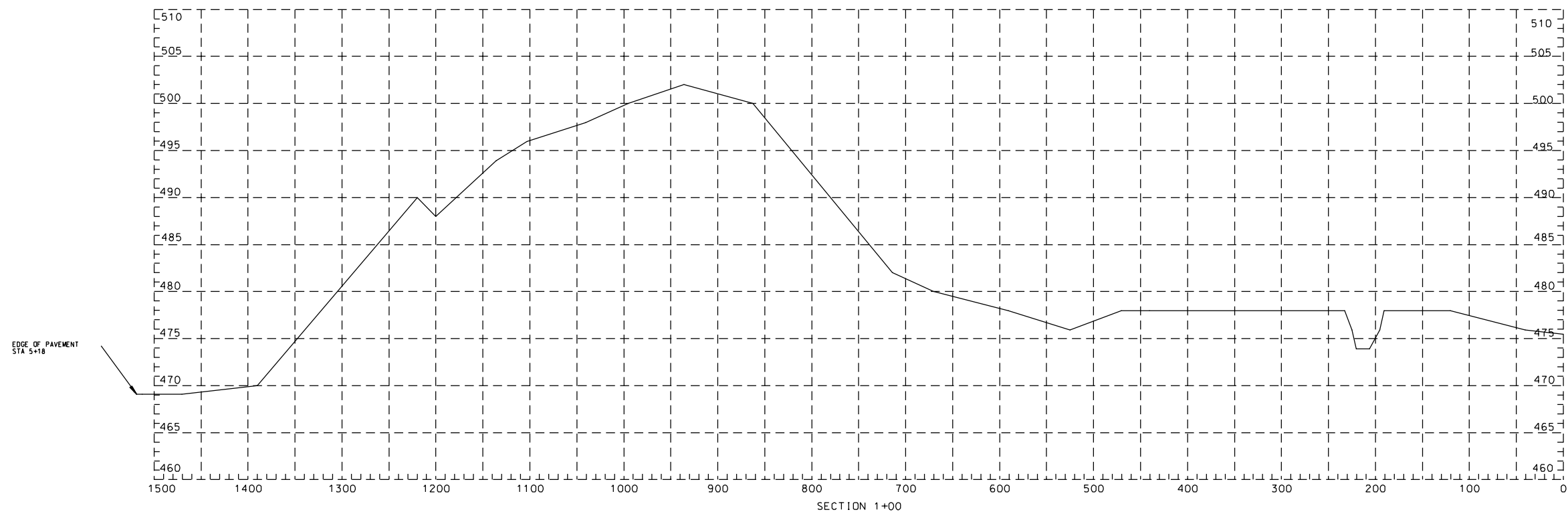
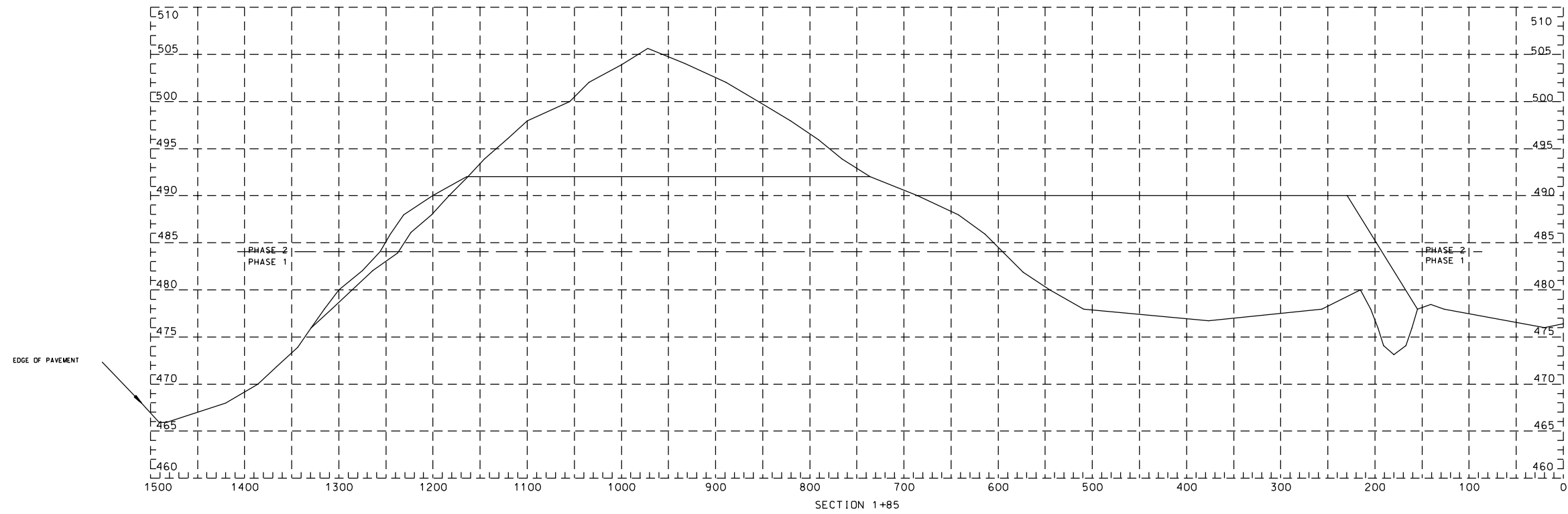
1. Drawing No. CE-HAV1-C1, Illinois Power Company.
2. "Cross Sections 1+00, 1+85, East Ash Pond 1", Drawing No. CE-HAV1-C2, Revision A, 22 December, 1993, Illinois Power Company.
3. "Cross Sections 2+00, 2+72, East Ash Pond 1", Drawing No. CE-HAV1-C3, Revision A, 22 December, 1993, Illinois Power Company.
4. "Cross Sections 3+88, 4+60, East Ash Pond 1", Drawing No. CE-HAV1-C4, Revision A, 22 December, 1993, Illinois Power Company.
5. "Cross Sections 5+21, 6+17, East Ash Pond 1", Drawing No. CE-HAV1-C5, Revision A, 22 December, 1993, Illinois Power Company.
6. "Cross Sections 6+88, 8+58, East Ash Pond 1", Drawing No. CE-HAV1-C6, Revision A, 22 December, 1993, Illinois Power Company.
7. "Cross Sections 9+30, 10+00, East Ash Pond 1", Drawing No. CE-HAV1-C7, Revision A, 22 December, 1993, Illinois Power Company.
8. "Cross Sections 10+88, 12+08, East Ash Pond 1", Drawing No. CE-HAV1-C8, Revision A, 22 December, 1993, Illinois Power Company.
9. "Cross Sections 12+83, 12+98, East Ash Pond 1", Drawing No. CE-HAV1-C9, Revision A, 22 December, 1993, Illinois Power Company.
10. "Cross Sections 13+70, 15+52, East Ash Pond 1", Drawing No. CE-HAV1-C10, Revision A, 22 December, 1993, Illinois Power Company.
11. "Cross Sections 16+24, 16+39, East Ash Pond 1", Drawing No. CE-HAV1-C11, Revision A, 22 December, 1993, Illinois Power Company.
12. "Cross Sections 17+58, East Ash Pond 1", Drawing No. CE-HAV1-C12, Revision A, 22 December, 1993, Illinois Power Company.
13. "Final Pond, Pond Discharge Structure", Drawing No. CE-HAV1-C14, Revision B, 22 December, 1993, Illinois Power Company.
14. "Typical Section, New Ash Pond Dike", Drawing No. CE-HAV1-C17, Revision 0, 13 January, 1994, Illinois Power Company.
15. "Steel Details and Erection Diagram, Pond 2 Inlet Structure and Pond 1 Outlet Structure", Drawing No. CE-HAV1-C41, Revision 1, 23 January, 1997, Illinois Power Company.
16. "Site Plan, East Ash Pond Cell 2", Drawing No. E-HAV1-C110, Revision 3, 14 May, 2002, Dynegy Midwest Generation, Inc.
17. "Typical Cross Section and Details, East Ash Pond Cell 2", Drawing No. E-HAV1-C113, Revision 1, 27 May, 1999, Illinois Power Company.
18. "Plan View and Section Thru, East Ash Pond 2 Outlet Pipe", Drawing No. E-HAV1-C114, Revision 1, 27 May, 1999, Illinois Power Company.
19. "Details for Auxiliary Spillways, East Ash Pond Cell 2", Drawing No. E-HAV1-C115, Revision 1, 10 May, 1999, Illinois Power Company.
20. "Cross Sections, Sta. 104+00 to Sta. 105+00", Drawing No. E-HAV1-C119, Revision 4, 14 May, 2002, Dynegy Midwest Generation, Inc.
21. "Cross Sections, Sta. 106+00 to Sta. 108+00", Drawing No. E-HAV1-C120, Revision 4, 14 May, 2002, Dynegy Midwest Generation, Inc.

Appendix B: Havana Power Station Drawings (continued)

22. "Cross Sections, Sta. 109+00 to Sta. 110+69", Drawing No. E-HAV1-C121, Revision 4, 14 May, 2002, Dynegy Midwest Generation, Inc.
23. "Cross Sections, Sta. 111+00 to Sta. 112+05.42", Drawing No. E-HAV1-C122, Revision 4, 14 May, 2002, Dynegy Midwest Generation, Inc.
24. "Overall Site Plan, East Ash Pond Cell 3", Drawing No. E-HAV1-C164, 12 October, 2001, Illinois Power Company.
25. "Site Plan, East Ash Pond Cell 3", Drawing No. E-HAV1-C166, 26 December, 2001, Illinois Power Company.
26. "Typical Cross Section and Details, East Ash Pond Cell 3", Drawing No. E-HAV1-C167, 28 December, 2001, Illinois Power Company.
27. "Cell #3 Discharge Structure & Pipe, Sheet 1 of 3", Drawing No. E-HAV1-C169-1, 14 July, 2003, Illinois Power Company.
28. "Cell #3 Discharge Structure & Pipe, Sheet 2 of 3", Drawing No. E-HAV1-C169-2, 14 July, 2003, Illinois Power Company.
29. "Cell #3 Discharge Structure & Pipe, Sheet 3 of 3", Drawing No. E-HAV1-C169-3, 14 July, 2003, Illinois Power Company.
30. "Cell #3 Spillway Profile with Sections Thru Spillway", Drawing No. E-HAV1-C169-4, 14 July, 2003, Illinois Power Company.



CE-HAV1-C1



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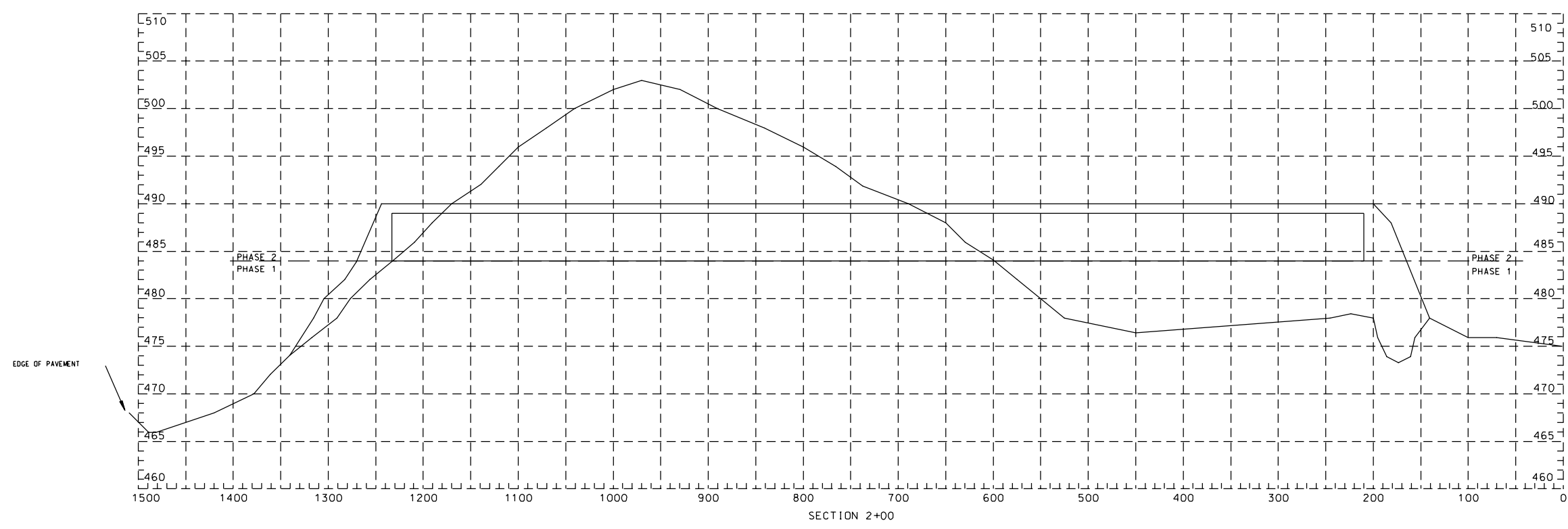
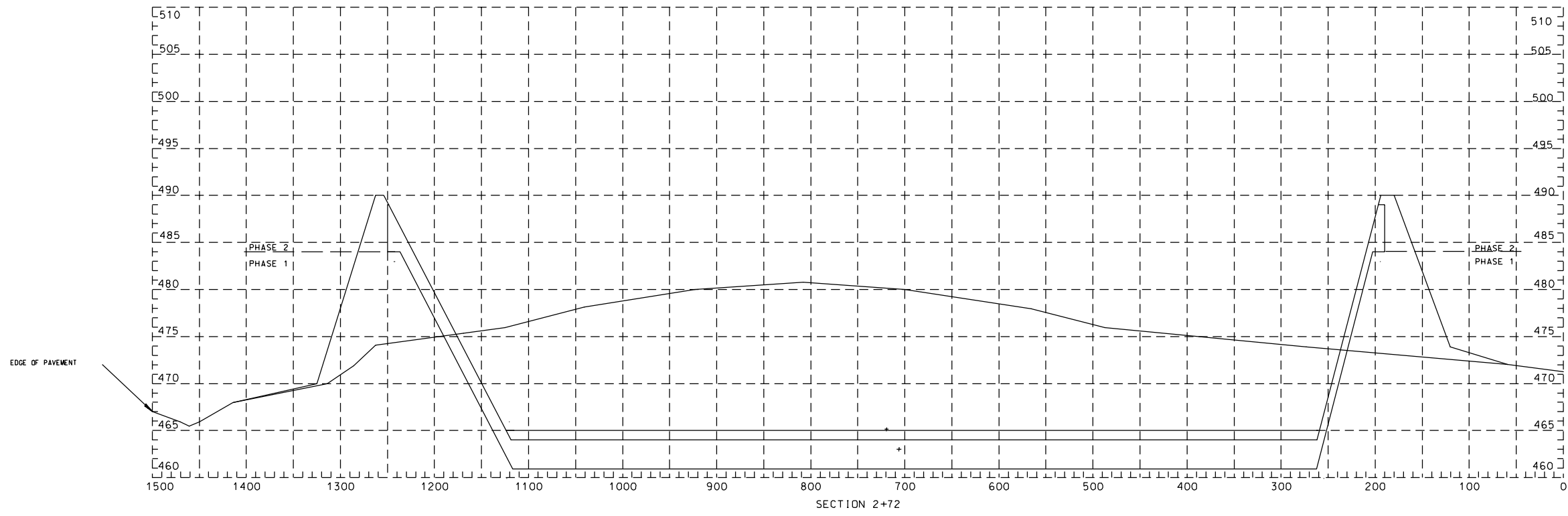
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DR WJM	CAD WJM	DATE 12-6-89
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APP	12-22-93	

M. SK25408-4.1

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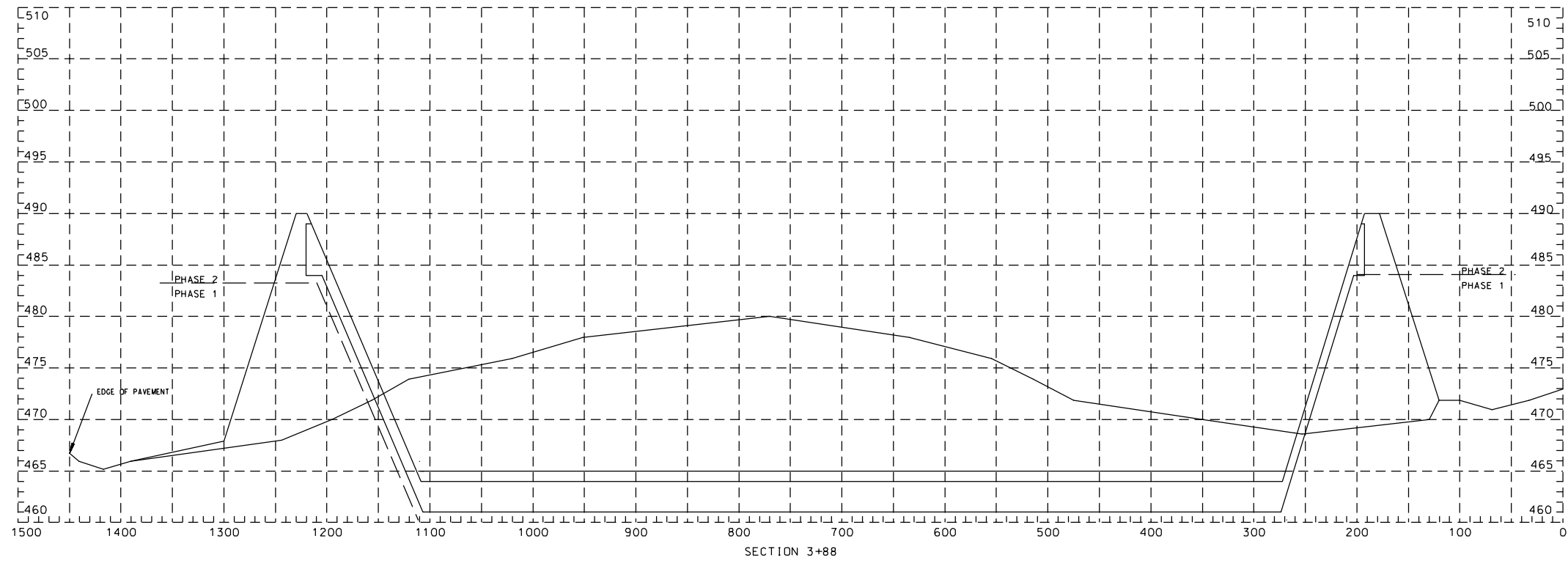
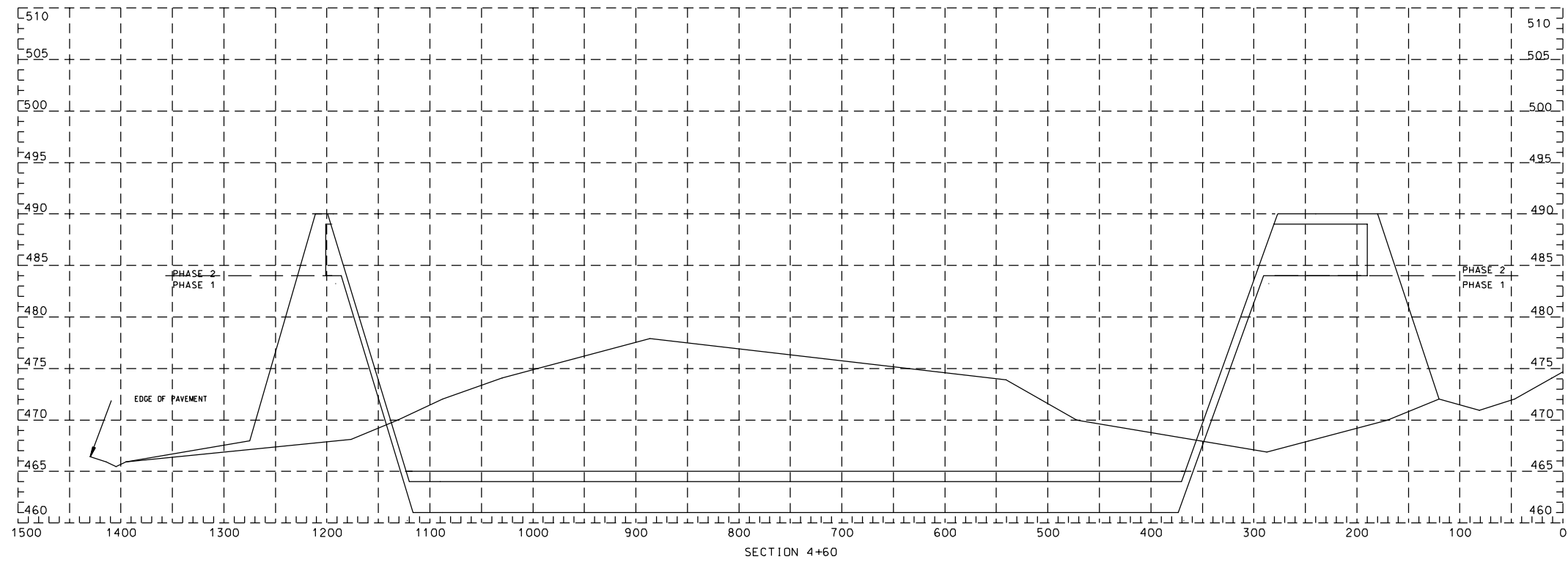
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ILLINOIS POWER COMPANY
DECATUR

CROSS SECTIONS 2+00, 2+72
EAST ASH POND 1
HAVANA POWER STATION

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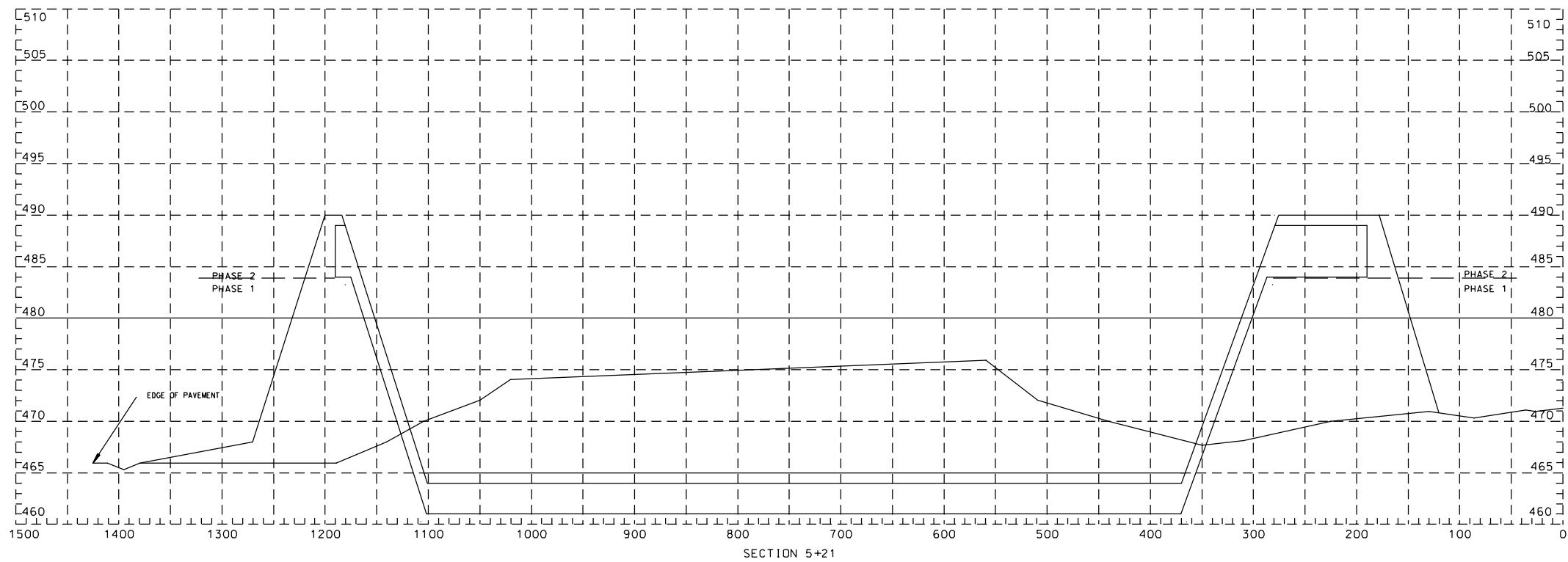
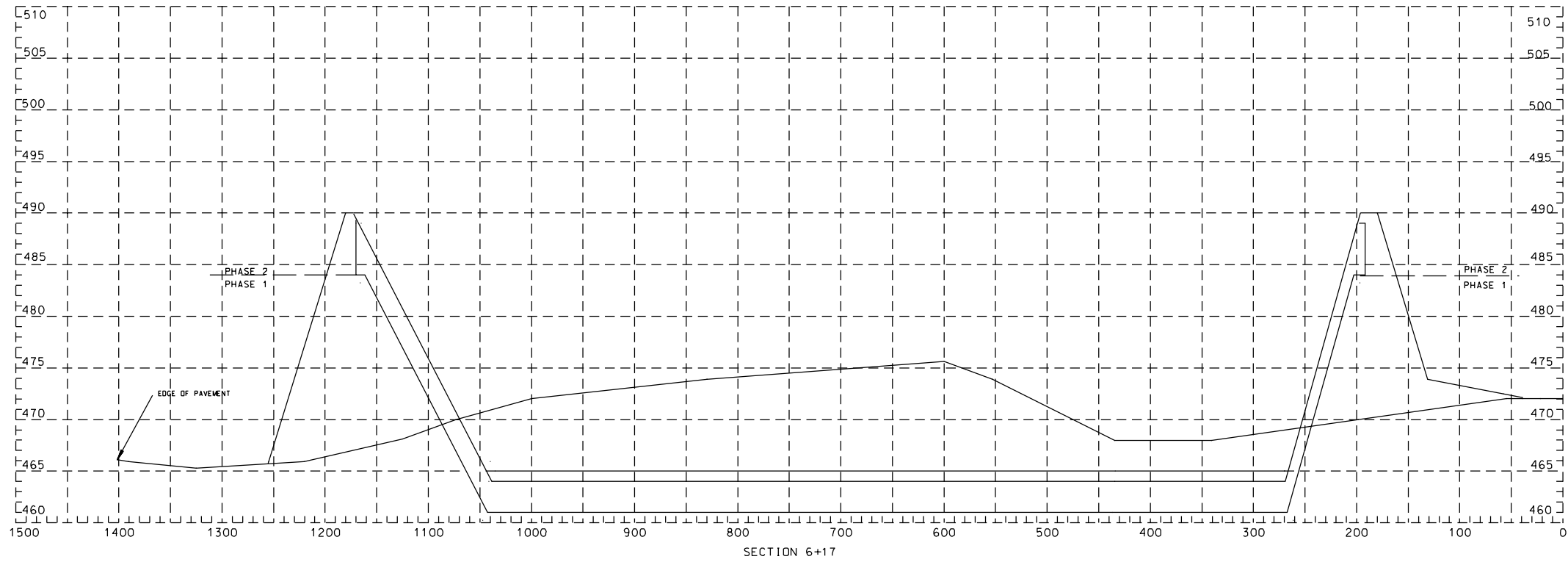
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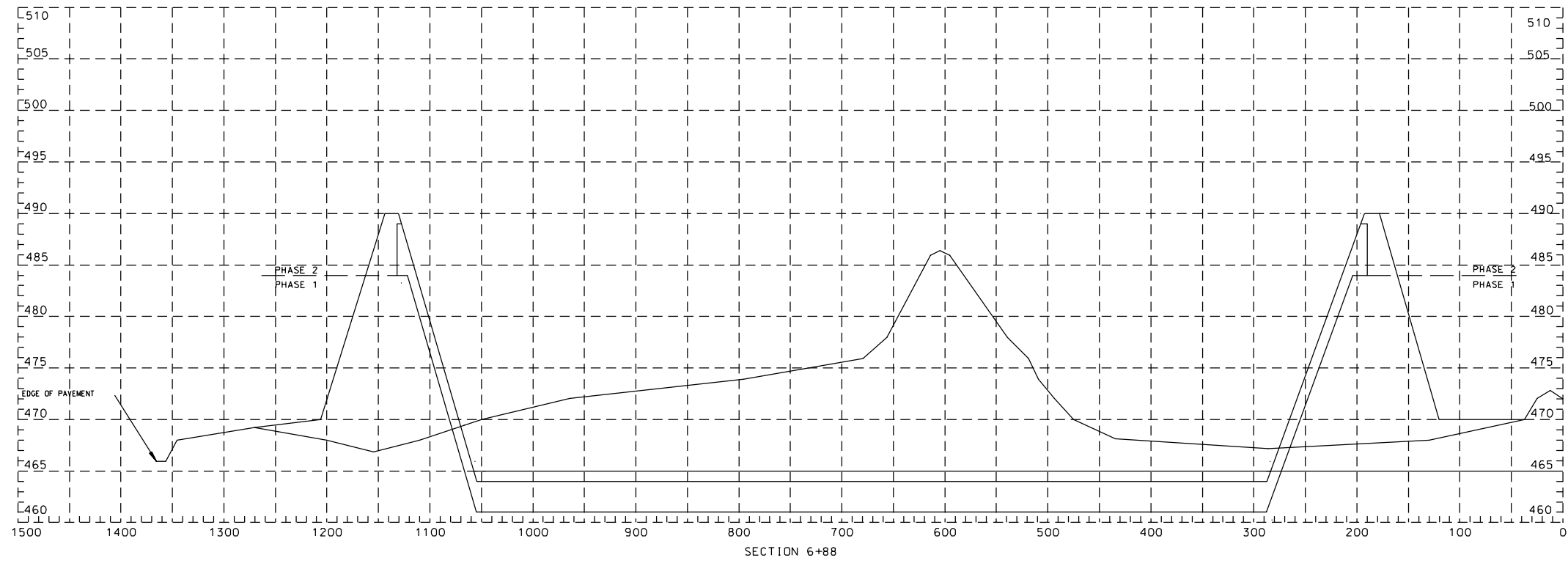
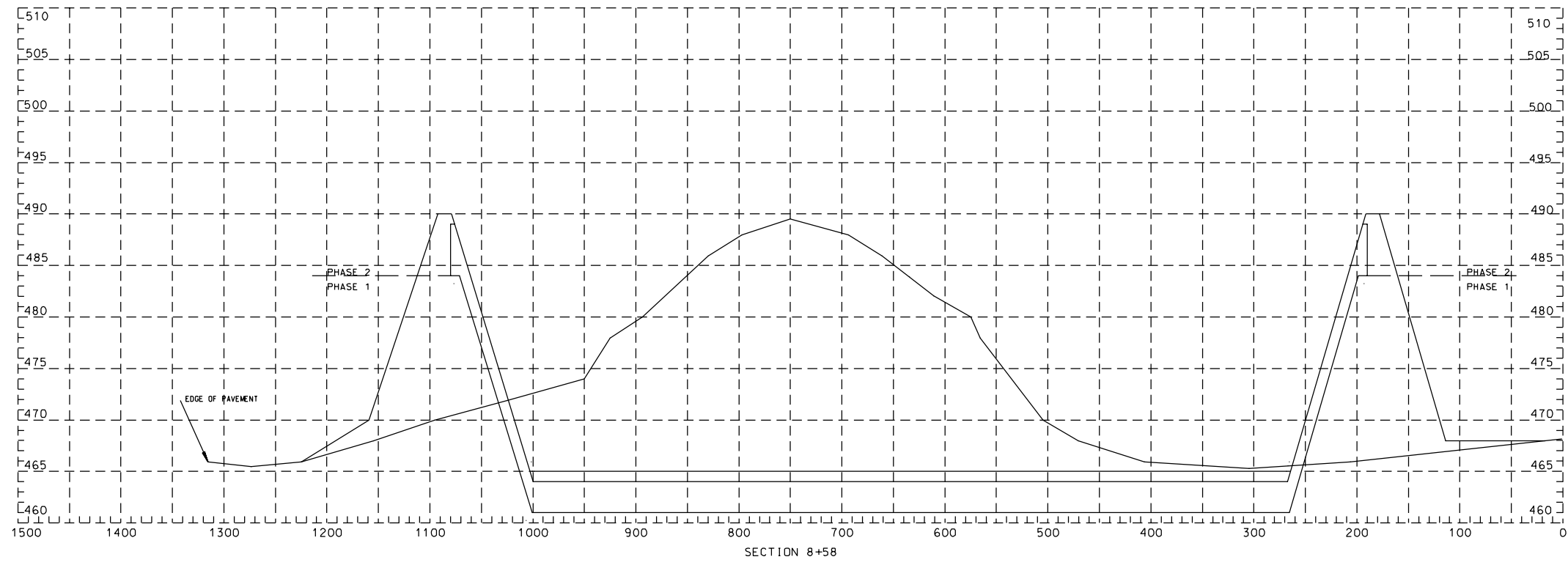
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p0018335.dgn



NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A	NOTES

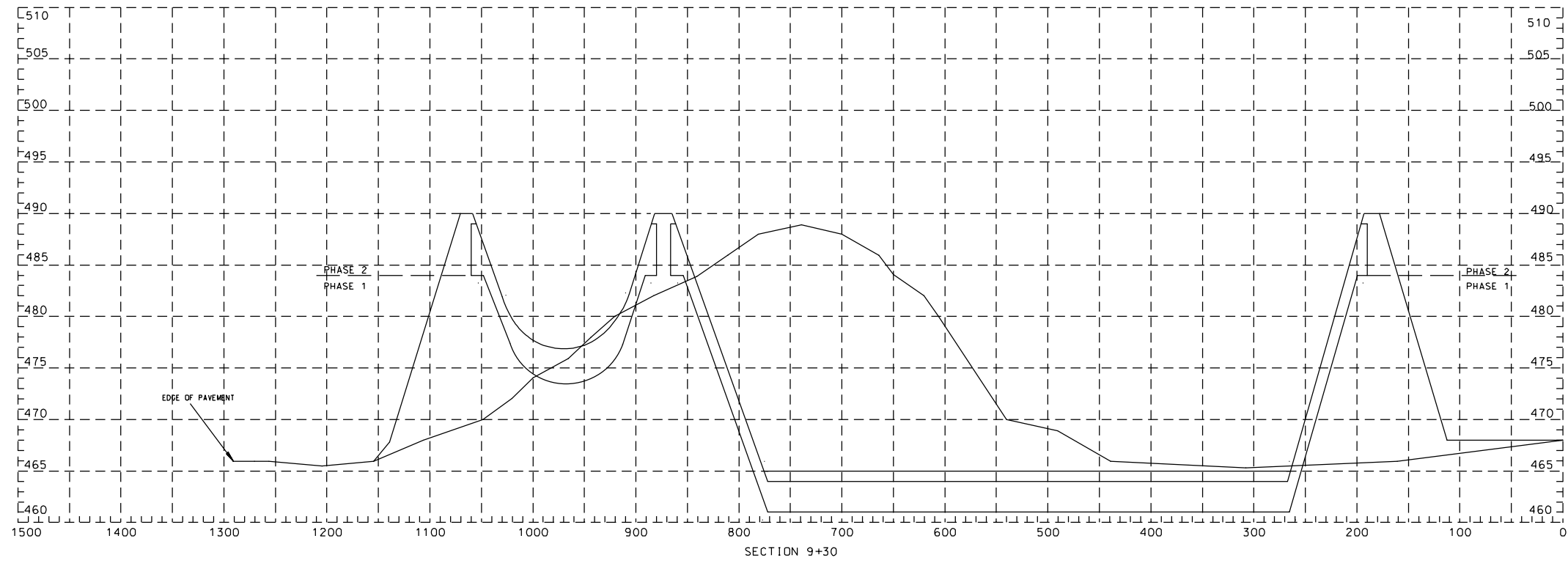
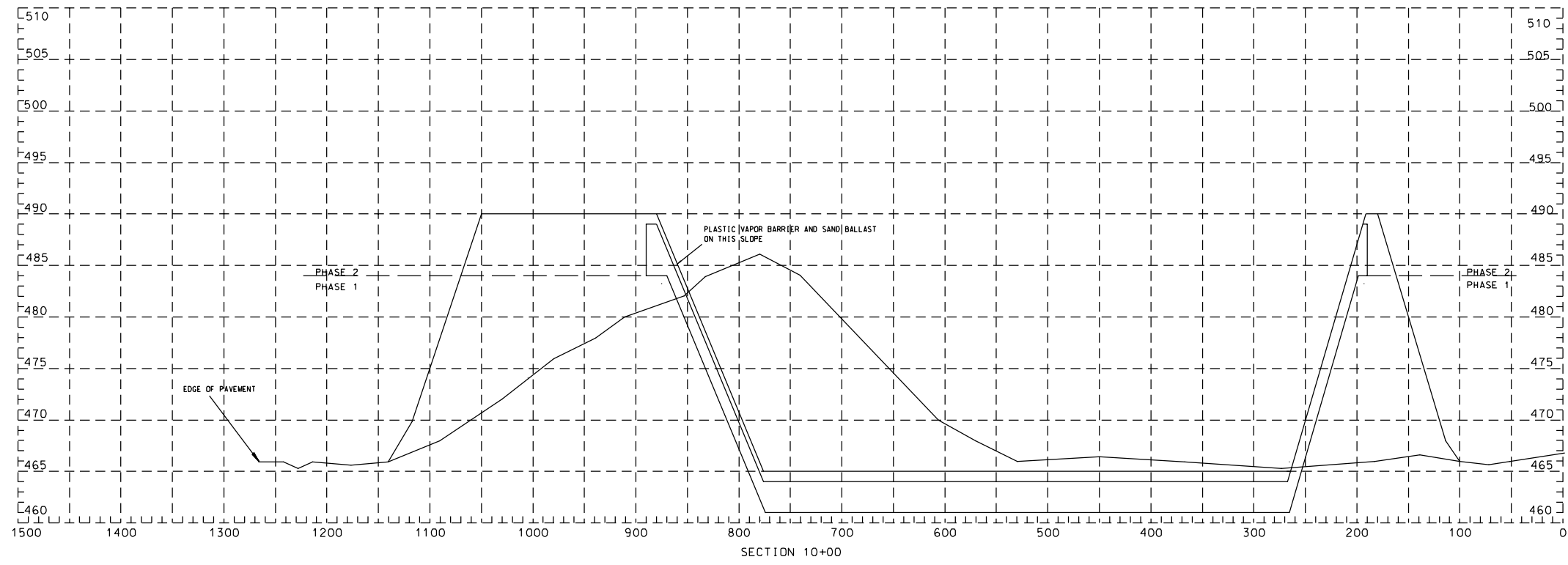
REFERENCES	

REVISION STATUS	
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ILLINOIS POWER COMPANY DECATUR		
CROSS SECTIONS 6+88, 8+58 EAST ASH POND 1 HAVANA POWER STATION		
DR WJM	CAD WJM	DATE 12-1-89
OK	CKD	SCALE 1"=5' V 1"=50'H
APP	PLOTTED	CE-HAV1-C6
APP	12-22-93	

M:SK25408-4.5

p0018336.dgn



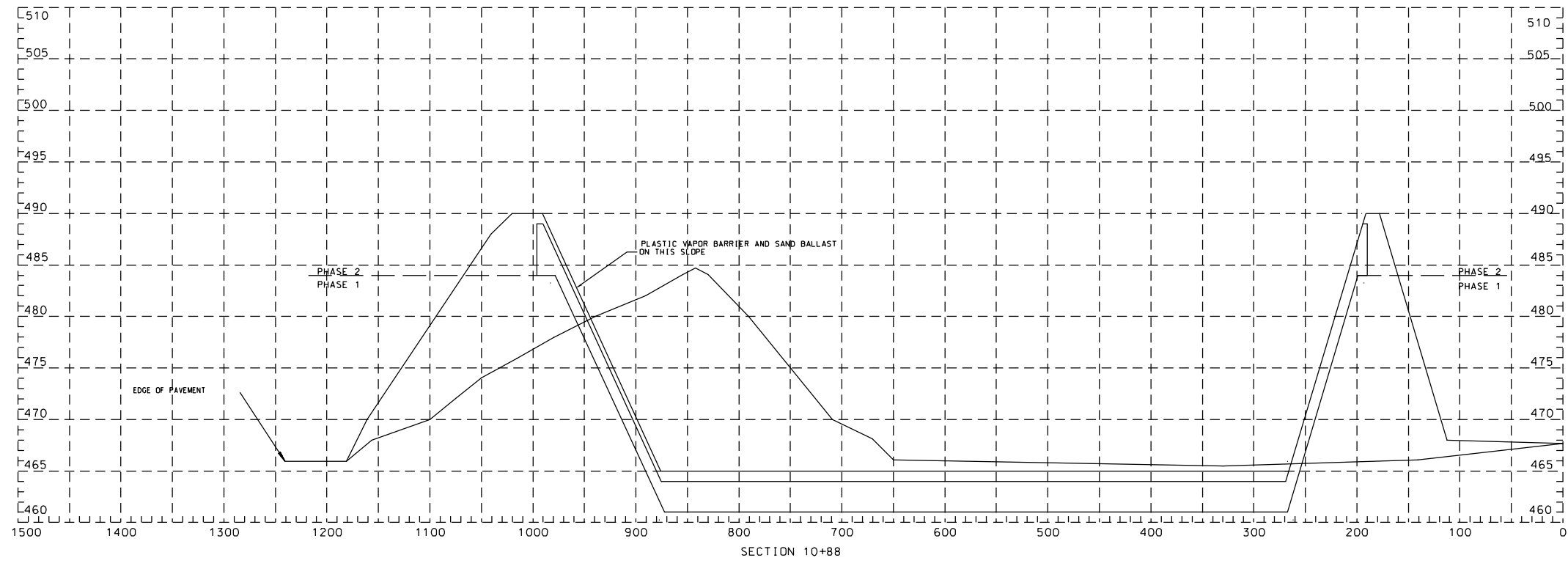
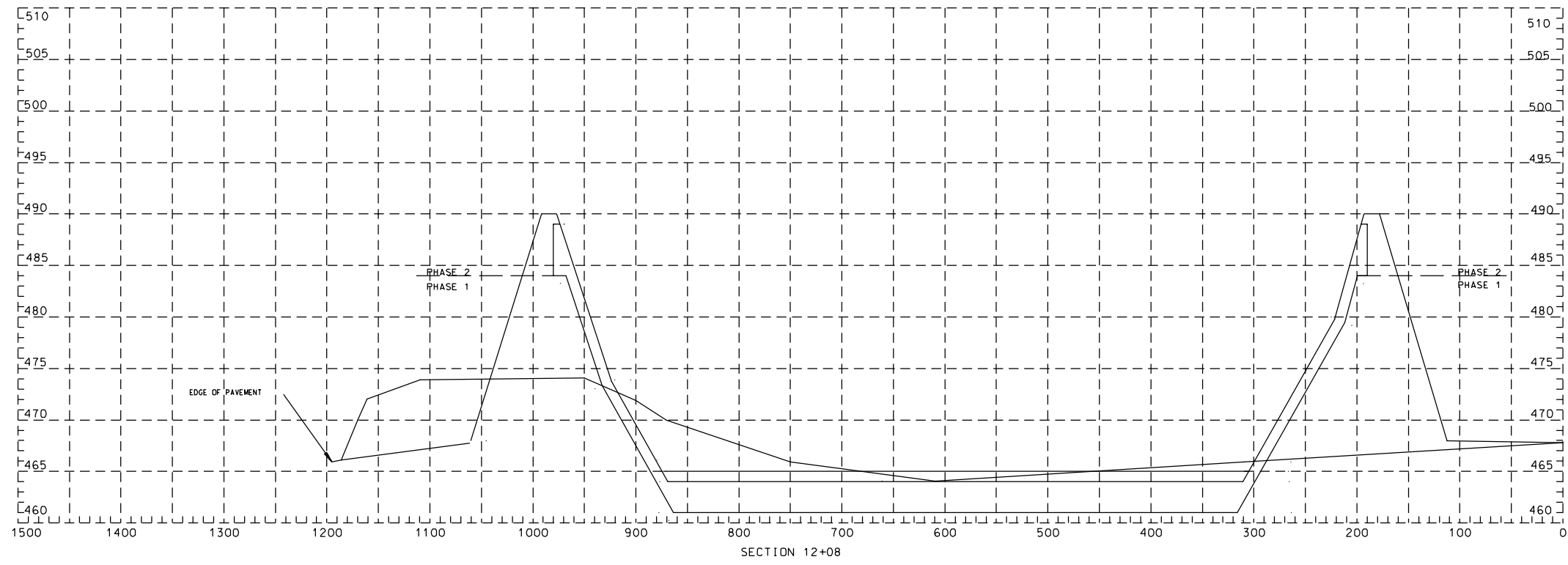
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REFERENCES	

REVISION STATUS	
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ILLINOIS POWER COMPANY DECATUR		
CROSS SECTIONS 9+30, 10+00 EAST ASH POND 1 HAVANA POWER STATION		
DR WJM	CAD WJM	DATE 12-7-89
OK	CKD	SCALE 1"=5' V 1"=20' H
APP	PLOTTED	CE-HAV1-C7
	12-22-93	

M:SK25408-4.6

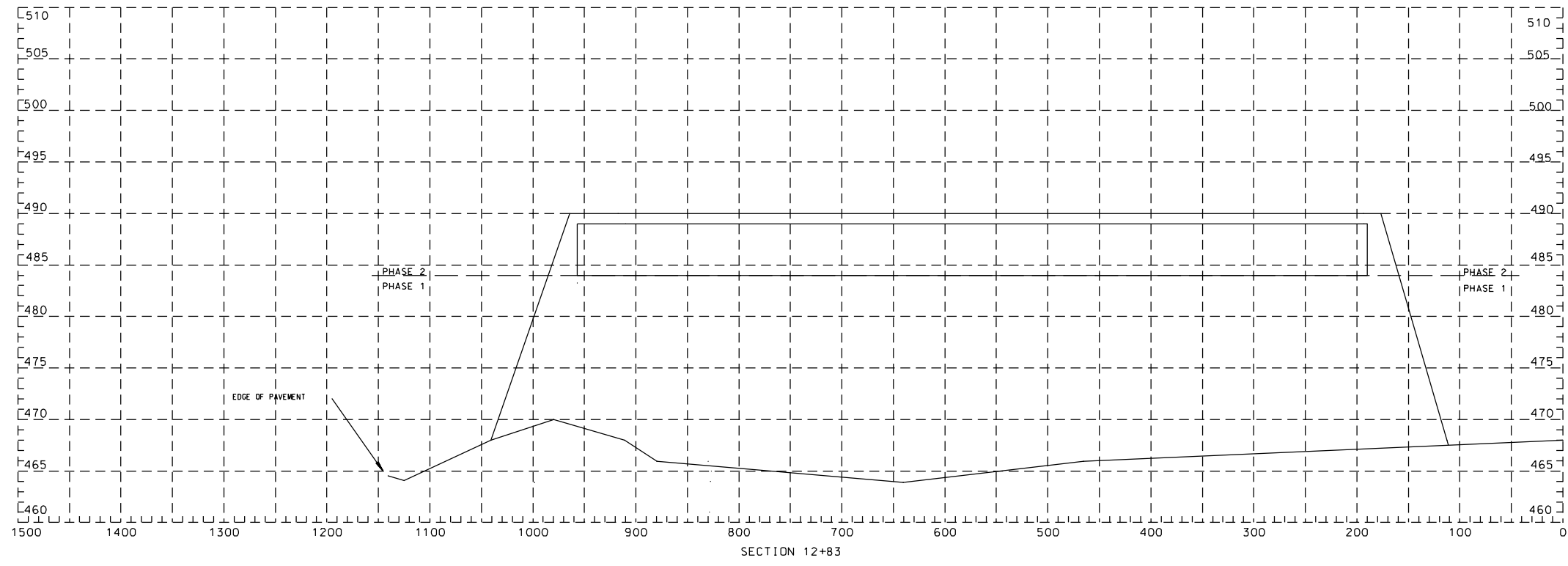
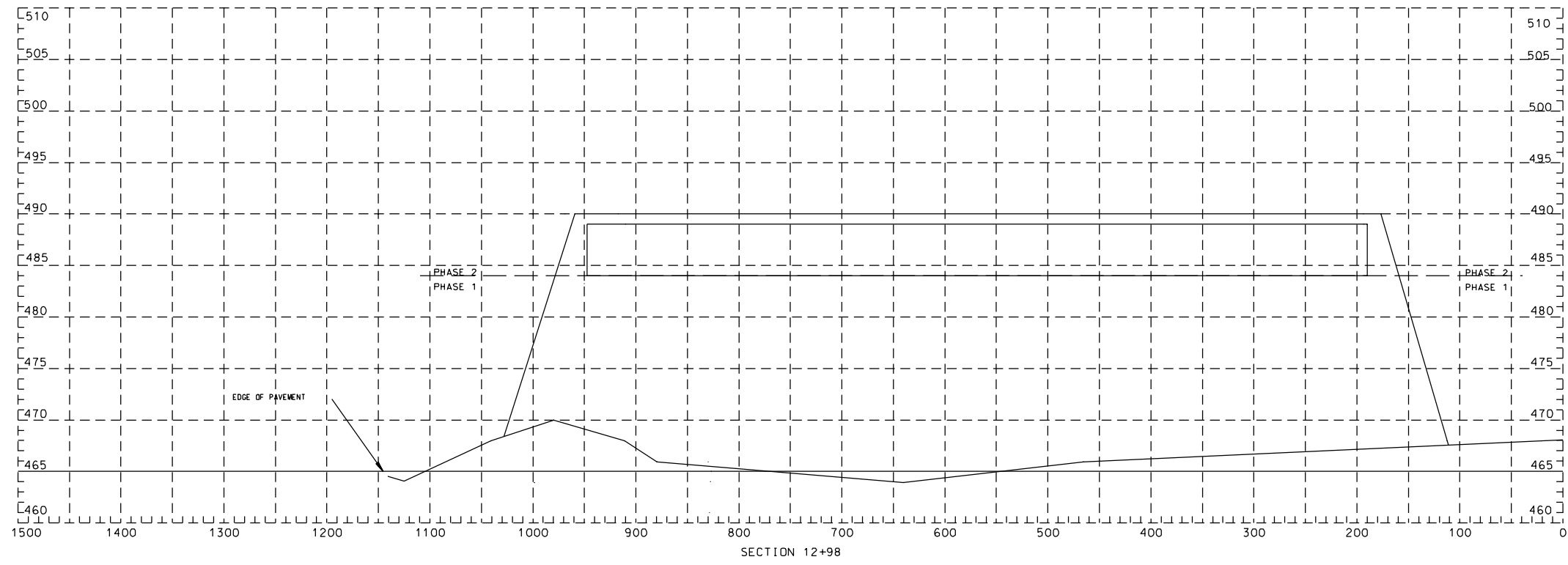


M.SK25408-4.7

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A	NOTES

REVISION STATUS	
□	CONSTRUCTION
□	RECORD

ILLINOIS POWER COMPANY DECATUR		
CROSS SECTIONS 10+88, 12+08 EAST ASH POND 1 HAVANA POWER STATION		
DR WJM	CAD WJM	DATE 12-7-89
OK	CKD	SCALE 1"=5' V 1"=50'H
APP	PLOTTED	CE-HAV1-C8
APP	12-22-93	



NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A	NOTES
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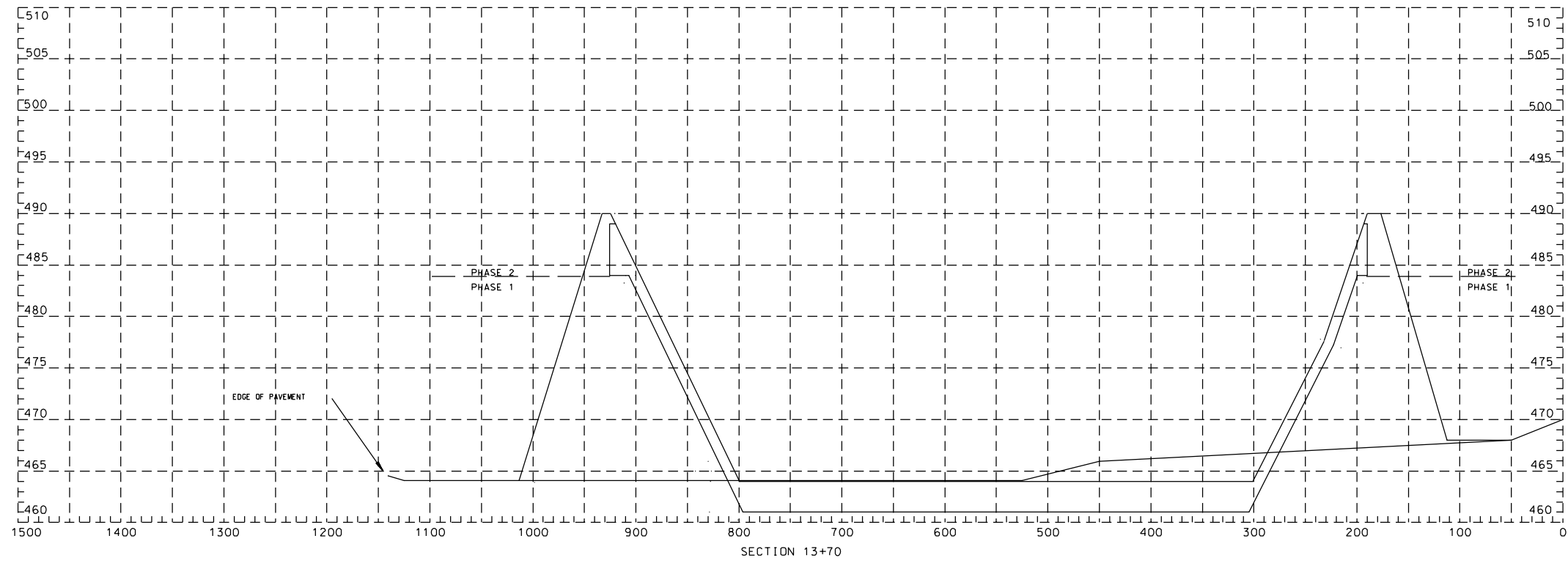
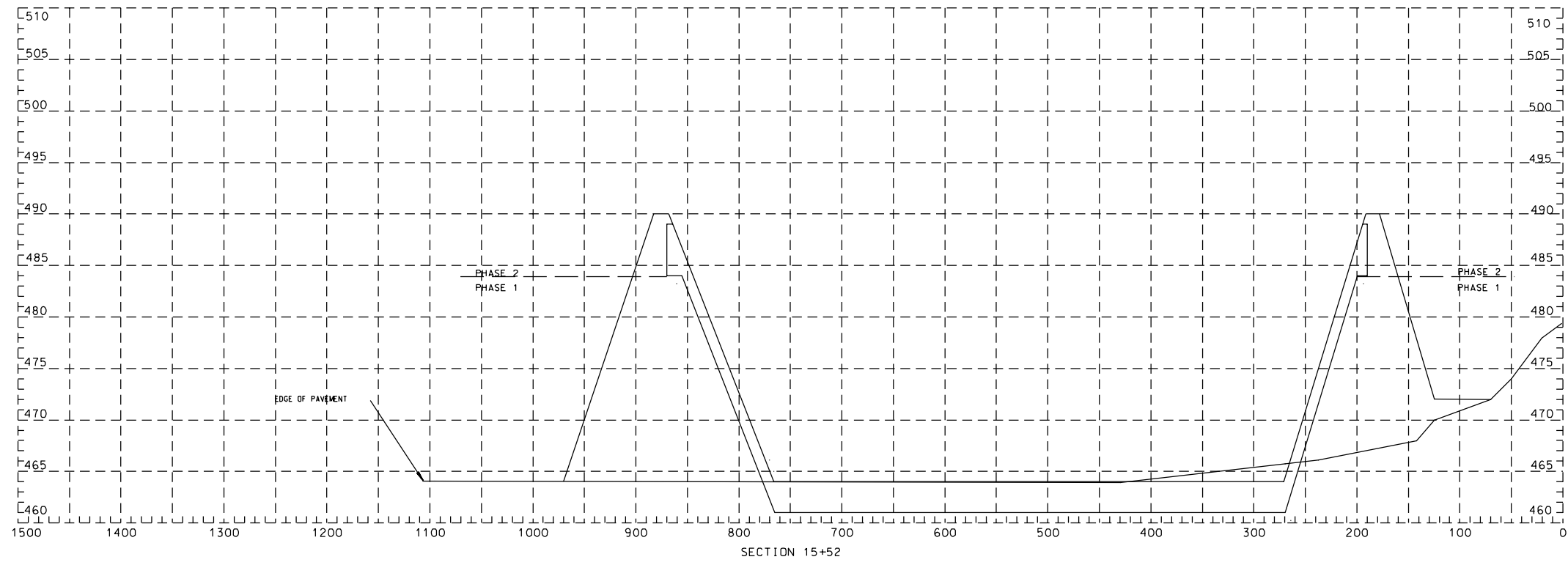
REFERENCES	

REVISION STATUS	
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<input checked="" type="checkbox"/>	

ILLINOIS POWER COMPANY DECATUR		
CROSS SECTIONS 12+83, 12+98 EAST ASH POND 1 HAVANA POWER STATION		
DR	WJM	DATE 12-7-89
OK	CKD	SCALE 1"=5' V 1"=50' H
APP		PLOTTED 12-22-93
APP		CE-HAV1-C9

M.SK25408-4.8

p0018339.dgn



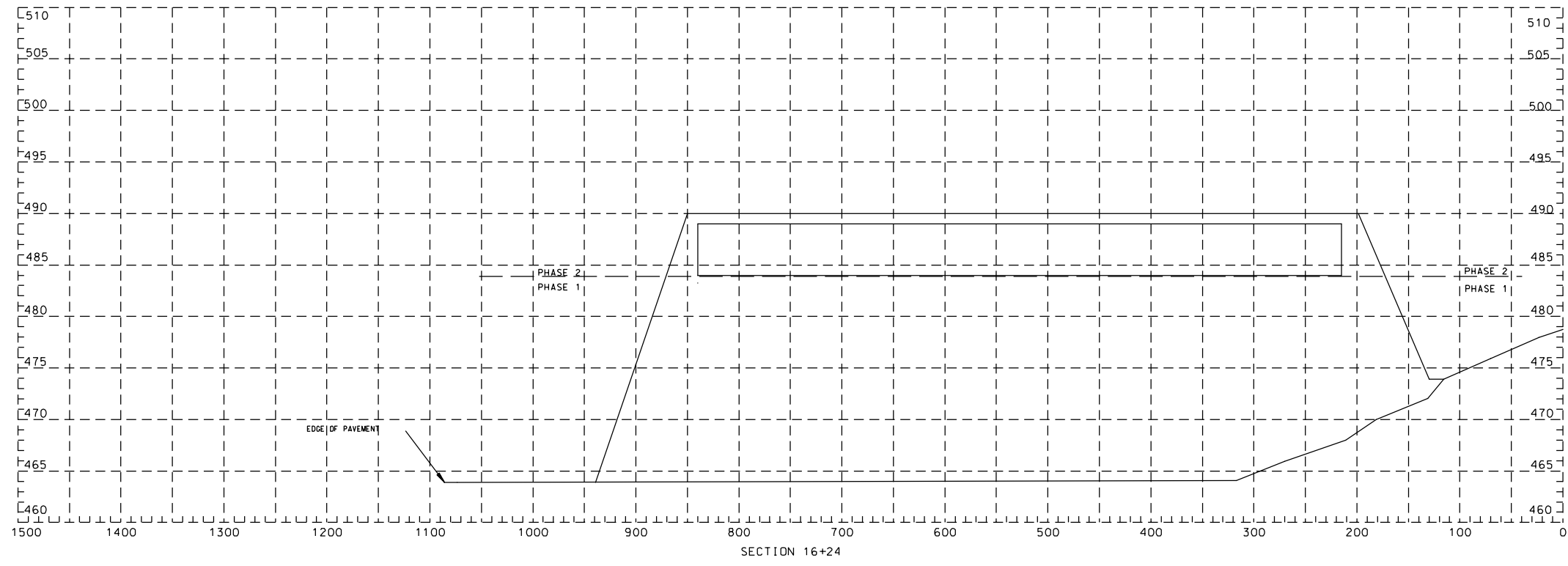
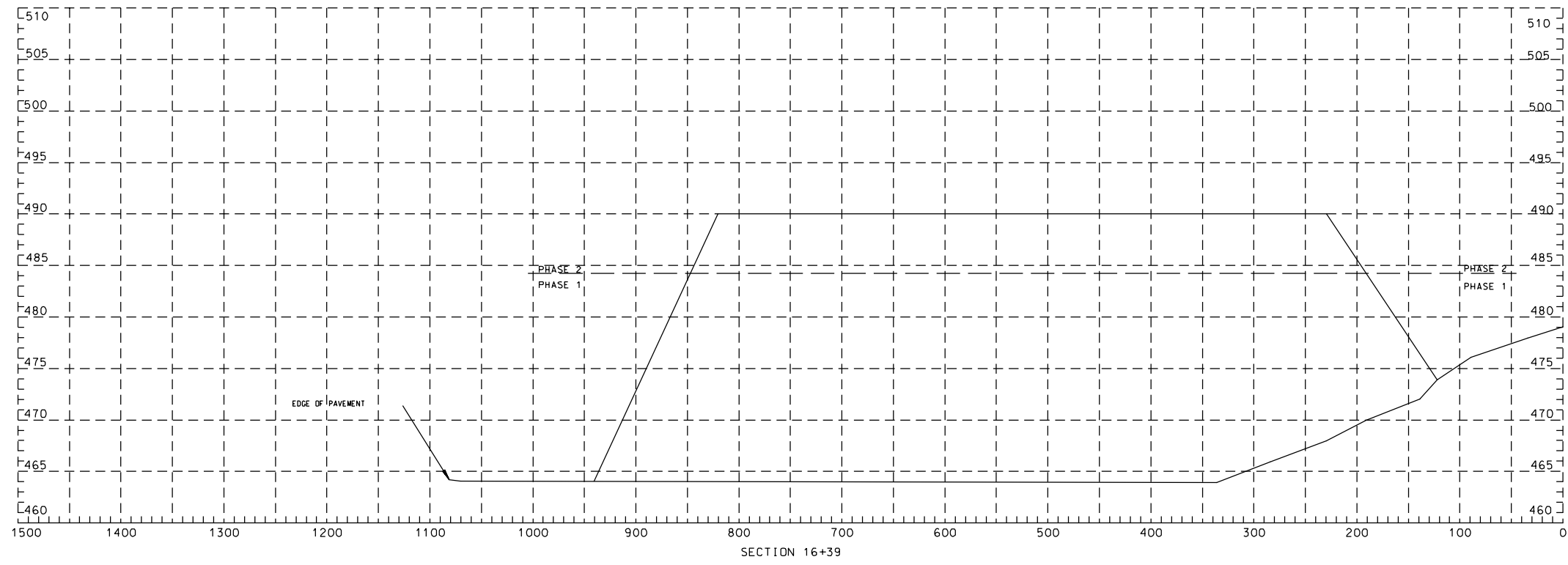
M. SK25408-4.9

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REVISION STATUS	
<input type="checkbox"/>	CONSTRUCTION
<input type="checkbox"/>	RECORD
<input type="checkbox"/>	A

ILLINOIS POWER COMPANY DECATUR		
CROSS SECTIONS 13+70, 15+52 EAST ASH POND 1 HAVANA POWER STATION		
DR	WJM	DATE 12-7-89
OK	CKD	SCALE 1"=5' V 1"=50'H
APP		PLOTTED 12-22-93
APP		CE-HAV1-C10

p0018340.dgn



NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A	NOTES
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REFERENCES

REVISION STATUS
<input type="checkbox"/> CONSTRUCTION
<input type="checkbox"/> RECORD
<input checked="" type="checkbox"/> (C)

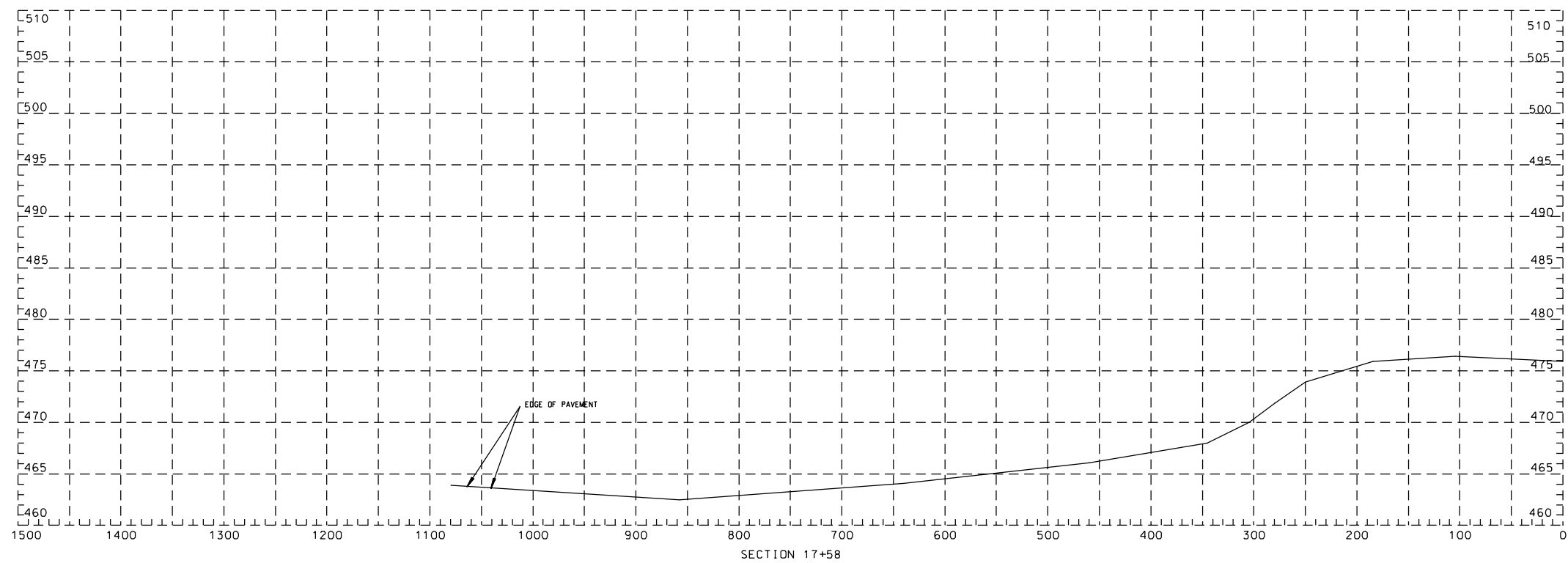
M. SK25408-4.10

ILLINOIS POWER COMPANY
DECATUR

CROSS SECTIONS 16+24, 16+39
EAST ASH POND 1
HAVANA POWER STATION

DR WJM	CAD WJM	DATE 12-7-89
OK	CKD	SCALE 1"=5' V 1"=50' H
APP	PLOTTED	CE-HAV1-C11
APP	12-22-93	

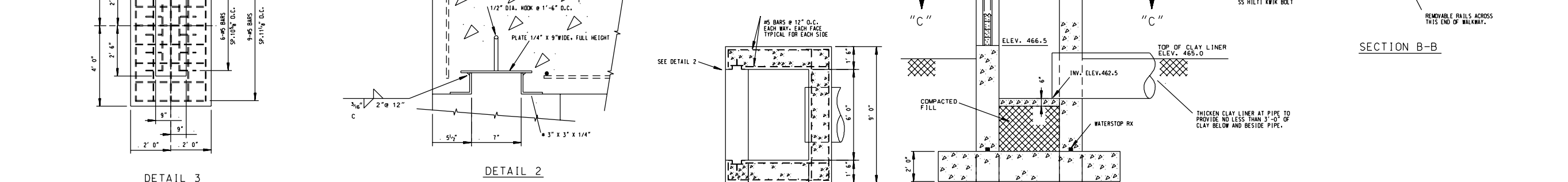
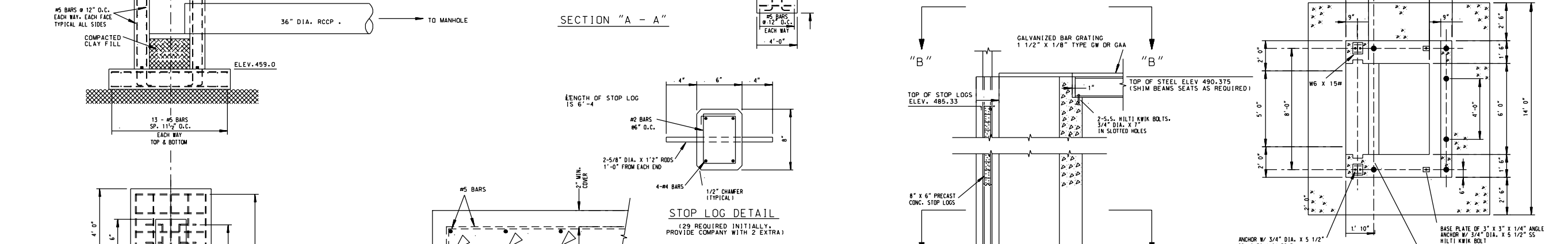
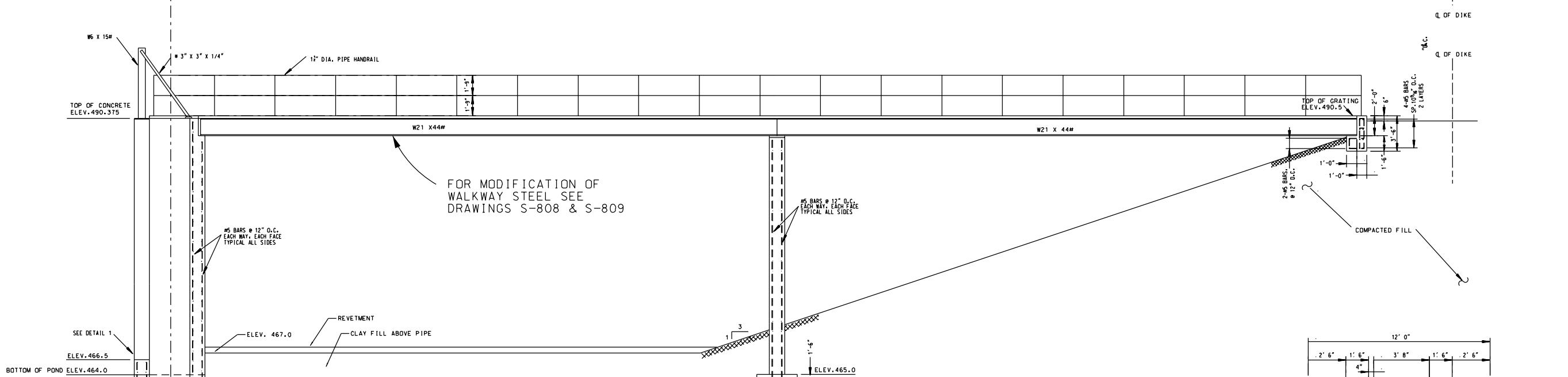
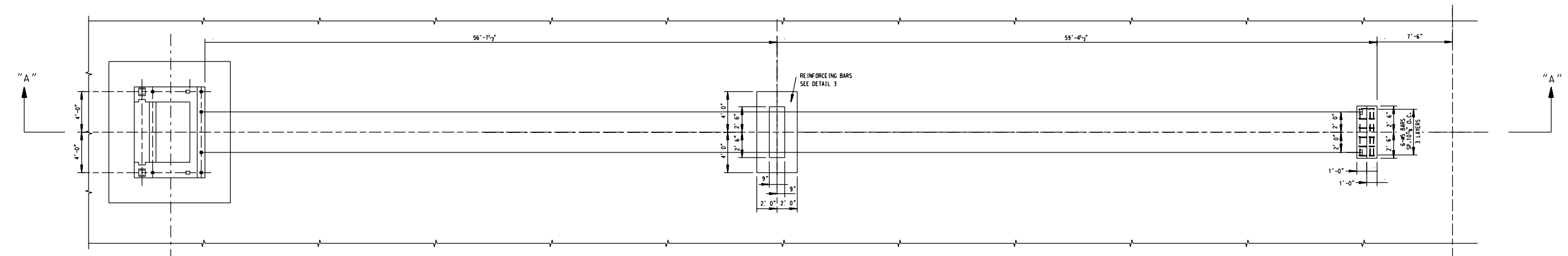
p0018341.dgn



M. SK25408-4.11

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A	NOTES	REFERENCES
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REVISION STATUS		ILLINOIS POWER COMPANY	
<input type="checkbox"/> CONSTRUCTION	<input type="checkbox"/> RECORD	DECATUR	
<input checked="" type="checkbox"/> RECORD		CROSS SECTION 17+58	
		EAST ASH POND 1	
		HAVANA POWER STATION	
DR WJM	CAD WJM	DATE	03-28-91
OK	CKD	SCALE	1"=5' V 1"=50'H
APP		PLOTTED	CE-HAV1-C12
APP		DATE	12-22-93

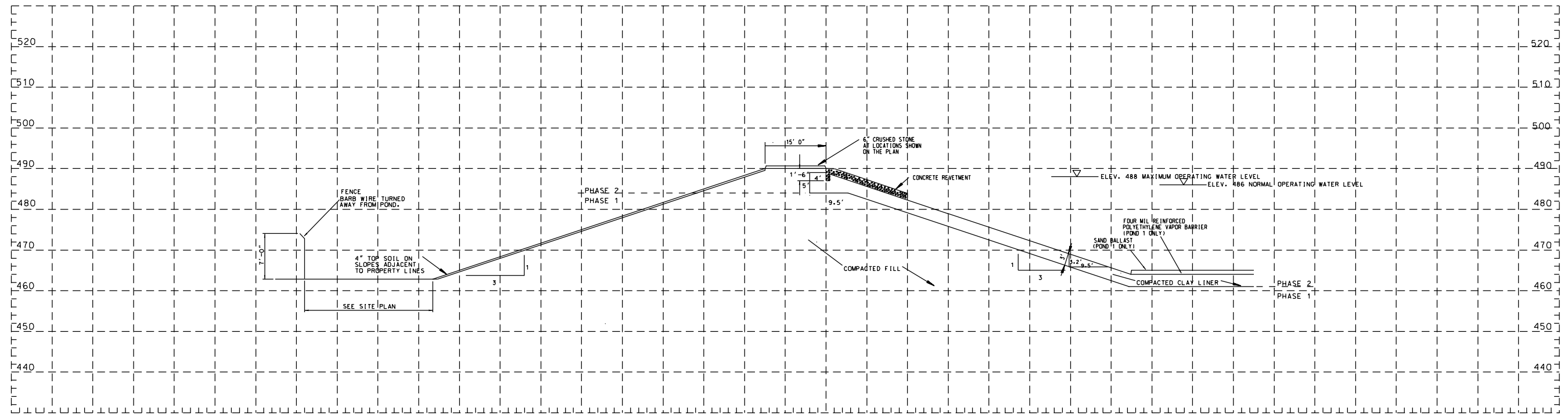


NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
A	3/21/89												
①	03/11/2005		FOR RECORD										

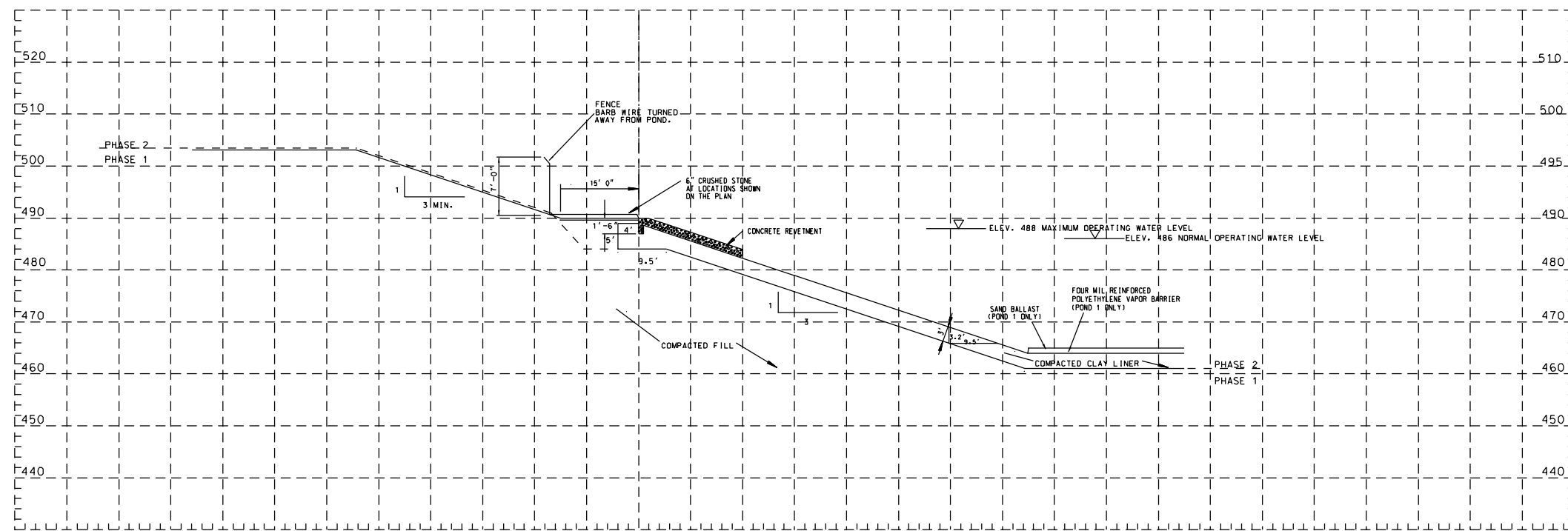
C-SK25408-6

REVISION STATUS		ILLINOIS POWER COMPANY DECATUR	
□	CONSTRUCTION	FINAL POND POND DISCHARGE STRUCTURE HAVANA POWER STATION	
①	RECORD	DR KVP	CAD WJM
		OK	CKD
		APP	PLOTTED
		APP	12-22-93
			CE-HAV1-C14

p0018344.dgn



TYPICAL SECTION - EMBANKMENT
(SOUTH, EAST, & WEST SIDES)



TYPICAL SECTION - CUT SLOPE
(NORTH SIDE)

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A	NOTES
0														

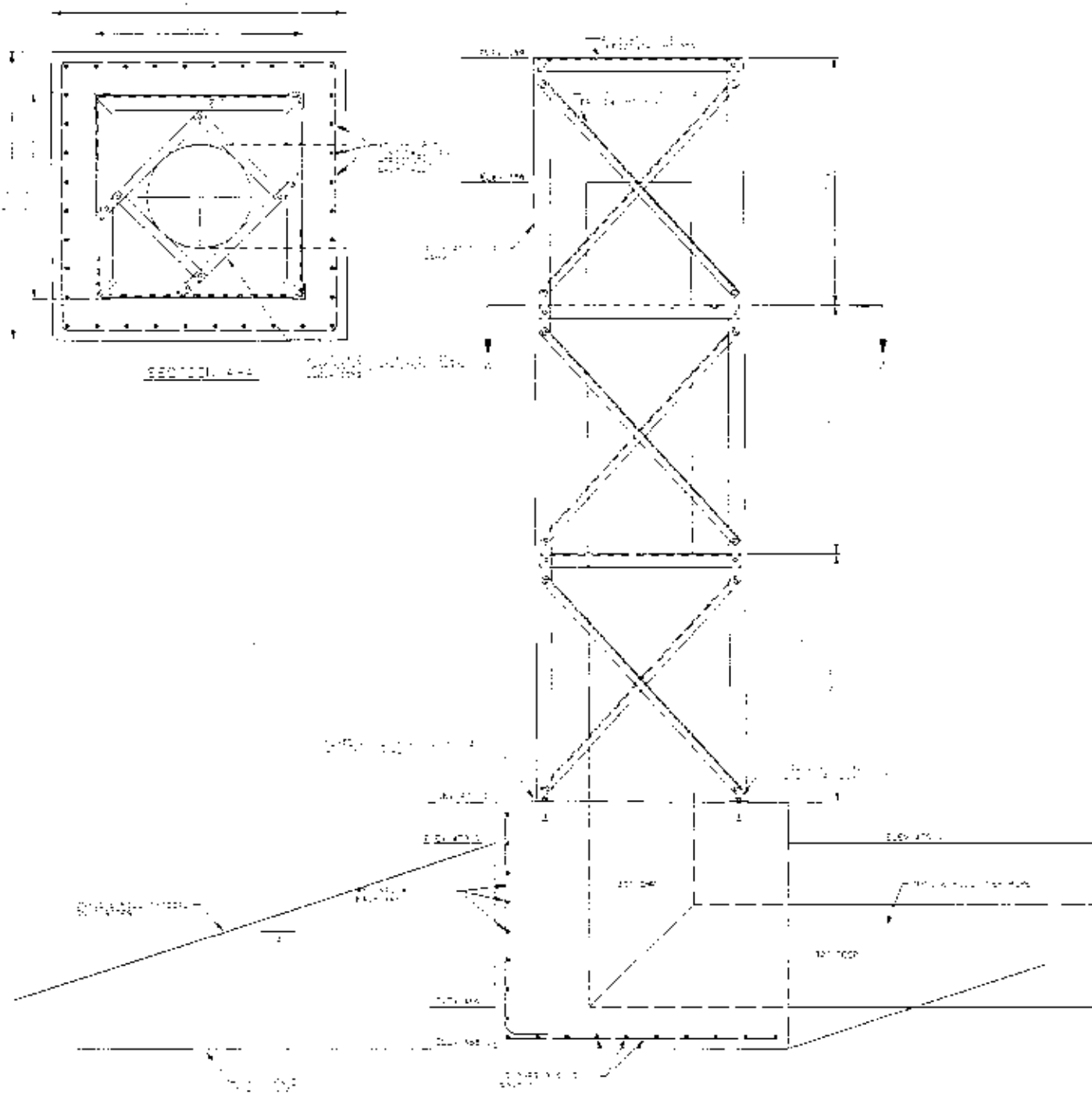
REFERENCES		

REVISION STATUS			ILLINOIS POWER COMPANY DECATUR		
<input type="checkbox"/>	CONSTRUCTION		TYPICAL SECTION NEW ASH POND DIKE HAVANA POWER STATION		
<input checked="" type="checkbox"/>	RECORD		DR WJM	CAD WJM	DATE 1-3-90
			OK	CKD	SCALE 1"=10' V 1"=10'H
			APP	PLOTTED	1-13-94
			APP		CE-HAV1-C17

m0000627.dgn

p0018347.dgn

CE-HAV1-C17



NOTE:
 1. ALL DIMENSIONS SHOWN ARE LOCATED INSIDE THE VERTICAL LINE UNLESS SHOWN OTHERWISE.
 2. ALL DIMENSIONS ARE TO CENTER UNLESS SHOWN OTHERWISE.
 3. ALL DIMENSIONS ARE TO CENTER UNLESS SHOWN OTHERWISE.
 4. ALL DIMENSIONS ARE TO CENTER UNLESS SHOWN OTHERWISE.

FIG. 1. TOWER STRUCTURE

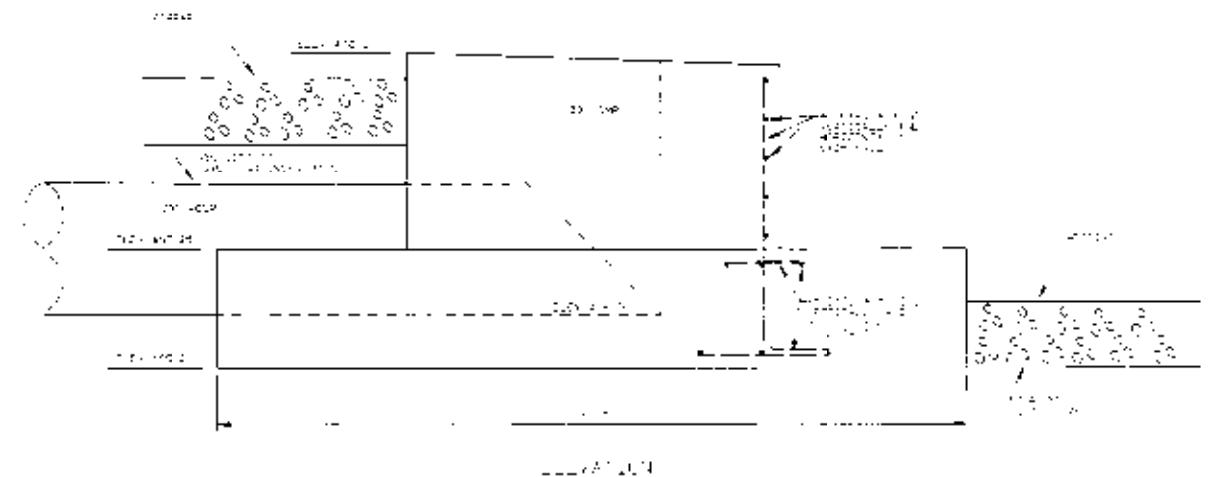
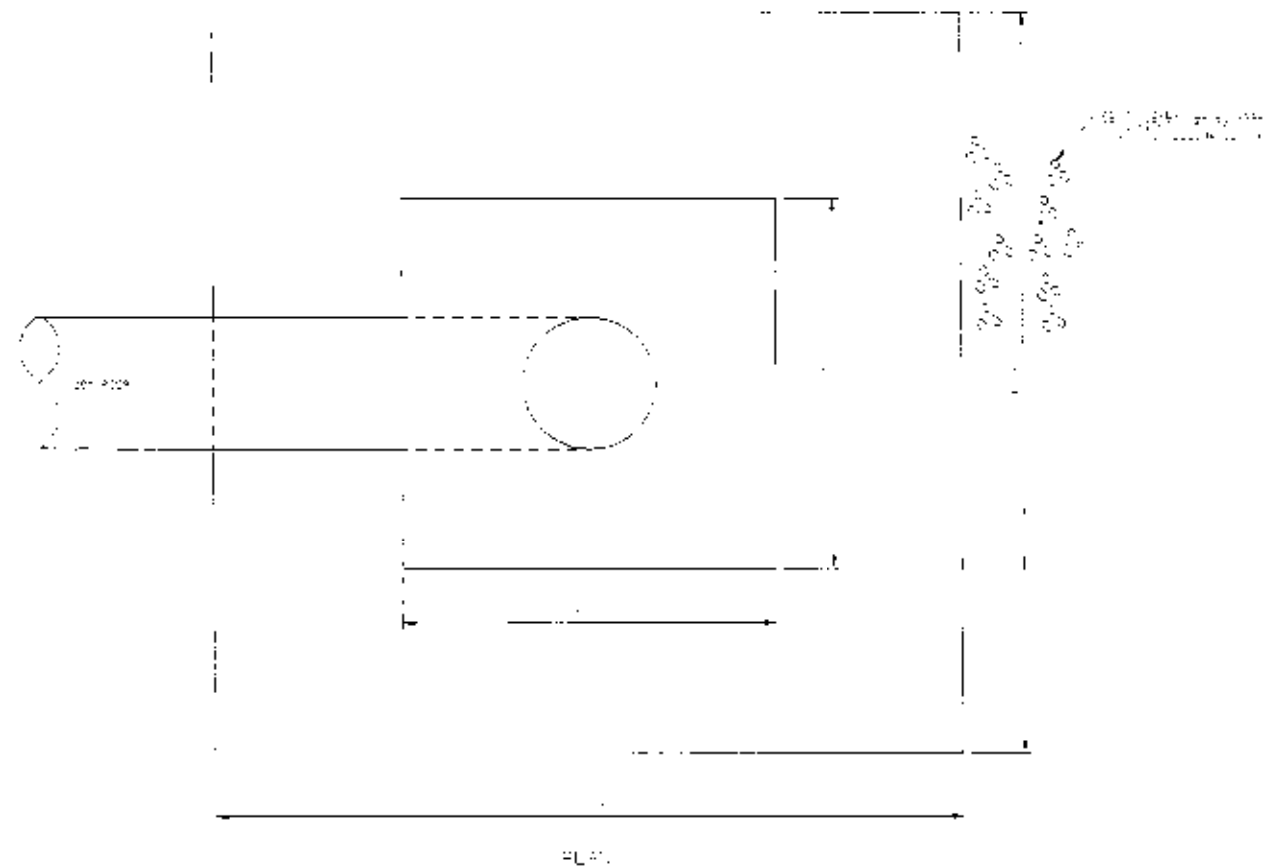
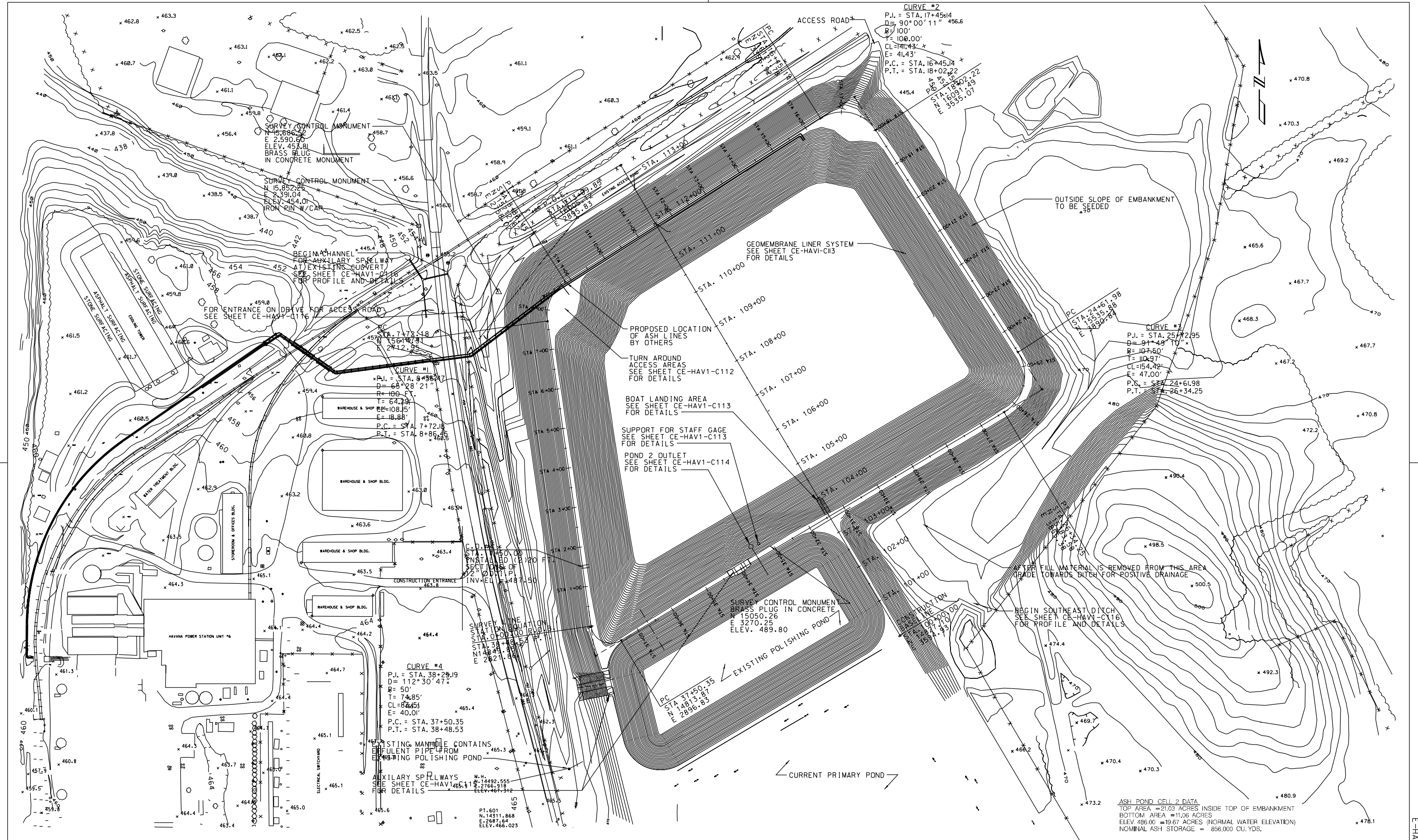


FIG. 2. TOWER STRUCTURE

NO.	DATE	BY	DESCRIPTION
1	2-5-94	WJM	FIELD REVISIONS

ILLINOIS POWER COMPANY
 1/23/97 CE-HAV1-C41



ASH POND CELL 2 DATA
 TOP AREA = 21.03 ACRES INSIDE TOP OF EMBANKMENT
 BOTTOM AREA = 11.06 ACRES
 ELEV. 486.00 = 19.67 ACRES (NORMAL WATER ELEVATION)
 NOMINAL ASH STORAGE = 856,000 CU. YDS.

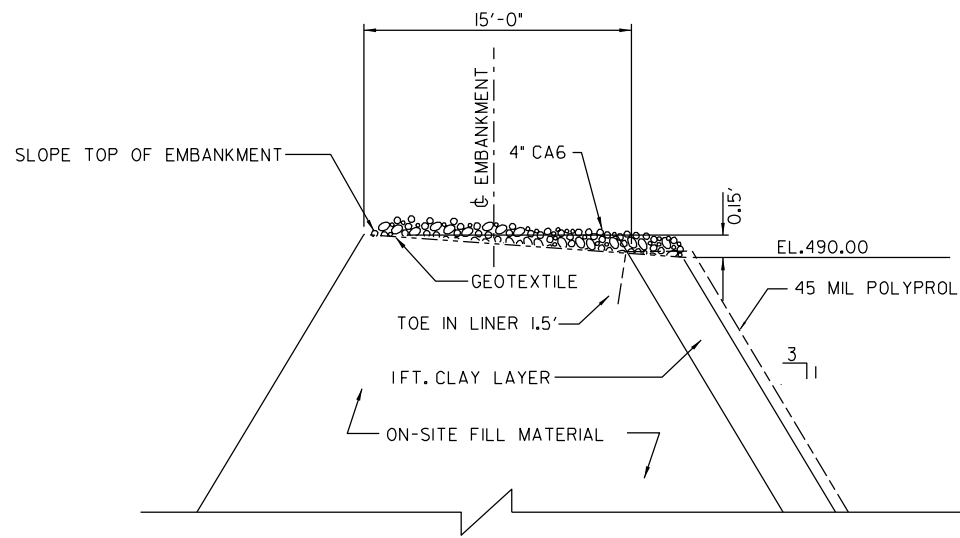
NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A	NOTES
1	2-22-99	RKF	AS-BUILTS PER W.O. 26650											
2	8-3-00	Chastain	ADDED SURVEY DATA FROM 7-11-00											
3	5-14-02	Chastain	ADDED SURVEY DATA FROM 5-14-00											

REFERENCES

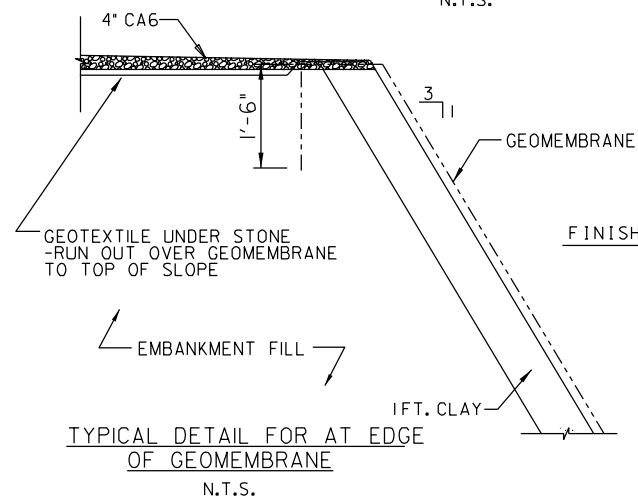
DYNEGY MIDWEST GENERATION, INC.
 DECATUR, ILLINOIS

SITE PLAN
EAST ASH POND CELL 2
HAYANA POWER STATION

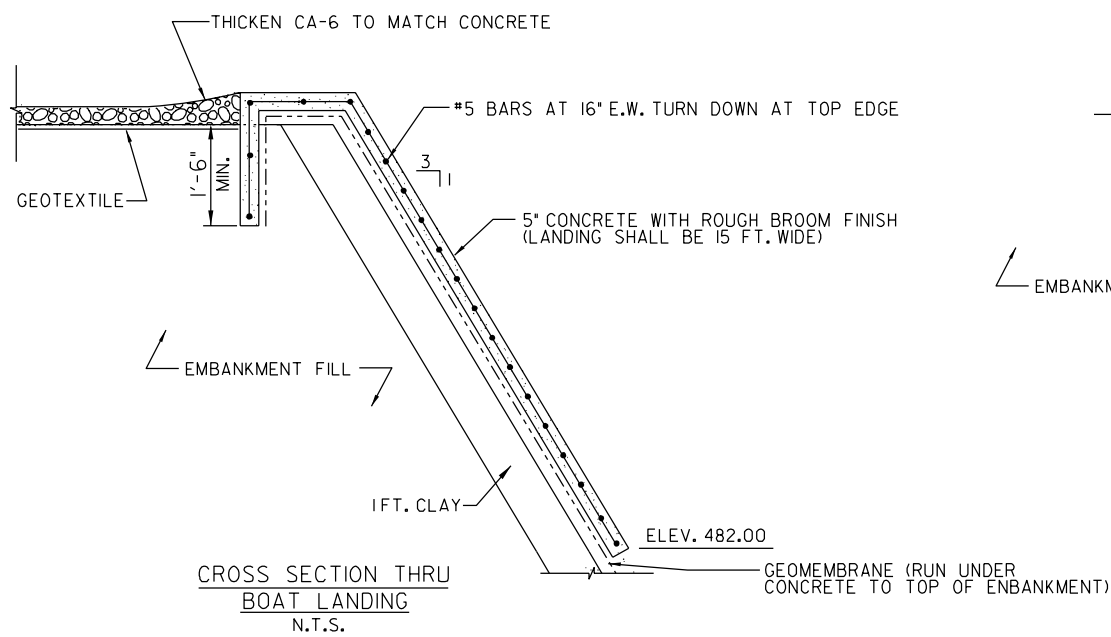
DR RKF	CAD RKF	DATE 6-12-97
OK DMG	CKD	SCALE 1"=100'
APP	PLOTTED	
APP	5-14-02	E-HAV1-C110



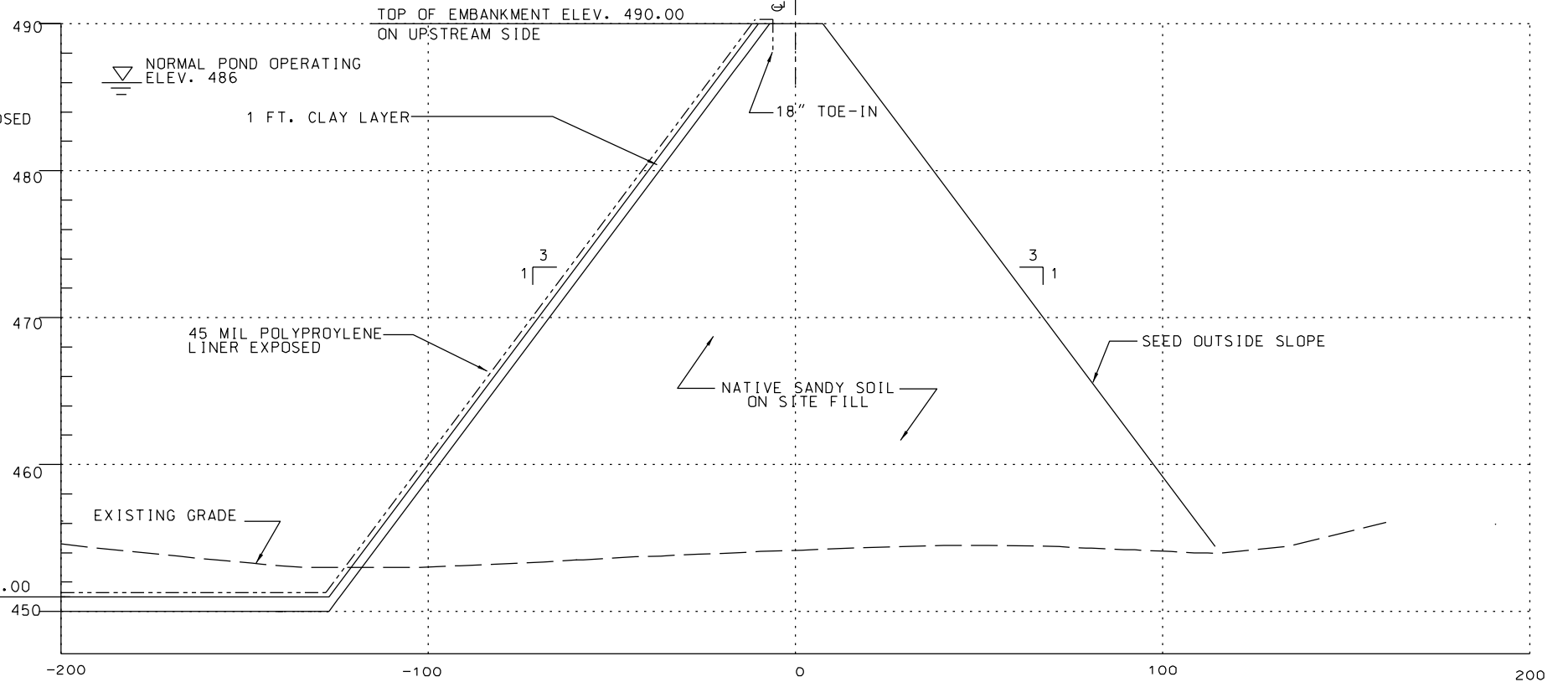
DETAIL OF TOP OF EMBANKMENT
N.T.S.



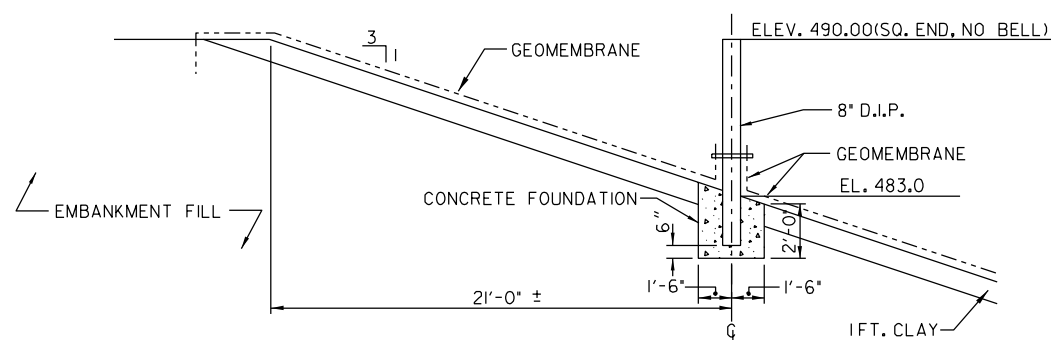
TYPICAL DETAIL FOR AT EDGE
OF GEOMEMBRANE
N.T.S.



CROSS SECTION THRU
BOAT LANDING
N.T.S.

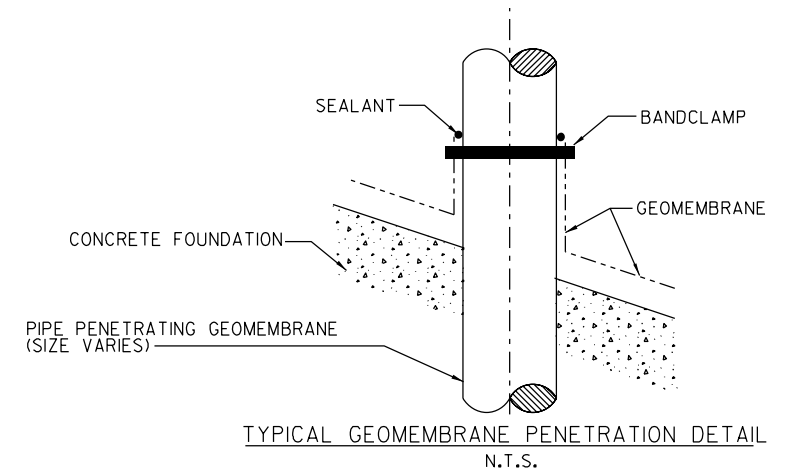


TYPICAL SECTION THRU EMBANKMENT
SCALE: 1' = 20' H
1' = 5' V



DETAIL OF STAFF GAGE SUPPORT
STA. 33+24.00
N.T.S.

AS-BUILT NOTE: ELEVATION OF 486.00' ON STAFF
GAGE IS ACTUALLY AT AN
ELEVATION OF 485.90'.



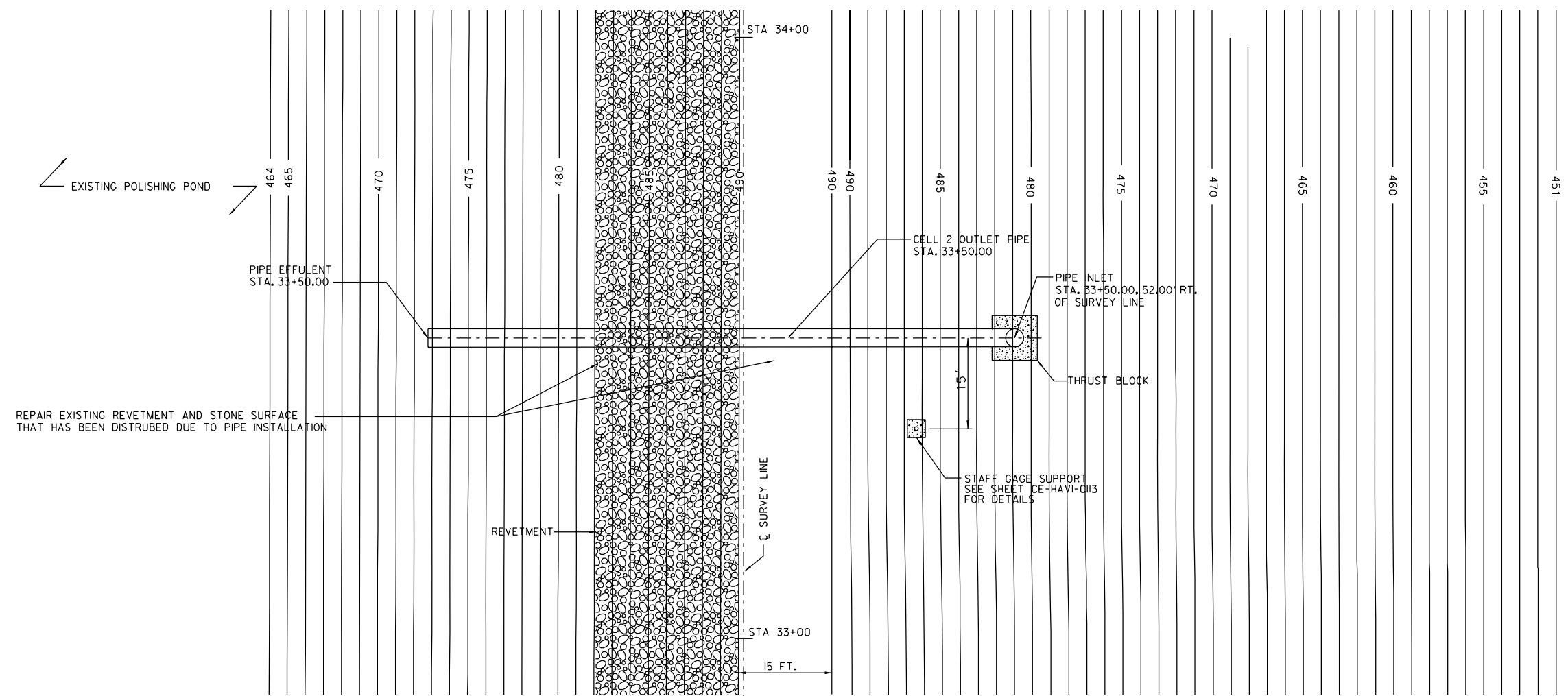
TYPICAL GEOMEMBRANE PENETRATION DETAIL
N.T.S.

NOTE: FINAL INSTALLATION MUST CONFORM TO
GEOMEMBRANE MANUFACTURER RECOMMENDATIONS

REVISION STATUS: □ - CONSTRUCTION ○ - RECORD														
NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A	NOTES
1	2-22-99	RKF	AS-BUILTS W.O. 26650	DMG										

REFERENCES

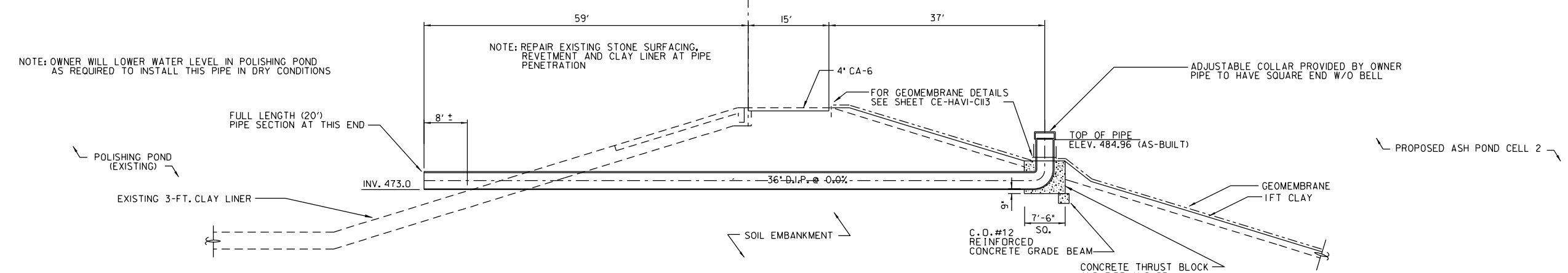
ILLINOIS POWER COMPANY DECATUR		
TYPICAL CROSS SECTION AND DETAILS EAST ASH POND CELL 2 HAVANA POWER STATION		
DR RKF	CAD RKF	DATE 8-6-97
OK DMG	CKD	SCALE: 1' = 20' H, 1" = 4' V
APP	PLOTTED	
APP	5-27-99	E-HAVI-CII3



PLAN OF POND 2 OUTLET PIPE

SCALE: 1"=10' HORIZ
1"=10' VERT

NOTE: OUTLET PIPE MUST BE INSTALLED BETWEEN FEB. 25, 1998 AND APRIL 19, 1998 DURING PLANT MAINTENANCE OUTAGE.



SECTION THRU POND 2 OUTLET PIPE

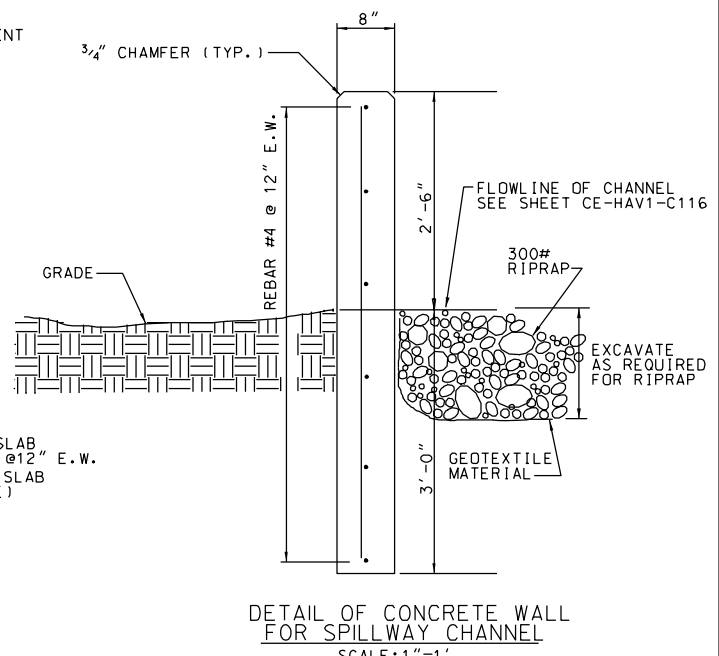
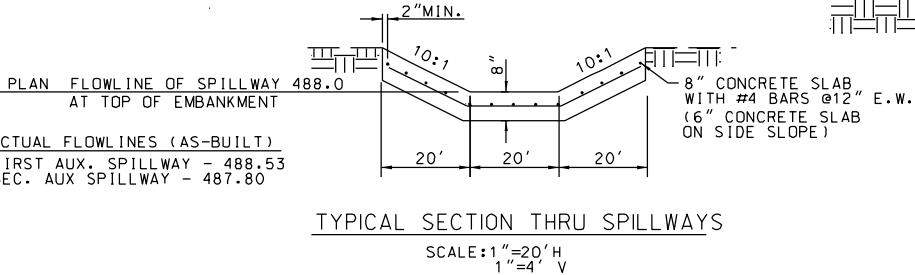
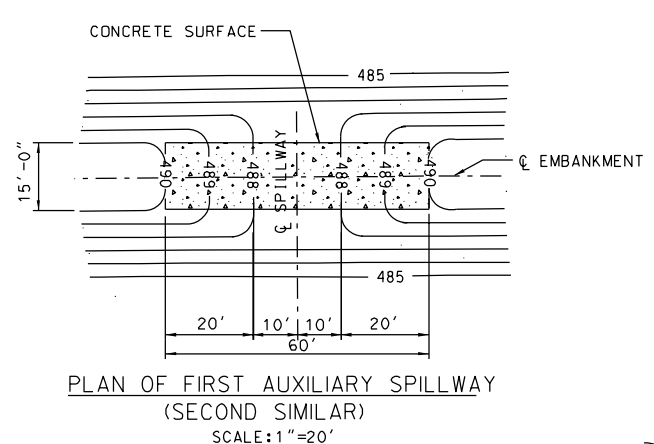
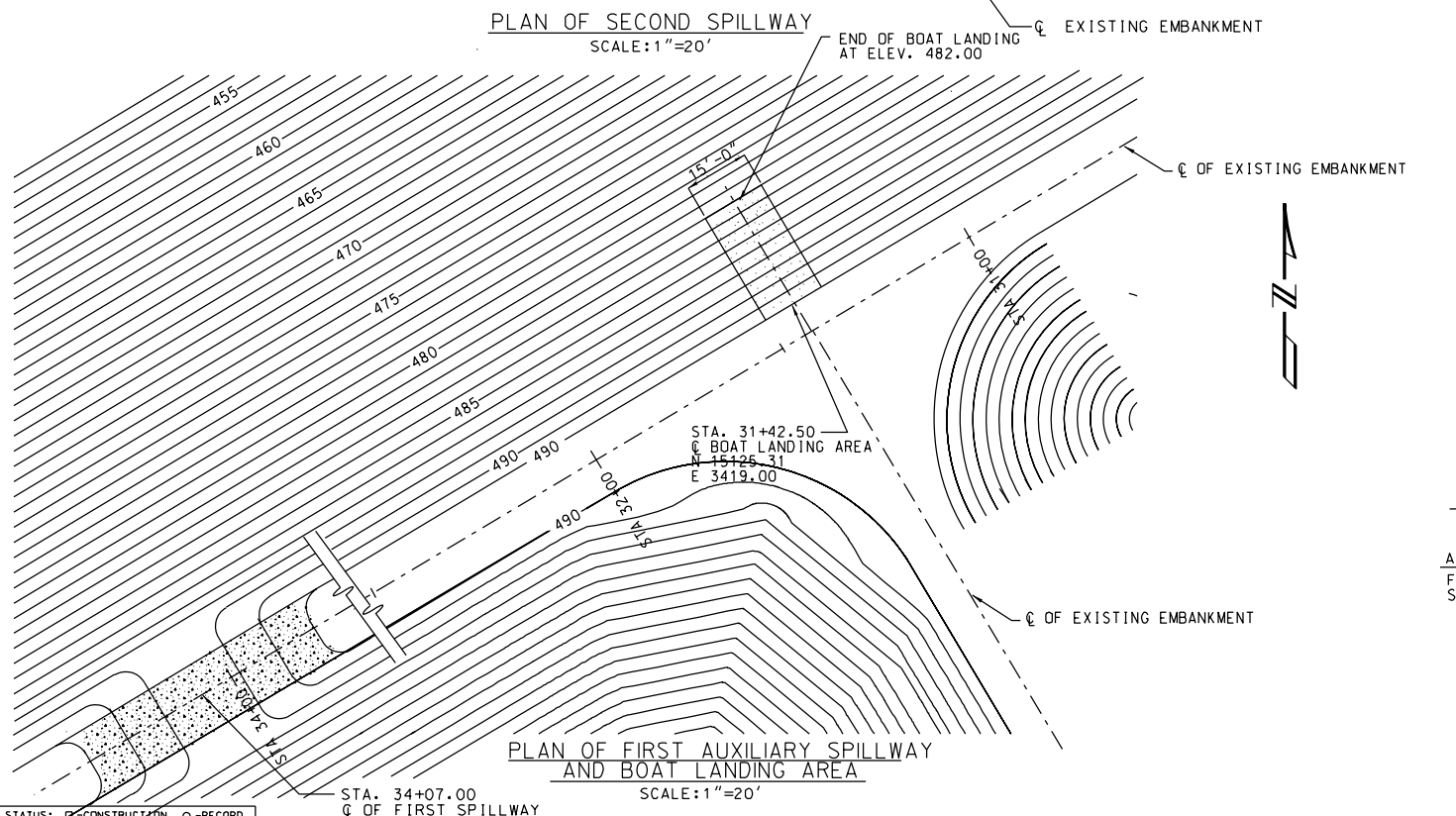
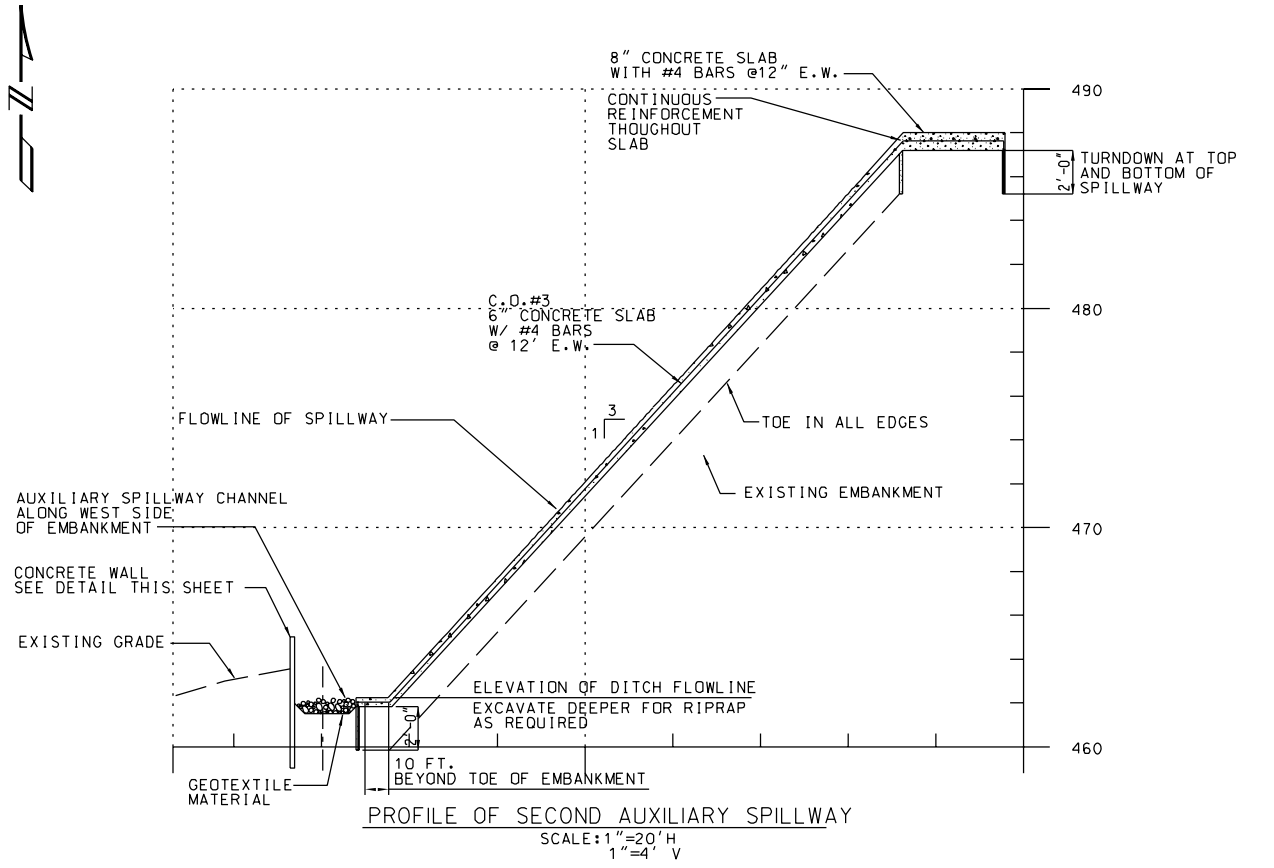
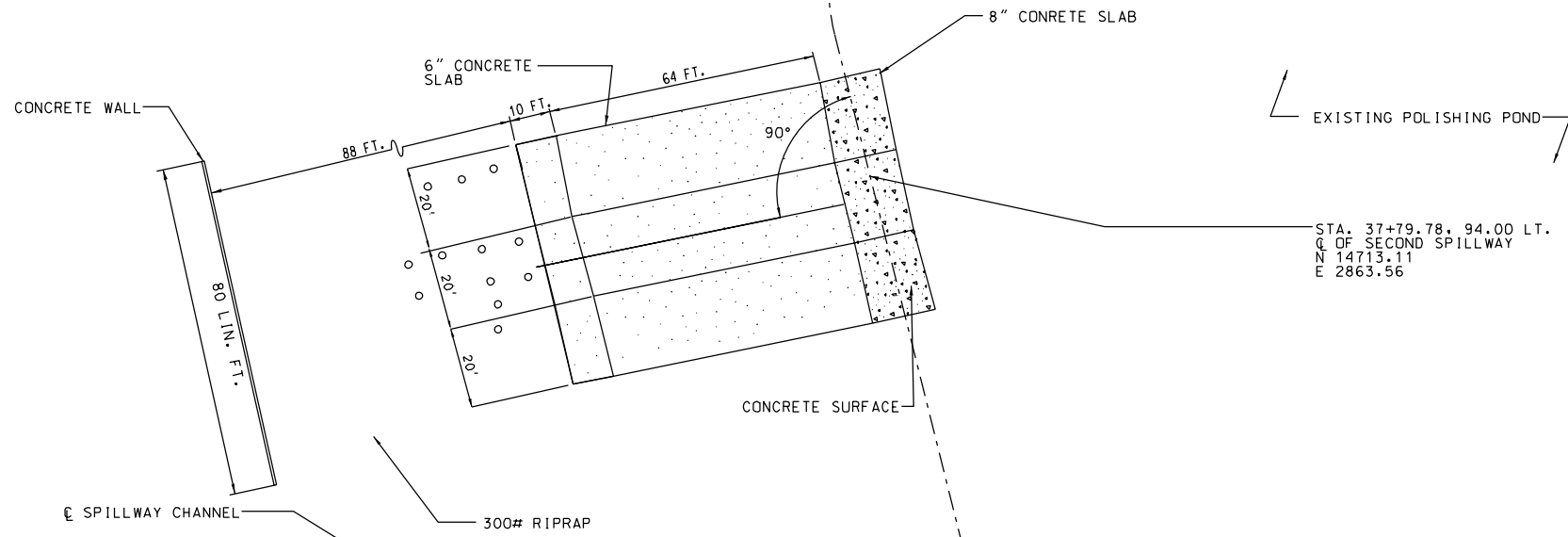
SCALE: 1"=10' HORIZ
1"=10' VERT

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A	NOTES
1	2-22-99	RKF	AS-BUILTS W.D.26650	DMG										

REFERENCES		
DR RKF	CAD RKF	DATE 7-17-97
OK	CKD	SCALE AS NOTED
APP DMG	PLOTTED	
APP	5-27-99	E-HAV1-C114

ILLINOIS POWER COMPANY
DECATUR

PLAN VIEW AND SECTION THRU
EAST ASH POND 2 OUTLET PIPE
HAVANA POWER STATION

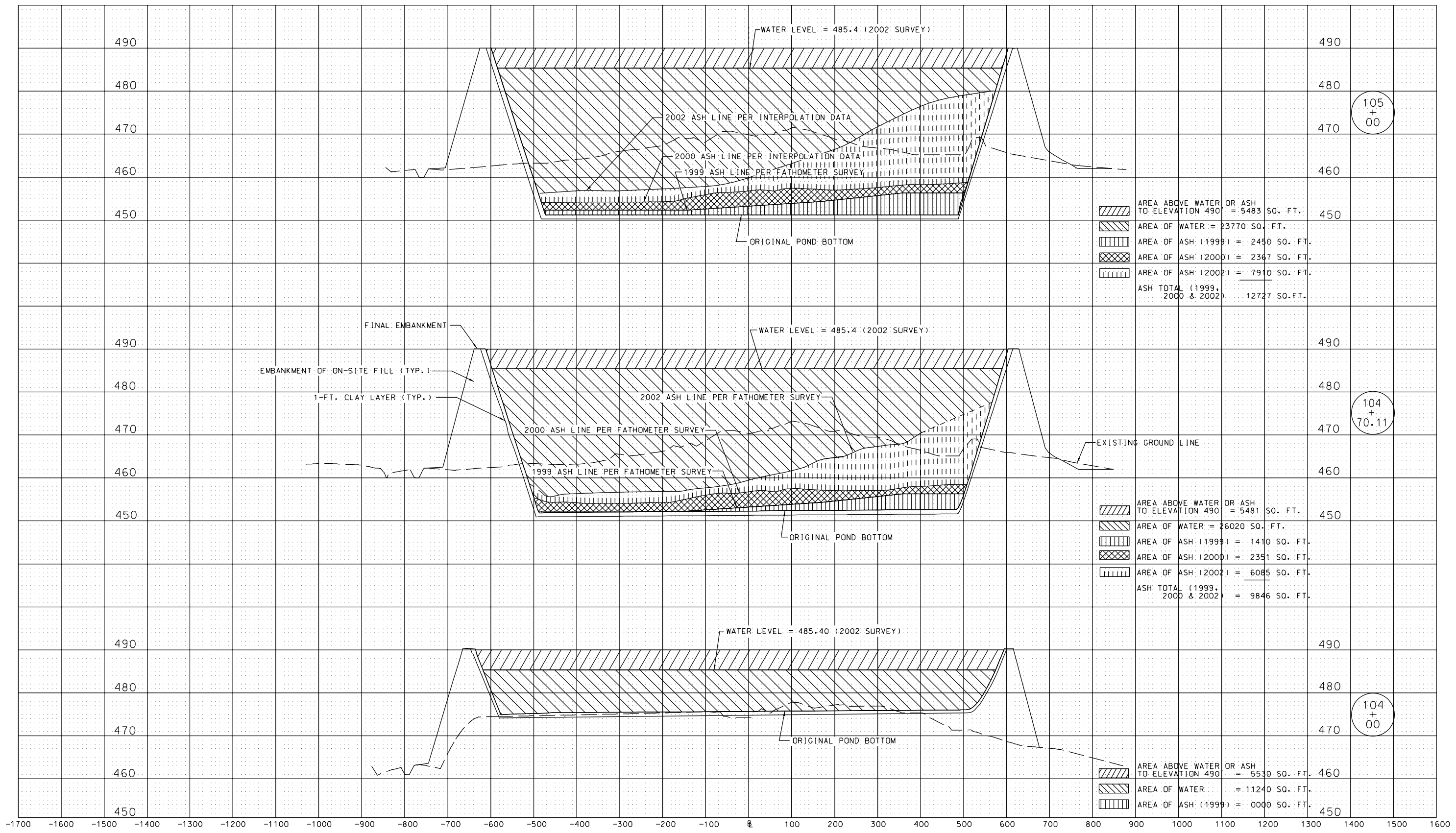


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1	3-6-98	RKF	DMG						REVISED SPILLWAY W.O. 26650																						

ILLINOIS POWER COMPANY
DECATUR

DETAILS FOR AUXILIARY SPILLWAYS
EAST ASH POND CELL 2
HAVANA POWER STATION

DR RKF	CAD RKF	DATE	8-5-97
OK DMG	CKD	SCALE	AS NOTED
APP	PLOTTED		
APP	5-10-99		E-HAV1-C115



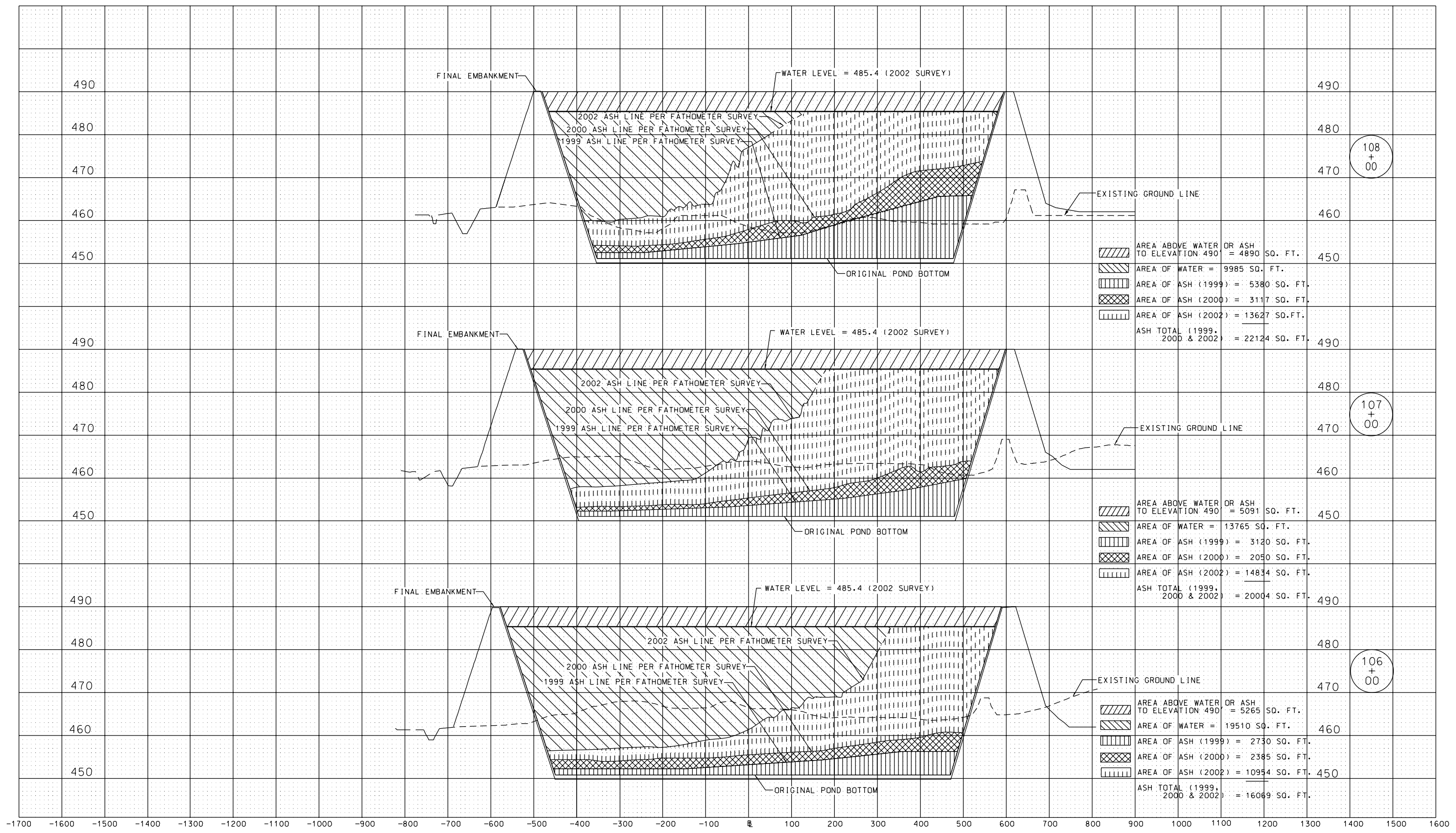
REVISION STATUS: <input type="checkbox"/> -CONSTRUCTION <input type="checkbox"/> -RECORD											
NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	NOTES
1	2-22-99	RKF	AS-BUILTS W.D. 26650	DMG							
2	11-19-99	CBD	ADDED 1999 ASH POND SURVEY	JPK							
3	8-3-00	Chastain	ADDED SURVEY DATA FROM 7-11-00	Chastain							
4	5-14-02	Chastain	ADDED SURVEY DATA FROM 5-14-02	Chastain							

REFERENCES
 DATE OF FIRST ASH SURVEY
 NOVEMBER 17, 1999
 ASH RESURVEYED JULY 11, 2000
 ASH RESURVEYED MAY 14, 2002

DYNEGY MIDWEST GENERATION, INC.
 DECATUR, ILLINOIS

CROSS SECTIONS
 STA. 104+00 TO STA. 105+00
 PROPOSED ASH POND CELL 2
 HAVANA POWER STATION

DR RKF	CAD RKF	DATE 6-25-97
OK DMG	CKD	SCALE 1"=100'H, 1"=10'V
APP	PLOTTED	
APP	5-14-02	E-HAV1-C119



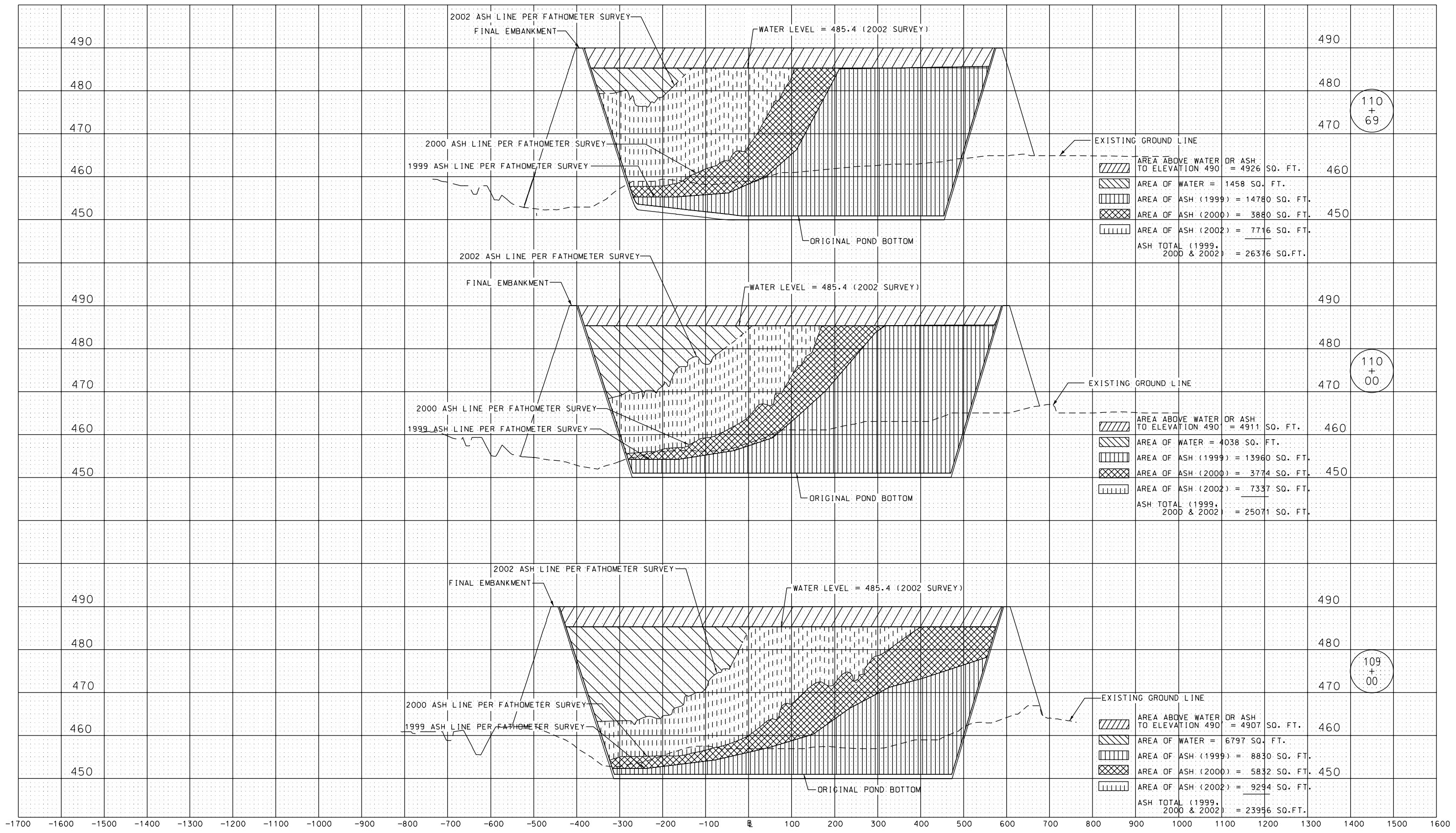
REVISION STATUS: <input type="checkbox"/> -CONSTRUCTION <input type="checkbox"/> -RECORD											
NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	NOTES
1	2-22-99	RKF	AS-BUILT W.O. 26650	RKF							
2	11-19-99	GBD	ADDED 1999 ASH POND SURVEY	JPK							
3	8-3-00	Chasrat	ADDED SURVEY DATA FROM 7-11-00	Chasrat							
4	5-14-02	Chasrat	ADDED SURVEY DATA FROM 5-14-02	Chasrat							

REFERENCES
 DATE OF FIRST ASH SURVEY
 NOVEMBER 17, 1999
 ASH RESURVEYED JULY 11, 2000
 ASH RESURVEYED MAY 14, 2002

DYNEGY MIDWEST GENERATION, INC.
 DECATUR, ILLINOIS

CROSS SECTIONS
 STA. 106+00 TO STA. 108+00
 PROPOSED ASH POND CELL 2
 HAVANA POWER STATION

DR RKF	CAD RKF	DATE	7-7-97
OK	CKD	SCALE	1"=100'H, 1"=10'V
APP	PLOTTED		
APP	5-14-02		E-HAV1-C120



REVISION STATUS: □ - CONSTRUCTION ○ - RECORD											
NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	NOTES
①	2-22-99	RKF	AS-BUILTS W.O. 26650								
②	11-19-99	GBD	ADDED 1999 ASH POND SURVEY								
③	8-3-00	Chastain	ADDED SURVEY DATA FROM 7-11-00								
④	5-14-02	Chastain	ADDED SURVEY DATA FROM 5-14-02								

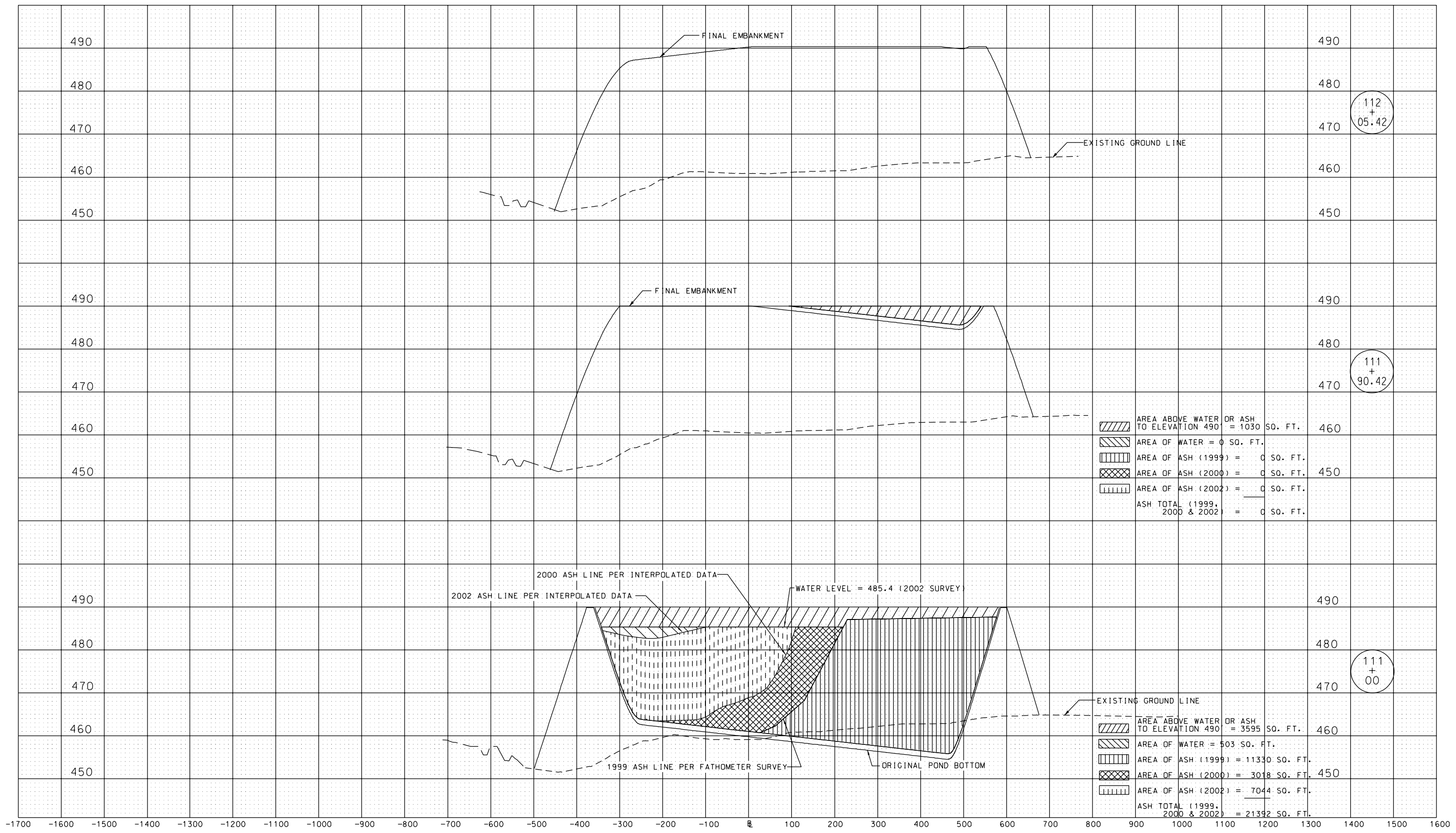
REFERENCES
 DATE OF FIRST ASH SURVEY
 NOVEMBER 17, 1999
 ASH RESURVEYED JULY 11, 2000
 ASH RESURVEYED MAY 14, 2002

DYNEGY MIDWEST GENERATION, INC.
 DECATUR, ILLINOIS

CROSS SECTIONS
 STA. 109+00 TO STA. 110+69
 PROPOSED ASH POND CELL 2
 HAVANA POWER STATION

DR RKF	CAD RKF	DATE 7-8-97
OK DMG	CKD	SCALE 1"=100'H, 1"=10'V
APP		PLOTTED
APP		5-14-02

E-HAV1-C121



REVISION STATUS: <input type="checkbox"/> -CONSTRUCTION <input type="checkbox"/> -RECORD											
NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	NOTES
1	2-22-99	RKF	AS-BUILTS W.O. 26650								
2	11-19-99	GBD	ADDED 1999 ASH POND SURVEY								
3	8-3-00	Chastain	ADDED SURVEY DATA FROM 7-11-00								
4	5-14-02	Chastain	ADDED SURVEY DATA FROM 5-14-02								

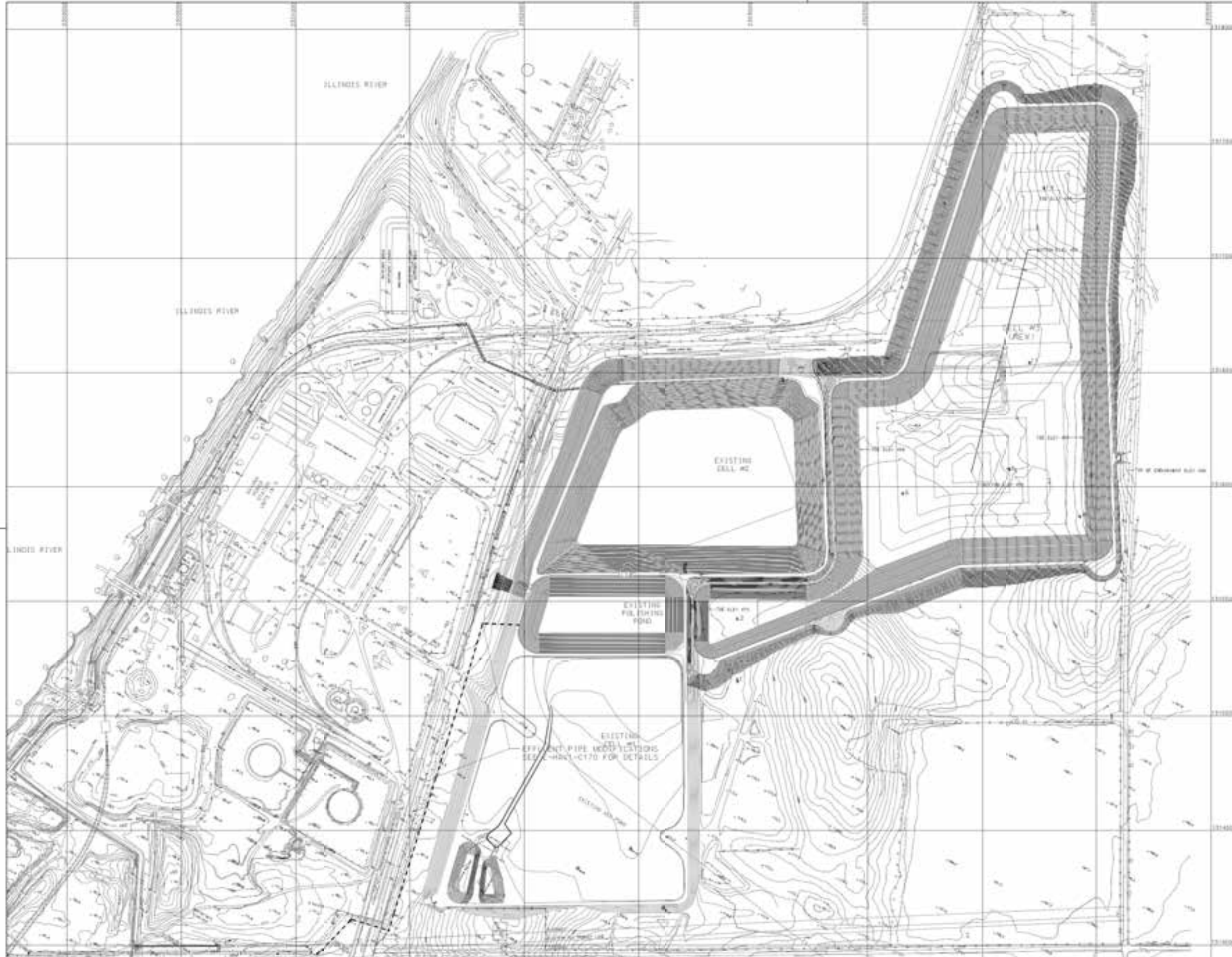
REFERENCES
 DATE OF FIRST ASH SURVEY
 NOVEMBER 17, 1999
 ASH RESURVEYED JULY 11, 2000
 ASH RESURVEYED MAY 14, 2002

DYNEGY MIDWEST GENERATION, INC.
 DECATUR, ILLINOIS

CROSS SECTIONS
 STA. 111+00 TO STA. 112+05.42
 PROPOSED ASH POND CELL 2
 HAYANA POWER STATION

DR RKF	CAD RKF	DATE 7-8-97
OK	CKD	SCALE 1=100'H, 1"=10'V
APP		PLOTTED
APP		5-14-02

E-HAV1-C122



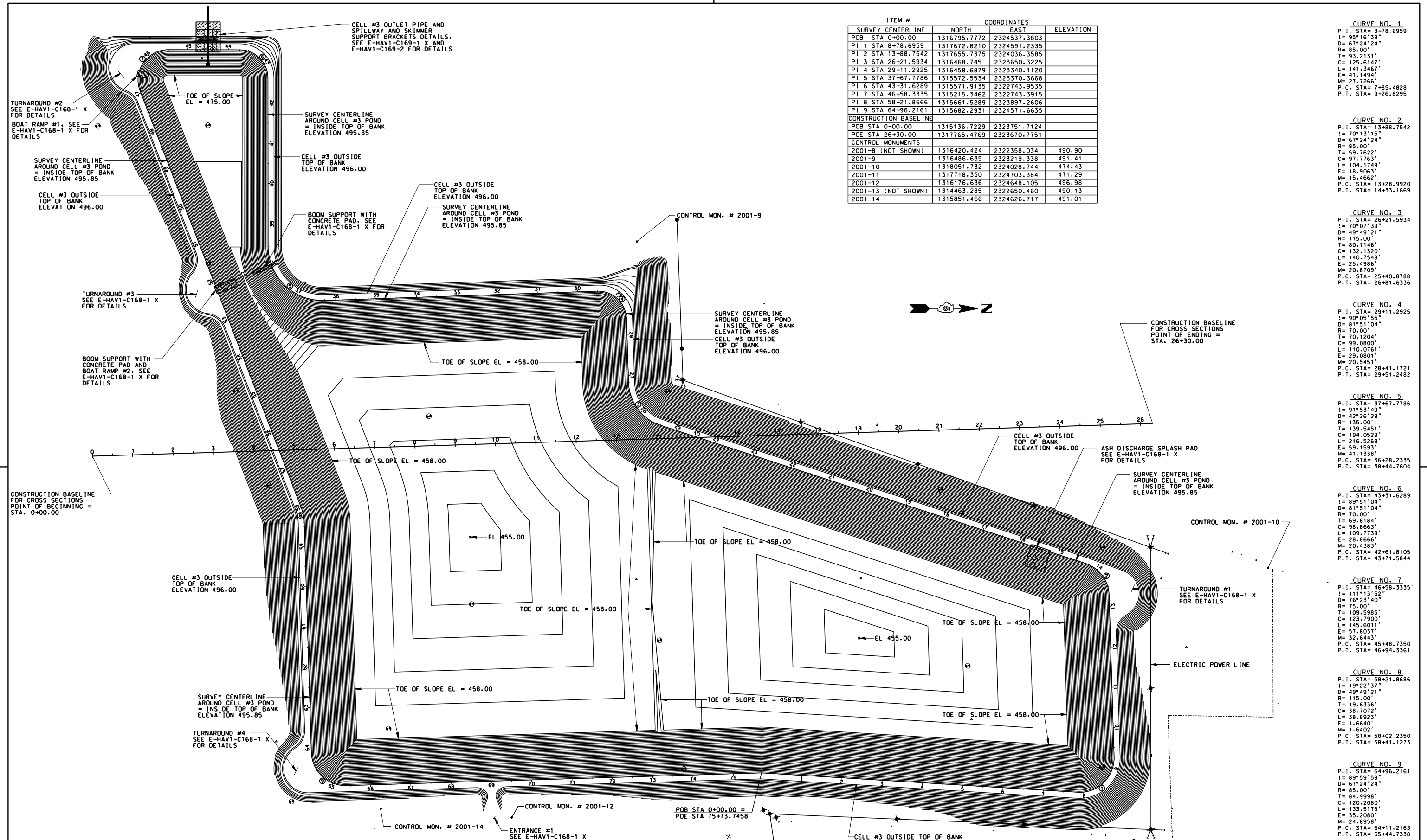
SOIL BORINGS			
BORING NO.	NORTH COORD.	EAST COORD.	ORIGINAL GROUND ELEV.
1	131392.4	232382.3	467.9
2	131393.1	232392.8	466.7
3	131424.3	232371.0	466.9
4	131348.3	232384.8	466.0
5	131374.4	232381.8	466.9
6	131371.9	232382.0	465.9
7	131401.2	232374.8	470.0
8	131387.2	232442.7	474.4
9	131402.8	232408.7	469.1
10	131460.8	232452.1	472.2
11	131484.8	232428.4	467.0
12	131484.1	232392.0	466.0
13	131744.0	232487.7	464.3
14	131700.7	232421.9	461.9
15	131347.1	232387.9	474.2
16	131364.2	232324.1	468.9

• INDICATES SOIL BORING LOCATION ON PLAN

NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION	NOTE	REFERENCES

REVISION STATUS: (1=CONSTRUCTION) (2=REWORK)
ILLINOIS POWER COMPANY
 DECATUR
 OVERALL SITE PLAN
 EAST ASH POND CELL 3
 HAVANNA POWER STATION
 DR. 1001
 DATE 10-18-2001
 SCALE 1" = 100'
 DESIGNED BY PLETZER
 CHECKED BY E-HAVI-C04 V
 11-2-0008

E-HAVI-C04 V



ITEM #	COORDINATES		
	SURVEY CENTERLINE	NORTH	EAST
POB STA 0+00.00	1316795.7772	2324537.3803	
PI 1 STA 8+78.6959	1317672.8210	2324591.2335	
PI 2 STA 13+88.7542	1317655.7375	2324036.3585	
PI 3 STA 26+21.5934	1316468.745	2323650.3225	
PI 4 STA 29+11.2925	1316458.6879	2323340.1120	
PI 5 STA 37+67.7786	1315572.5534	2323370.3668	
PI 6 STA 43+31.6289	1315571.9135	2322743.9535	
PI 7 STA 46+58.3335	1315215.3462	2322743.3915	
PI 8 STA 58+21.8666	1315661.5289	2323897.2606	
PI 9 STA 64+96.2161	1315682.2931	2324571.6635	
CONSTRUCTION BASELINE			
POB STA 0+00.00	1315136.7229	2323751.7124	
POE STA 26+30.00	1317765.4769	2323670.7751	
CONTROL MONUMENTS			
2001-8 (NOT SHOWN)	1316420.424	2322358.034	490.90
2001-9	1316486.635	2323219.338	491.41
2001-10	1318051.732	2324028.744	474.43
2001-11	1317718.350	2324703.384	471.29
2001-12	1316176.636	2324648.105	496.98
2001-13 (NOT SHOWN)	1314463.285	2322650.460	490.13
2001-14	1315851.466	2324626.717	491.01

CURVE NO. 1
 P.I. STA= 8+78.6959
 I= 95°16'38"
 D= 67°24'24"
 R= 85.00'
 T= 93.2131'
 C= 125.6147'
 L= 141.3467'
 E= 41.1494'
 M= 27.7266'
 P.C. STA= 7+85.4828
 P.T. STA= 9+26.8295

CURVE NO. 2
 P.I. STA= 13+88.7542
 I= 70°13'15"
 D= 67°24'24"
 R= 85.00'
 T= 59.7622'
 C= 97.7763'
 L= 104.1749'
 E= 18.9063'
 M= 15.4662'
 P.C. STA= 13+28.9920
 P.T. STA= 14+33.1669

CURVE NO. 3
 P.I. STA= 26+21.5934
 I= 70°07'59"
 D= 49°49'21"
 R= 115.00'
 T= 80.7146'
 C= 132.1320'
 L= 140.7548'
 E= 25.4986'
 M= 20.8709'
 P.C. STA= 25+40.8788
 P.T. STA= 26+81.6336

CURVE NO. 4
 P.I. STA= 29+11.2925
 I= 90°05'55"
 D= 81°51'04"
 R= 70.00'
 T= 70.1204'
 C= 99.0800'
 L= 110.0761'
 E= 29.0801'
 M= 20.5451'
 P.C. STA= 28+41.1721
 P.T. STA= 29+51.2482

CURVE NO. 5
 P.I. STA= 37+67.7786
 I= 91°53'49"
 D= 42°26'29"
 R= 135.00'
 T= 139.5451'
 C= 194.0529'
 L= 216.5269'
 E= 59.1593'
 M= 41.1338'
 P.C. STA= 36+28.2335
 P.T. STA= 38+44.7604

CURVE NO. 6
 P.I. STA= 43+31.6289
 I= 89°51'04"
 D= 81°51'04"
 R= 70.00'
 T= 69.8184'
 C= 98.8663'
 L= 109.7739'
 E= 28.8666'
 M= 20.4383'
 P.C. STA= 42+61.8105
 P.T. STA= 43+71.5844

CURVE NO. 7
 P.I. STA= 46+58.3335
 I= 111°13'52"
 D= 76°23'40"
 R= 75.00'
 T= 109.5985'
 C= 123.7900'
 L= 145.6011'
 E= 57.8037'
 M= 32.6443'
 P.C. STA= 45+48.7350
 P.T. STA= 46+94.3361

CURVE NO. 8
 P.I. STA= 58+21.8666
 I= 19°22'37"
 D= 49°49'21"
 R= 115.00'
 T= 19.6336'
 C= 38.7072'
 L= 38.8923'
 E= 1.6640'
 M= 1.6402'
 P.C. STA= 58+02.2350
 P.T. STA= 58+41.1273

CURVE NO. 9
 P.I. STA= 64+96.2161
 I= 89°59'59"
 D= 67°24'24"
 R= 85.00'
 T= 84.9998'
 C= 120.2080'
 L= 133.5175'
 E= 35.2080'
 M= 24.8958'
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 P.T. STA= 65+44.7338

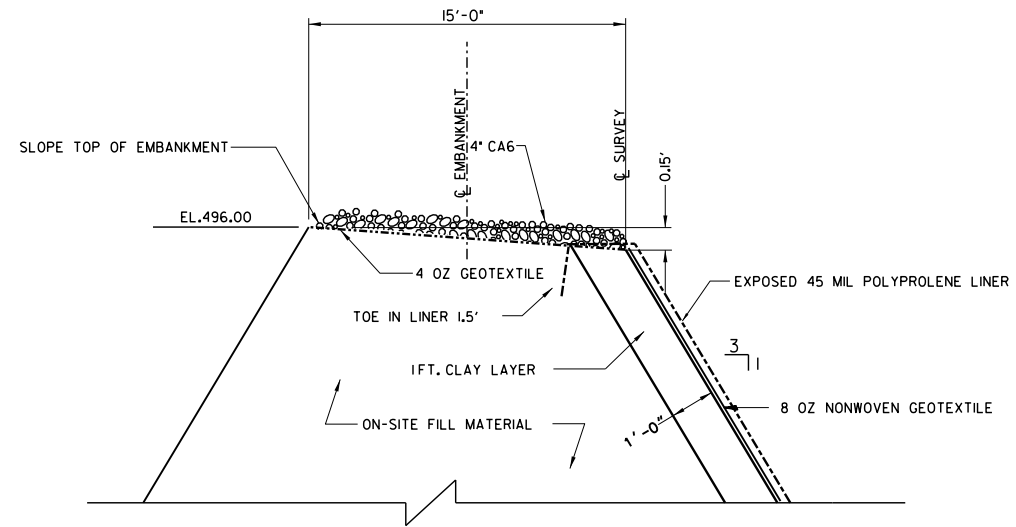
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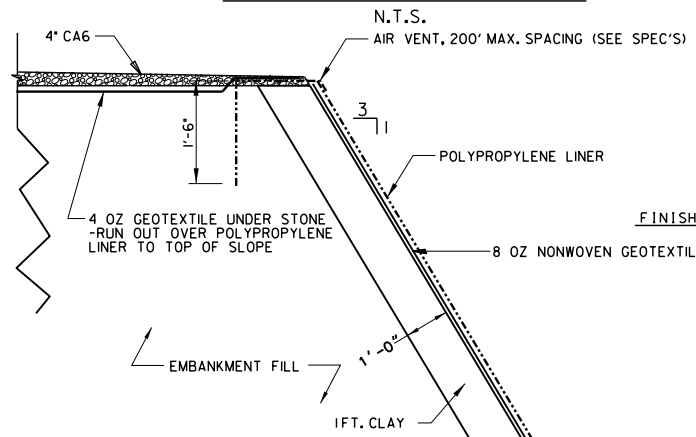
ILLINOIS POWER COMPANY DECATUR
SITE PLAN EAST ASH POND CELL 3 HAVANA POWER STATION
DR GBD CAD GBD DATE 10-12-2001
OK CKD SCALE 1"= 100'
APP PLOTTED
APP 12-26-2001 E-HAVI-CI66 X

E-HAVI-CI66 X

COMPUTER DWG. - DO NOT REVISE MANUALLY

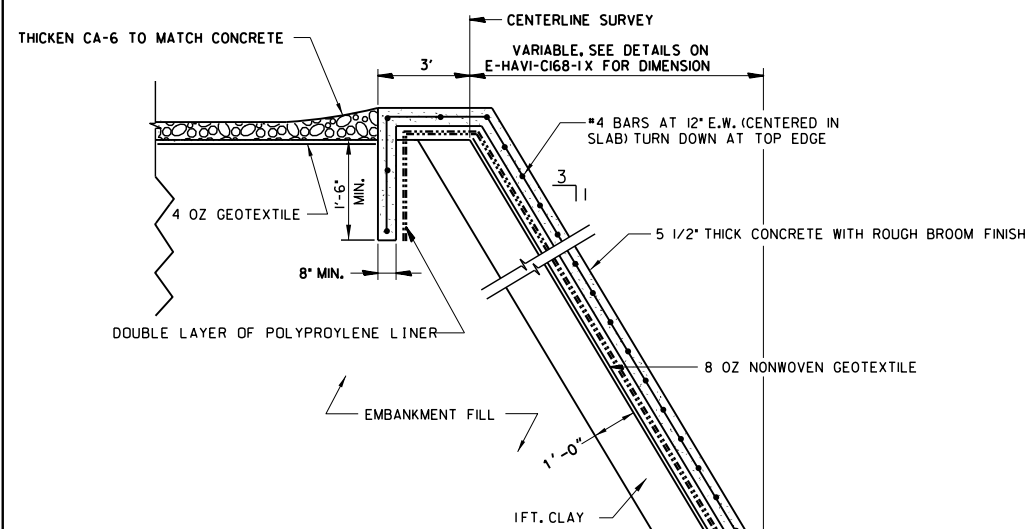


DETAIL OF TOP OF EMBANKMENT



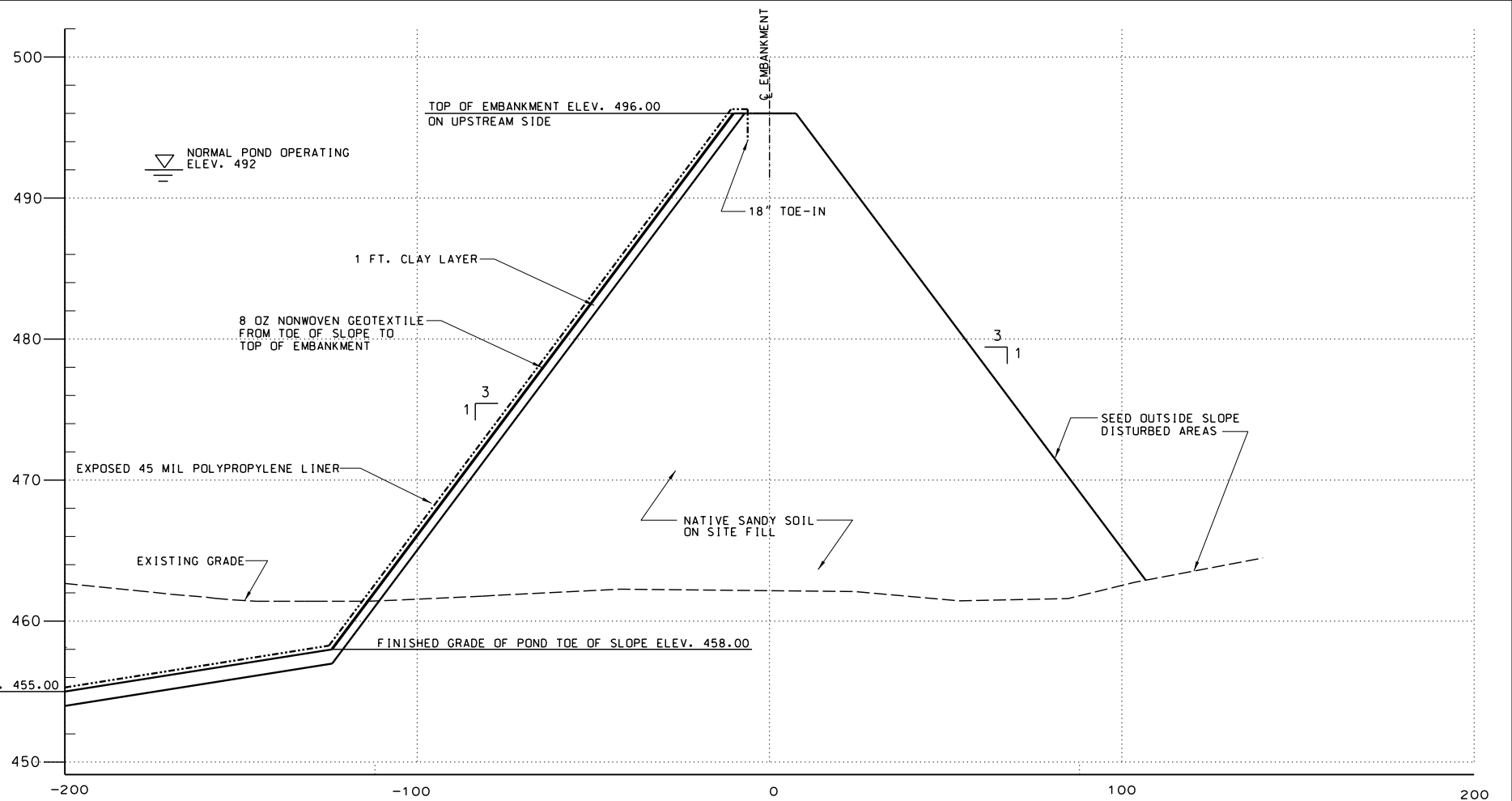
TYPICAL DETAIL FOR AT EDGE OF POLYPROPYLENE LINER

N.T.S.



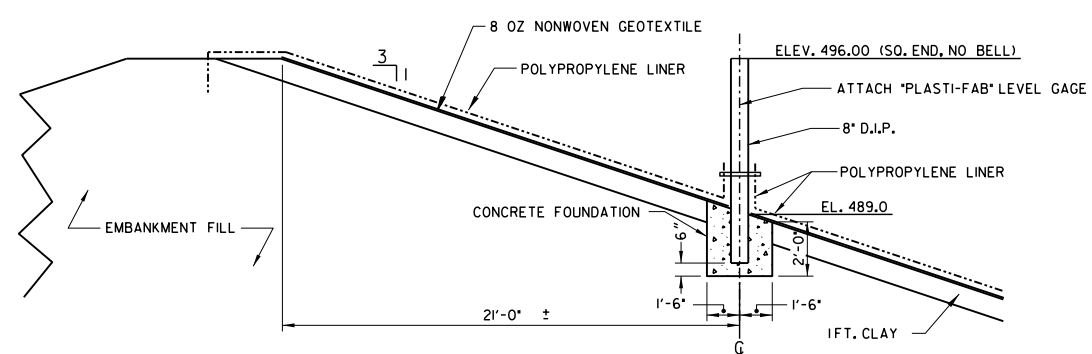
SECTIONAL VIEW OF CONCRETE PAD

N.T.S.



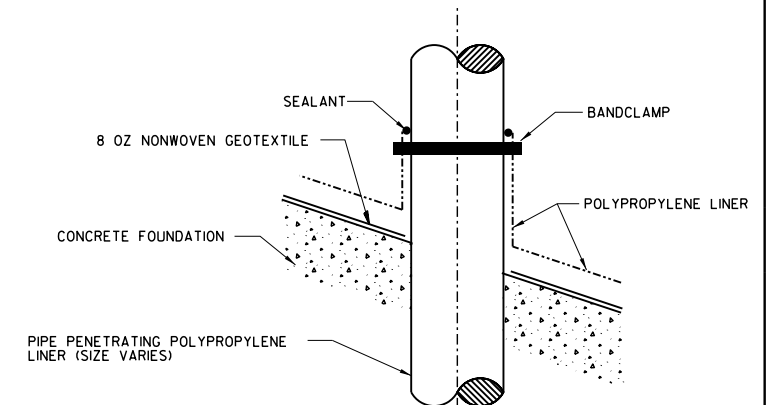
TYPICAL SECTION THRU EMBANKMENT

SCALE: 1' = 20'H
1' = 5'V



DETAIL OF STAFF GAGE SUPPORT

N.T.S.



TYPICAL POLYPROPYLENE LINER PENETRATION DETAIL

N.T.S.

REVISION STATUS: CONSTRUCTION RECORD

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A

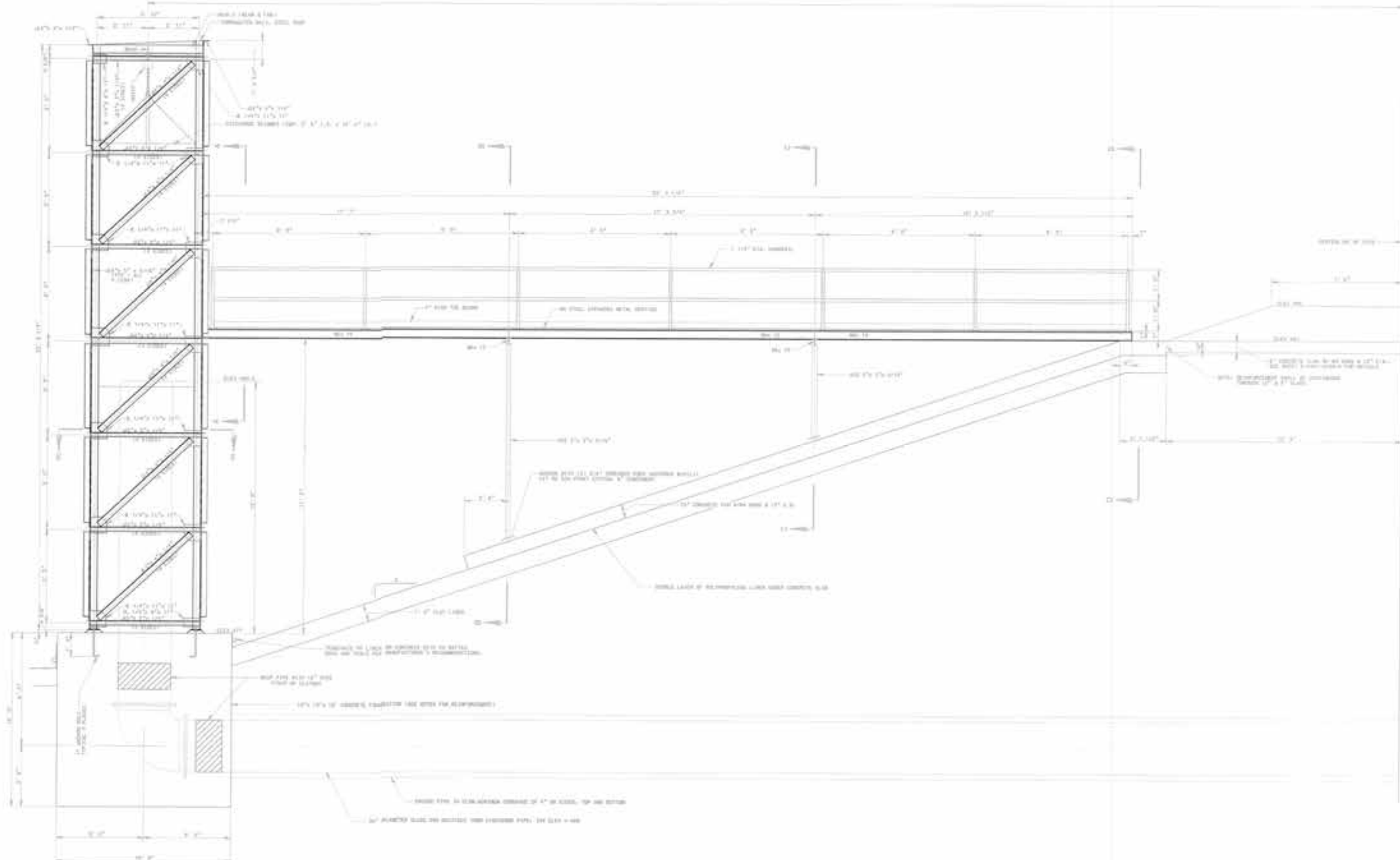
NOTES
1. FINAL INSTALLATION MUST CONFORM TO GEOMEMBRANE MANUFACTURER RECOMMENDATIONS

REFERENCES

ILLINOIS POWER COMPANY
DECATUR

TYPICAL CROSS SECTION AND DETAILS
EAST ASH POND CELL 3
HAVANA POWER STATION

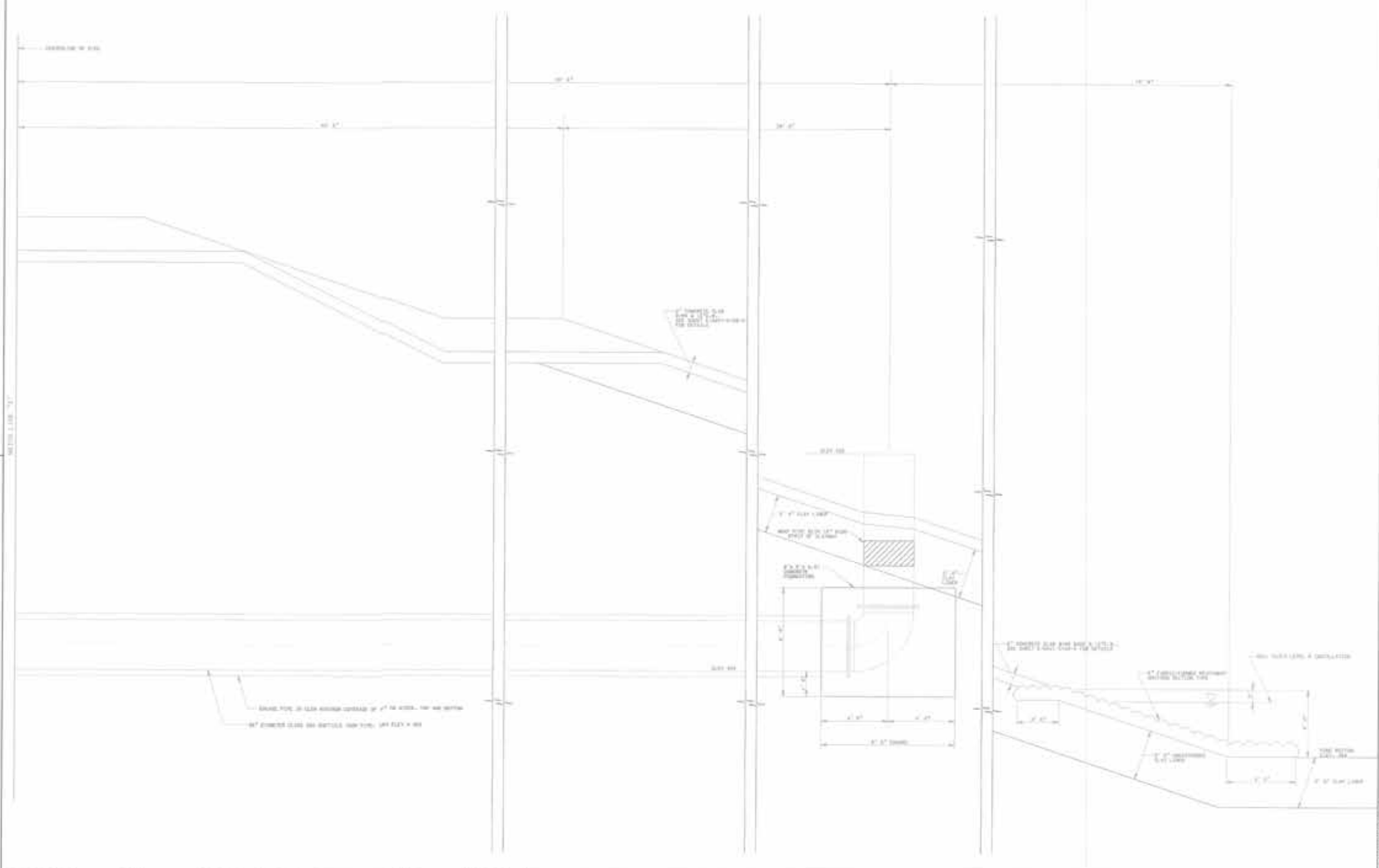
DR GBD	CAD GBD	DATE 9-28-2001
DK	CKD	SCALE: 1"=20'H, 1"=4'V
APP	PLOTTED	E-HAVI-C167 X
APP	12-28-2001	



NO.	DATE	REV.	DESCRIPTION	BY	APP.	NO.	DATE	REV.	DESCRIPTION	BY	APP.

ILLINOIS POWER COMPANY
 CHICAGO, ILL.
 CELL NO. DISCHARGE STRUCTURE & PIPE
 SHEET 1 OF 3
 HAWANA POWER STATION
 E-HAV1-C169-1

E-HAV1-C169-1



NO.	DATE	BY	DESCRIPTION	REV.	DATE	BY	DESCRIPTION	REV.	DATE	BY	DESCRIPTION

REVISIONS

ILLINOIS POWER COMPANY
 CELL #2 DISCHARGE STRUCTURE & PIPE
 SHEET 2 OF 3
 HAYMA POWER STATION
 DATE: 11-11-2009
 DRAWN: J.P.
 CHECKED: J.P.
 APPROVED: J.P.
 E-HAV1-C169-2

MATERIAL SPECIFICATION FOR
ALTERNATE DISCHARGE STRUCTURE

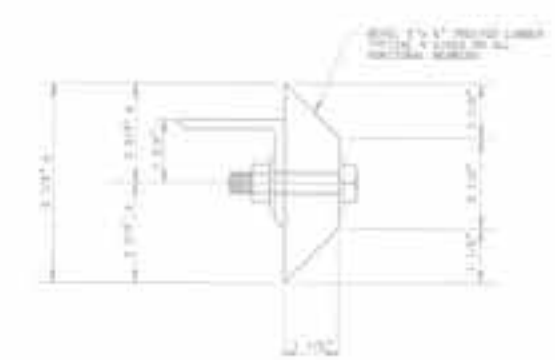
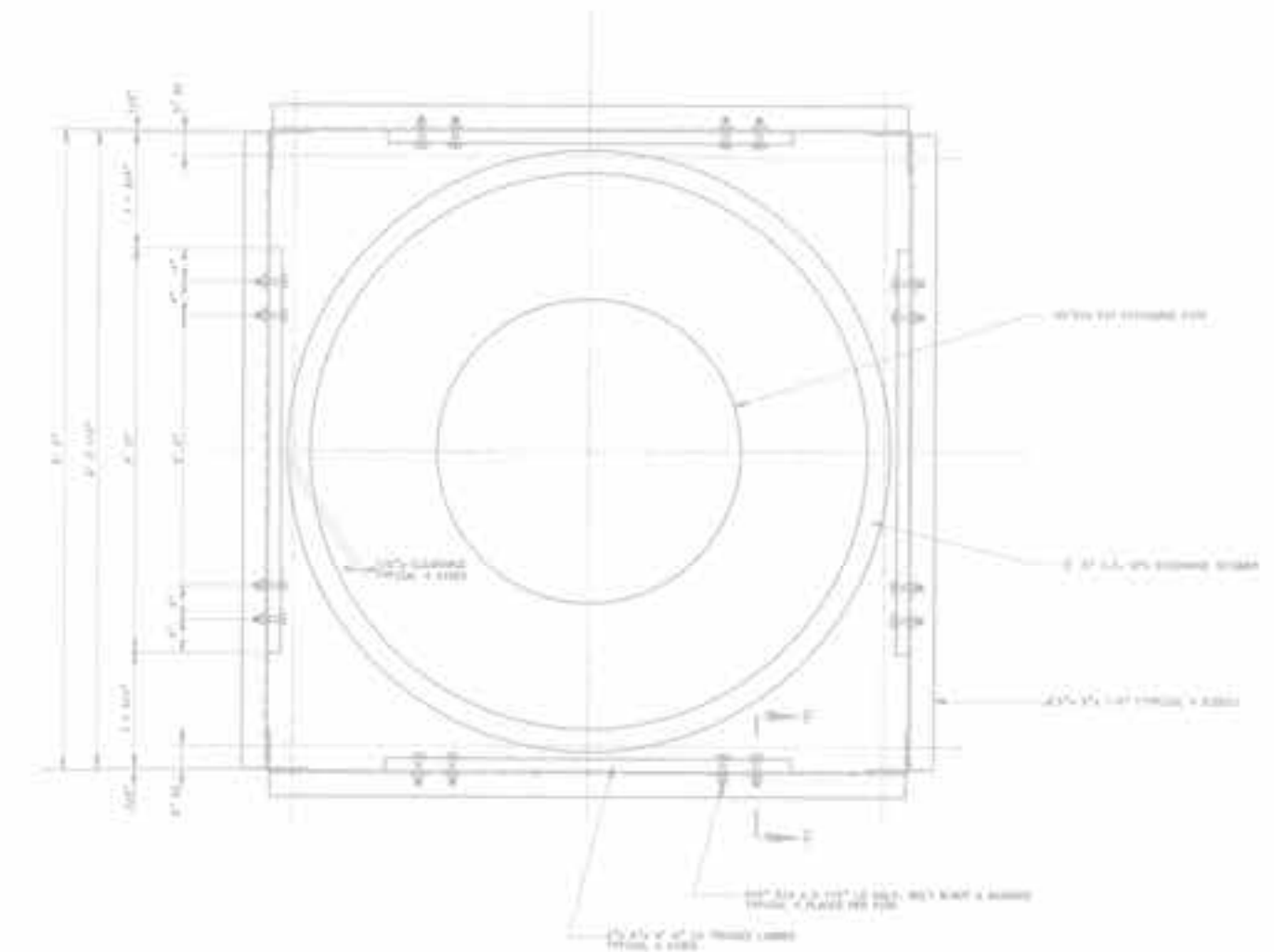
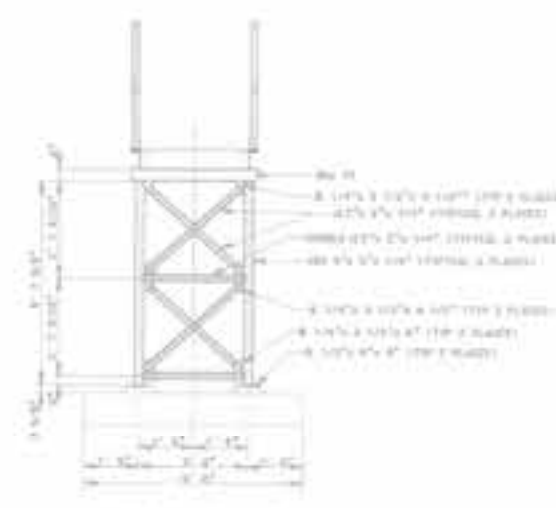
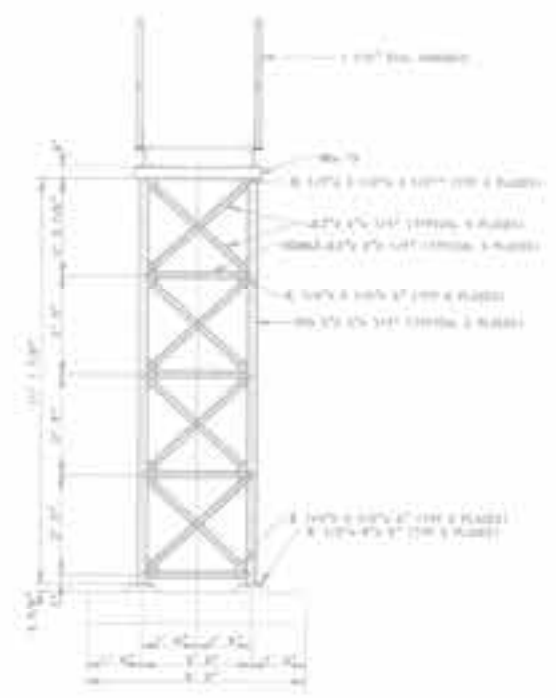
ALL WORK SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE ILLINOIS POWER COMPANY AND THE ILLINOIS STATE BOARD OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE ILLINOIS POWER COMPANY AND THE ILLINOIS STATE BOARD OF CONSTRUCTION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.
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7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.
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10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.



NO.	DATE	BY	DESCRIPTION	REV.	APP.	DATE	DESCRIPTION	REV.	APP.	DATE	DESCRIPTION

NO.	DATE	BY	DESCRIPTION	REV.	APP.	DATE	DESCRIPTION	REV.	APP.	DATE	DESCRIPTION

ILLINOIS POWER COMPANY
 HAVANA POWER STATION
 SHEET 3 OF 3
 E-HAV1-C169-3

E-HAV1-C169-3



Appendix C: Havana East Ash Pond Construction Specifications



**SPECIFICATIONS FOR A NEW
ASH DISPOSAL FACILITY**

**EAST - POND 1
HAVANA POWER PLANT**

W.O. 25408

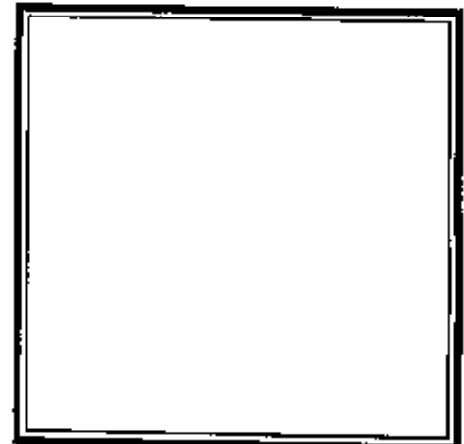
**PHASE 1
MAY, 1991**

APPROVED FOR CONSTRUCTION

Released By: David M. Jenkins

Approved By: H. T. Justice

**Civil/Structural Engineering
Illinois Power Company
500 S. 27th Street
Decatur, Illinois 62525**



STATE OF ILLINOIS



Permit
No 20748

Department of Transportation

Division of Water Resources

2300 South Dirksen Parkway
Springfield, Illinois 62764

Permission is Hereby Granted, this 25th day of September 19 91

To

Illinois Power Company
500 South 27th Street
Decatur, Illinois 62525

To construct, operate and maintain a fly ash disposal pond dam, a small-size, Class I dam which will have a perched impoundment located in the SW 1/4 of Section 12, Township 21 North, Range 9 West of the 3rd Principal Meridian in Mason County,

in accordance with an application dated March 9, 1990, and the specifications and plans entitled

HAVANA POWER STATION TOPOGRAPHIC MAP, C-SK.25408-1, DTD 5-29-91; ILLINOIS POWER COMPANY, DECATUR, EAST ASH POND I, HAVANA POWER STATION, SHEETS C-SK.25408-4.1 THRU C-SK.25408-4.11, ALL DTD 12/7/89 EXCEPT FOR SHEET 4.1 WHICH IS DTD 12/6/89, TYPICAL SECTION NEW ASH POND DIKE HAVANA POWER STATION, C-SK.25408-8, DTD 1/3/90; SPECIFICATIONS FOR A NEW ASH DISPOSAL FACILITY, DTD 5/91; HAVANA POWER STATION CLASS I DAM OPERATIONS AND MAINTENANCE PLAN REC'D W/LETTER DTD 9/16/91

filed with the Department of Transportation and made a part hereof, and subject to the terms and special conditions contained herein:

Examined and Recommended:

Martin J. Stralow
Martin J. Stralow, Chief, Dam Safety Section

APPROVED:

Kirk Brown
Kirk Brown Secretary

Approval Recommended:

Donald R. Vonnahme
Donald R. Vonnahme Director

CC: Rock Island Dist. COE Inspection File

THIS PERMIT is subject to the following conditions:

(a) This permit is granted in accordance with an act entitled: "AN ACT in relation to the regulation of the rivers, lakes and streams of the State of Illinois," approved June 10, 1911, as amended. (Ill. Rev. Stat., ch. 19, par. 52, et. seq.)

(b) This permit does not convey title to the permittee or recognize title of the permittee to any submerged or other lands, and furthermore, does not convey, lease or provide any right or rights of occupancy or use of the public or private property on which the project or any part thereof will be located, or otherwise grant to the permittee any right or interest in or to the property, whether the property is owned or possessed by the State of Illinois or by any private or public party or parties.

(c) This permit does not release the permittee from liability for damage to persons or property resulting from the work covered by this permit, and does not authorize any injury to private property or invasion of private rights.

(d) This permit does not relieve the permittee of the responsibility to obtain other federal, state or local authorizations required for the construction of the permitted activity; and if the permittee is required by law to obtain approval from any federal agency to do the work, this permit is not effective until the federal approval is obtained.

(e) The permittee shall, at his own expense, remove all temporary piling, cofferdams, false work, and material incidental to the construction of the project, from the floodway, river, stream or lake in which the work is done. If the permittee fails to remove such structures or materials, the state may have removal made at the expense of the permittee. If future need for public navigation or public interests of any character, by the state or federal government, necessitates changes in any part of the structure or structures, such changes shall be made by and at the expense of the permittee or his successors as required by the Department of Transportation or other properly constituted agency, within sixty (60) days from receipt of written notice of the necessity from the Department or other agency, unless a longer period of time is specifically authorized.

(f) The execution and details of the work authorized shall be subject to the supervision and approval of the Department. Department personnel shall have right of access to accomplish this purpose.

(g) The permittee shall file with the Department a properly executed acceptance of all terms and conditions of the permit within sixty (60) days of receipt of the permit; however, starting work on the construction authorized will be considered full acceptance by the permittee of the terms and conditions of the permit.

(h) The Department in issuing this permit has relied upon the statements and representations made by the permittee; if any statement or representation made by the permittee is found to be false, the permit may be revoked at the option of the Department; and when a permit is revoked all rights of the permittee under the permit are voided.

(i) If the project authorized by this permit is located in or along Lake Michigan or a meandered lake, the permittee and his successors shall make no claim whatsoever to any interest in any accretions caused by the project.

(j) In issuing this permit, the Department does not approve the adequacy of the design or structural strength or the structure or improvement.

(k) Noncompliance with the conditions of this permit will be considered grounds for revocation.

(l) If the work permitted is not completed on or before N/A this permit shall be void.

THIS PERMIT is subject to further special conditions as follows:

(SEE ATTACHED SPECIAL CONDITIONS)

SPECIAL CONDITIONS
FOR
ILLINOIS POWER COMPANY

PERMIT NO. 20748

1. If the construction activity herein permitted is not completed on or before December 31, 1994, this permit shall cease and be null and void.
2. The Permittee shall request, in writing, an inspection of the dam by the Department of Transportation, Division of Water Resources when the dam is completed and the impoundment is ready for filling.
3. The Permittee shall request, in writing, and must receive authorization to commence filling operations from the Department of Transportation, Division of Water Resources. If the Department of Transportation has not acted to grant or deny the authorization to fill within 30 days after receipt of the written request, the owner may proceed with filling operations.
4. The Permittee authorizes the Department of Transportation, Division of Water Resources, in the event that the dam is found to be in immediate danger of failure, to enter upon the dam property, if necessary, to prevent or alleviate any dam breach damage. The Permittee agrees to compensate DWR for costs reasonably incurred by such emergency action.
5. The Permittee shall operate, inspect, and maintain the dam and appurtenances in accordance with the approved plans and in accordance with the latest edition of the "Rules for Construction and Maintenance of Dams" adopted by the Department of Transportation. If the approved operation, inspection, and maintenance plans are not complied with by the Permittee, this permit shall cease and be null and void.
6. The Permittee grants the Department of Transportation, Division of Water Resources, the right of access to inspect the dam site and immediate vicinity beginning from the date of this permit, for the life of the dam and appurtenances.
7. The Permittee shall provide the Department of Transportation, Division of Water Resources, with "As-Built" plans and specifications when construction has been completed.
8. There shall be no deviation from the plans submitted and hereby approved unless the proposed change in plans shall first have been submitted to and approved, in writing, by the State of Illinois acting by and through its Department of Transportation.
9. The Permittee shall have the dam and appurtenances inspected annually by a professional engineer registered in the State of Illinois and shall have the engineer prepare and submit an inspection report on forms provided by the Department of Transportation to the Department of Transportation, Division of Water Resources. The first inspection report shall be submitted within one year of the completion of the construction of the dam.

This Acceptance Must Be executed Before Work is Started — See Condition G

Permit
Nº 20748

STATE OF ILLINOIS
Department of Transportation
Division of Water Resources
2300 South Dirksen Parkway
SPRINGFIELD, ILLINOIS 62764

The undersigned permittee, personally, or if a corporation by its duly authorized officers, hereby ac-
cepts the permit bearing the same serial number as this coupon subject to all the conditions named
therein, on this 30th day of September, 1991, at Decatur, Illinois.

ILLINOIS POWER COMPANY

By [Signature] Manager of
Environmental Affairs

If a corporation
affix seal here.

ATTEST: [Signature] Asst. Sec.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
WATER POLLUTION CONTROL PERMIT

LOG NUMBERS: 1034-90 (0400-90)

PERMIT NO.: 1990-EA-1034

FINAL PLANS, SPECIFICATIONS, APPLICATION
AND SUPPORTING DOCUMENTS
PREPARED BY: Illinois Power Company

DATE ISSUED: August 1, 1990

SUBJECT: ILLINOIS POWER COMPANY, Havana Power Plant -- Ash Disposal Facility

PERMITTEE TO CONSTRUCT, OWN AND OPERATE
Illinois Power Company
500 South 27th Street
Post Office Box 511
Decatur, IL 62525-1805

Permit is hereby granted to the above designated permittee(s) to construct and/or operate water pollution control facilities described as follows:

Construction of a new wet ash disposal facility at the Havana Power Plant. The proposed facility will be a surface impoundment occupying 30 acres in Section 12, T21N, R9W of the 3rd P.M., Mason County. A compacted soil berm will be constructed above grade to an elevation of 490 M.S.L. to form the impoundment. The impoundment bottom elevation will be at elevation 460 M.S.L. A three feet thick soil liner constructed of silty clay having a maximum permeability of 1×10^{-7} cm/sec will line the pond bottom and inner slope of the impoundment berm. The berm slope will be 3:1 horizontal to vertical. New ash transport piping will be installed from the power plant to the pond. A reinforced concrete pipeline will be built to carry the discharge from the new ash disposal pond to the existing South Ash Pond discharge piping. When construction of the new ash disposal pond is completed ash transport water from the existing South Ash Pond and wastewater from the existing North Ash Pond will be diverted to the new ash disposal pond (7.2 MGD DAF). Nine groundwater monitoring wells (six downgradient and three upgradient) will be installed around the proposed facility. The monitoring wells will be constructed with 10-foot screens intercepting approximately the top seven feet of the saturated zone.

This Operating Permit expires on July 1, 1995.

This Permit is issued subject to the following Special Condition(s). If such Special Condition(s) require(s) additional or revised facilities, satisfactory engineering plan documents must be submitted to this Agency for review and approval for issuance of a Supplement Permit.

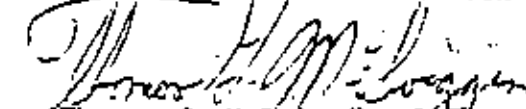
Continued on Page 2

THE STANDARD CONDITIONS OF ISSUANCE INDICATED ON THE REVERSE SIDE MUST BE COMPLIED WITH IN FULL. READ ALL CONDITIONS CAREFULLY.

TGM:GC:kja:2647n/70-71

cc: EPA - Region 5
Record
Binds

DIVISION OF WATER POLLUTION CONTROL


Thomas G. McSwiggin, P.E.
Manager, Permit Section

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
WATER POLLUTION CONTROL PERMIT

LOG NUMBERS: 1034-90 (0400-90)

PERMIT NO.: 1990-EA-1034

FINAL PLANS, SPECIFICATIONS, APPLICATION
AND SUPPORTING DOCUMENTS
PREPARED BY: Illinois Power Company

DATE ISSUED: August 1, 1990

SUBJECT: ILLINOIS POWER COMPANY, Havana Power Plant -- Ash Disposal Facility

SPECIAL CONDITION 1: Discharge from the subject facility to the Illinois River shall be governed by the effluent limitations and monitoring requirements set forth in NPDES Permit No. IL0001571.

SPECIAL CONDITION 2: During construction erosion control practices shall be implemented in accordance with Standard Specifications for Soil Erosion and Sediment Control as contained in IEPA/WPC/87-012 or current edition.

SPECIAL CONDITION 3: Construction quality assurance program reports shall be maintained by the permittee and made available for Agency inspection at reasonable times.

SPECIAL CONDITION 4: Nine performance monitoring wells shall be installed and monitored quarterly for boron, magnesium, manganese, pH, sulfate and total dissolved solids in accordance with the plans and specifications filed with the IEPA dated February 28, 1990 and July 5, 1990. Copies of the monitoring results shall be submitted to the IEPA within 60 days after each quarterly sampling date, to the following address:

Illinois EPA
Division of Water Pollution Control
Permit Section, Industrial Unit
2200 Churchill Road
Post Office Box 19276
Springfield, Illinois 62794-9276



Table of Contents

The following data and drawings, attached hereto, are a part of these specifications:

		<u>Page</u>
	Table of Contents	1
	Description of Project	3
	Location Map	4
Section I	Construction Schedule	5
Section II	General Requirements	10
Section III	Earthwork Specifications (CS 6-7.1 thru .13)	15
Section IV	Foundation Specifications (CS 6-8.1 thru .8)	31
Section V	Stone Riprap Specifications (CS 13.1 thru .4)	40
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The following drawings are not attached hereto, but are considered a part of these specifications:

Phase 1

Cover Sheet	
Ash Pond Plan	C-SK.25408-1
Cross Section 1+00, 1+85	C-SK.25408-4.1
Cross Section 2+00, 2+72	C-SK.25408-4.2
Cross Section 3+88, 4+60	C-SK.25408-4.3
Cross Section 5+21, 6+17	C-SK.25408-4.4
Cross Section 6+88, 8+58	C-SK.25408-4.5
Cross Section 9+30, 10+00	C-SK.25408-4.6
Cross Section 10+88, 12+08	C-SK.25408-4.7
Cross Section 12+83, 12+98	C-SK.25408-4.8
Cross Section 13+70, 15+52	C-SK.25408-4.9
Cross Section 16+24, 16+39	C-SK.25408-4.10
Cross Section 17+58	C-SK.25408-4.11
Typical Sections	C-SK.25408-8

SPECIFICATIONS FOR A NEW
ASH DISPOSAL FACILITY
EAST - POND 1
HAVANA POWER PLANT
W.O. 25408

Description of Project

This project consists of excavating, hauling, placing, and compacting borrow material to construct a new surface impoundment for ash disposal at the Havana Power Plant. Sand on or near the site will be used to form most of the embankment. Clay will be hauled to the site for use as liner material. Ash sluice piping will be installed from the plant to the new facility. A new discharge line will be constructed from the new polishing pond to the existing discharge point.

Phase 1 Construction will consist of building the sand embankment portion of the facility except for the gaps to be left for pipe installation.

Phase 2 Construction will consist of placing the facility's low permeability liner, pond structures, and outlet piping east of Rt. 78.

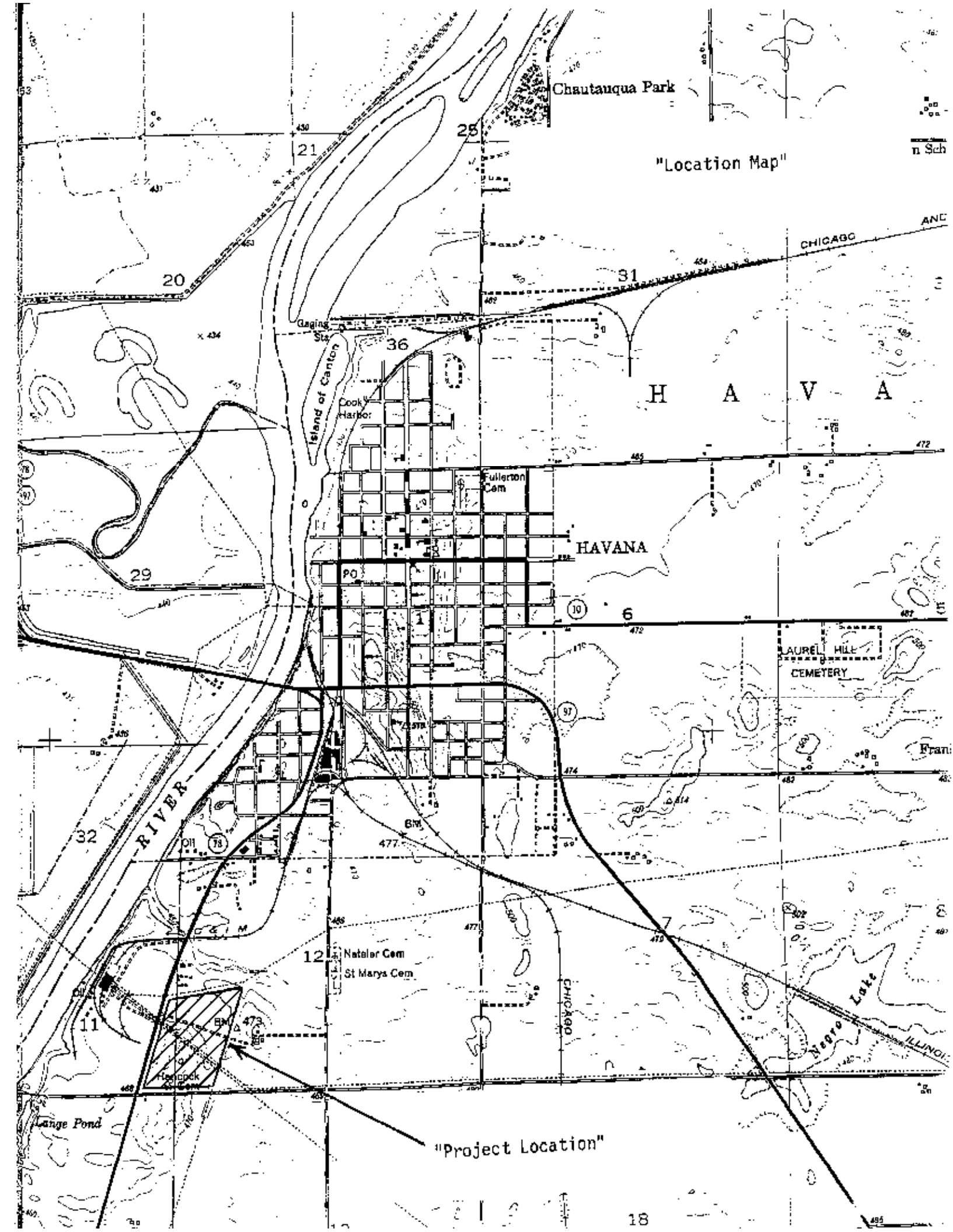
Phase 3 Construction will consist of installing the new ash sluice piping, discharge piping, ash wetting piping, and structures.

Project Location

Havana Power Plant
Rt. 78 South of Havana
Box 368
Havana, IL 62644

Phone: (309) 543-2227

Dan Thompson - Plant Manager



SECTION I

Construction Schedule

The purpose of this schedule is to assist the Contractor in the management of time, equipment, and manpower for each step of this project in order to meet the project requirements. The completed schedule will be used during the bid evaluation process to determine if the Contractor's understanding of the scope of work required to complete the project is complete, and subsequent to award of contract to evaluate project status.

The work to be performed under this contract has been grouped into the job tasks and sequence shown below.

The bidder shall provide the start date, completion date, number of personnel required, and equipment required for each project task. The Contractor is encouraged to modify the tasks and/or sequences to reflect how he plans to construct this facility. If the bidder provides a modified schedule, it must be at least as detailed as the tasks and sequences listed below.

Failure of bidder to provide the information requested below is grounds for disqualification of bid.

After award of contract, it will be the responsibility of the Contractor to report starting and completion dates for each project item to the Company's Representative. Updated project schedules and project status report shall be submitted along with all requests for partial payment.

Completion Date

Phase 1 Construction - The work shall be completed on or before **September 30, 1991.**

Phase 2 Construction - The work shall be completed on or before **October 31, 1992.**

Phase 3 Construction - The work shall be completed on or before **October 31, 1992.**

Key Construction ActivitiesPhase 1:

	<u>Task</u>	<u>Start Date</u>	<u>End Date</u>	<u>Number of Personnel</u>	<u>Equipment Required</u>
1.	Locate all utilities and other above/below ground services and improvements.				

Key Construction Activities (cont'd)Phase 1: (cont'd)

<u>Task</u>	<u>Start Date</u>	<u>End Date</u>	<u>Number of Personnel</u>	<u>Equipment Required</u>
2. Clear and strip construction areas.				
3. Construct embankment/cut slopes.				
4. Final grading and rock placement.				
5. Seed construction areas.				

Phase 2:

<u>Task</u>	<u>Start Date</u>	<u>End Date</u>	<u>Number of Personnel</u>	<u>Equipment Required</u>
1. Locate all utilities and other above/below ground services and improvements.				
2. Clear and strip construction areas.				

Key Construction Activities (cont'd)

Phase 2: (cont'd)

<u>Task</u>	<u>Start Date</u>	<u>End Date</u>	<u>Number of Personnel</u>	<u>Equipment Required</u>
3. Construct embankment/ cut slopes.	_____	_____	_____	_____ _____ _____
4. Pour reinforced concrete outfall structures and ash line splash pad.	_____	_____	_____	_____ _____ _____
5. Complete all piping connections.	_____	_____	_____	_____ _____ _____
6. Test pipe lines.	_____	_____	_____	_____ _____ _____
7. Final grading and rock placement.	_____	_____	_____	_____ _____ _____
8. Seed construction areas.	_____	_____	_____	_____ _____ _____

Key Construction Activities (cont'd)Phase 3:

	<u>Task</u>	<u>Start Date</u>	<u>End Date</u>	<u>Number of Personnel</u>	<u>Equipment Required</u>
1.	Locate all utilities and other above/below ground services and improvements.				
2.	Clear and strip construction areas.				
3.	Lay ash sluice lines.				
4.	Place outfall pipe from pond to river.				
5.	Complete all piping connections.				
6.	Test pipe lines.				

Key Construction Activities (cont'd)

Phase 3: (cont'd)

<u>Task</u>	<u>Start Date</u>	<u>End Date</u>	<u>Number of Personnel</u>	<u>Equipment Required</u>
7. Install fence.				

A pre-construction meeting will be held at the plant to review the Contractor's construction schedule. Construction activities may have to be adjusted to fit the operation of the plant. The Contractor should be prepared to stage portions of the work and anticipate some delays due to plant requirements. Contractor costs associated with the delays shall be considered incidental to the contract. The plant must continue to operate during construction. Generally, these possible delays will be associated with the pipe laying and connecting the new and old ash sluice lines.

The Contractor shall cooperate with other contractors working at or near the site on this or other Company projects.

SECTION II

General RequirementsIntroduction

The Contractor shall furnish, at his expense, all tools, equipment, transportation, and materials (unless noted otherwise) necessary for the construction of this project. The Contractor shall perform the work in a good, workmanlike manner in accordance with these specifications and drawings.

A Company Representative will be on the job to assure that the facilities constructed meet the requirements of the Company's specifications.

The Company will cooperate in any way possible with technical or practical construction advice requested by the Contractor. However, the methods used to meet these specifications are the sole responsibility of the Contractor. The Contractor is in charge of the work and is responsible for safety.

The Contractor shall submit a list of subcontractors with his proposal.

Drawings, Data, and Special Agreements

Drawings and data are listed in the Table of Contents of these specifications. Any questions concerning these drawings and data shall be referred to the Company's Representative. The Contractor shall not take advantage of errors and omissions in the plans and/or discrepancies between the plans and specifications. The Company will make corrections and supply information omitted to the plans and specifications, with the Company's interpretation being final. Any addenda issued during the time of bidding are considered a part of these specifications.

Revised or additional drawings and data may be issued after the contract agreement is signed. Within ten days after the receipt of any supplemental information, the Contractor shall advise the Company of any changes in unit costs in writing. No work shall be done on properties on which a cost change is required until a price is negotiated that is acceptable to the Company and to the Contractor.

Examination of the Work Site

The Contractor shall examine the job location and job requirements. The Contractor shall be held responsible for any loss or error resulting from ignorance concerning requirements of the work or any difficulties encountered. Contractor shall be familiar with the conditions and difficulties to be encountered in the work.

Approved for Construction Drawings

Work on this project shall not begin until drawings labeled "Approved for Construction" have been issued to the Contractor. All other drawings (such as preliminary drawings issued for bidding purposes) shall be discarded.

Project Description

A new wet ash disposal facility is to be constructed at the Havana Power Plant. The main construction components will be compacted sand for the embankments and compacted clay for the pond liner.

Phase 1:

Phase I Construction will consist of clearing and stripping the Pond 1 site, hauling, placing, and compacting the sand embankment to the lines and grades shown on the plans. Locations where piping penetrates the embankment, a gap in the embankment will be left for later installation of the pipe. This gap will be a 10 ft. horizontal opening with side slopes at 3H to 1V rising to the top of the embankment.

Construction areas shall be cleared and stripped. A minimum of six inches of topsoil shall be taken from all construction areas to remove vegetation and other deleterious materials. The depth of material removed will vary across the site, being greater in the wooded areas to remove the tree roots located there. Raking of the area will be required. Depth of material to be removed shall be determined by the Company's Representative during the work. The material removed shall be stockpiled to provide the topsoil for placement on the berms prior to seeding.

All material cleared from the site shall be legally disposed of by the Contractor in an environmentally safe manner. Open burning conditions are contained in Section X. The Contractor shall notify the Engineer one day in advance of anticipated burning of landscape debris at the site.

The Contractor shall control and eliminate any fugitive dust caused by the work.

The Contractor shall control and eliminate all erosion resulting from the work.

The Company will provide a reasonable number of horizontal and vertical control points for the project. The Contractor is responsible for day to day staking and layout work.

Prior to placing any fill material for the embankment or liner, the subgrade shall be compacted as detailed in Section III. The embankment shall be brought to the lines and grades shown on the plans prior to placing any liner material.

The embankment shall be constructed of sand excavated on the site, placed and compacted to the lines and grades shown on the plans.

Any structures, fills, roads, or other facilities built to provide access or protect items on the site shall be removed at the end of the project at the direction of the Company.

The Contractor shall inform the construction work force of the high voltage transmission lines crossing the site. Work operations shall not cause damage to or tripping out of the line.

Phase 1: (cont'd)

Access to the Company's equipment, material, and property shall be maintained at all times. Interference with daily operations shall be minimized.

The Contractor shall obtain all permits, licenses, and required documents to perform the work. All costs resulting from compliance with these documents shall be considered incidental to the contract and be included in the Contractor's bid.

Phase 2:

Phase 2 Construction will consist of placing the outlet piping and concrete structures east of Rt. 78, construction the rest of the sand embankment, and installing the low permeability liner in the ponds.

Construction areas shall be cleared and stripped, if required. A minimum of six inches of topsoil shall be taken from all construction areas to remove vegetation and other deleterious materials. The depth of material removed will vary across the site, being greater in the wooded areas to remove the tree roots located there. Raking of the area will be required. Depth of material to be removed shall be determined by the Company's Representative during the work. The material removed shall be stockpiled to provide the topsoil for placement on the berms prior to seeding.

All material cleared from the site shall be legally disposed of by the Contractor in an environmentally safe manner. Open burning conditions are contained in Section X. The Contractor shall notify the Engineer one day in advance of anticipated burning of landscape debris at the site.

The Contractor shall control and eliminate any fugitive dust caused by the work.

The Contractor shall control and eliminate all erosion resulting from the work.

The Company will provide a reasonable number of horizontal and vertical control points for the project. The Contractor is responsible for day to day staking and layout work.

Prior to placing any fill material for the embankment or liner, the subgrade shall be compacted as detailed in Section III. Phase 2 Contractor shall be prepared to re-shape and compact the surface of the embankment after the Phase 1 work has been completed. The embankment shall be brought to the lines and grades shown on the plans prior to placing any liner material. Pipe shall be installed to the line and grade shown on the plans and the embankment gap closed prior to placing any liner material.

The embankment shall be constructed of sand excavated on the site, placed and compacted to the lines and grades shown on the plans.

Phase 2: (cont'd)

The liner shall be constructed of silty clay. The clay shall be tested prior to hauling any material to the site to insure it meets the project requirements. The liner material shall be provided from a single location by the Contractor or one of the locations previously investigated by the Company. These locations are given in Section III. The Company, at its own expense, shall arrange for soil borings to verify the quantity and quality of clay at the Contractor's borrow area. The Construction Contractor shall construct access roads to the soil boring locations and maintain the paths to allow ingress/egress by the Testing Contractor while the borings are taken. The Company shall locate the boring locations. The quality of the clay is paramount to the success of this project. An alternate bid shall be sought using a manufactured bentonite/geotextile fabric for a liner. The Contractor shall state what product will be used and submit manufacturer's data along with the bid. Liner shall be installed per manufacturer's recommendations.

Only material incorporated into the work, i.e., "as-built" quantities will be paid for by the Company. Work associated with clearing, overburden removal, waste removal, stockpiling of unsuitable material, hauling, placing, grading, and compacting the clay shall be included in the price of the clay. Unsuitable material hauled to the site shall be removed at the Contractor's expense.

A vapor barrier and sand ballast shall be placed over the liner to help prevent any loss of moisture from the clay.

Crushed stone aggregate will be placed on the areas shown in the drawings to provide an all weather road.

Any structures, fills, roads, or other facilities built to provide access or protect items on the site shall be removed at the end of the project at the direction of the Company.

The Contractor shall inform the construction work force of the high voltage transmission lines crossing the site. Work operations shall not cause damage to or tripping out of the line.

Access to the Company's equipment, material, and property shall be maintained at all times. Interference with daily operations shall be minimized.

The Contractor shall obtain all permits, licenses, and required documents to perform the work. All costs resulting from compliance with these documents shall be considered incidental to the contract and be included in the Contractor's bid.

Phase 3:

Phase 3 Construction will consist of installing ash sluice piping, outlet piping, and concrete structures under Rt. 78 and west towards the river.

Phase 3: (cont'd)

The Contractor shall control and eliminate any fugitive dust caused by the work.

The Contractor shall control and eliminate all erosion resulting from the work.

The Contractor shall install the fence as shown on the plans. The fence shall be installed one foot inside the property line. The Contractor shall reimburse the Company for costs associated with re-establishing any property corner monument damaged or destroyed by the work.

The Company will provide a reasonable number of horizontal and vertical control points for the project. The Contractor is responsible for day to day staking and layout work.

Only material incorporated into the work, i.e., "as-built" quantities will be paid for by the Company.

New ash sluice piping will be installed from the plant to the pond at the lines and grades shown on the plans. A highway crossing will be required.

A reinforced concrete pipeline will be built to carry water from the new facility to the river.

Two reinforced concrete structures will be constructed to control water levels in the pond and water flow out of the facility.

Ductile iron pipe shall be installed from the north ash pond pumping station to the ash sluice pipe discharge point (ash wetting line). A highway crossing will be required.

All blocking, fittings, and appurtenances shall be considered incidental to the pipe per foot price for each type of pipe.

Ash sluice lines and the ash wetting line shall be pressure tested as outlined in Section VII.

Any structures, fills, roads, or other facilities built to provide access or protect items on the site shall be removed at the end of the project at the direction of the Company.

The Contractor shall inform the construction work force of the high voltage transmission lines crossing the site. Work operations shall not cause damage to or tripping out of the line.

Access to the Company's equipment, material, and property shall be maintained at all times. Interference with daily operations shall be minimized.

The Contractor shall obtain all permits, licenses, and required documents to perform the work. All costs resulting from compliance with these documents shall be considered incidental to the contract and be included in the Contractor's bid.

SECTION III

Earthwork Specifications

Portions of this work require the placement and compaction of soil or aggregate. This work will be covered by the following specification for earthwork operations.

Phase 1:

All wooded areas shall be cleared and raked to remove all large limbs, branches, and roots. The landscape debris will be burned on site.

At least six inches of topsoil shall be stripped and stockpiled near the proposed facility. The depth of removal will be determined by the Company's Representative. Wooded areas will require a deeper cut due to more underground roots and debris than agricultural areas.

Subgrade exposed on horizontal or sloped surfaces shall be compacted to 95% of the subgrade material's maximum dry density value as determined by the Standard Proctor, ASTM D698, for a depth of 6 inches, prior to the placement of any more fill material.

Embankment material shall be compacted to 95% of the fill material's maximum dry density value as determined by the Modified Proctor, ASTM D1557. Each lift shall be tested and achieve the specified compaction prior to the placement of additional lifts of material. Embankment material shall consist of the material excavated on site and placed to the lines and grades shown on the plans. If additional material is required, it will be excavated from an area adjacent to the site.

Construction of the liner and pond berms shall be accomplished in one construction season.

Subsection 7 - Measurement section of the following standard (CS 6-7) is not applicable to this work. Measurement and payment will be in accordance with Section XIII - Bid Units.

Measurement of embankment shall be based on cubic yards of fill placed to the lines and grades shown on the plans.

Excess material excavated from the pond shall be hauled to the outside of the dike at a location designated by the Company's Representative, rolled to remove voids, and graded to provide positive drainage. This material shall be designated as overburden removal and measured in cubic yards.

Stone will be measured in tons.

Subgrade exposed on horizontal or sloped surfaces shall be compacted to 95% of the subgrade material's maximum dry density value as determined by the Standard Proctor, ASTM D698, for a depth of 6 inches, prior to the placement of any more fill material.

Phase 2:

Embankment material shall be compacted to 95% of the fill material's maximum dry density value as determined by the Modified Proctor, ASTM D1557. Each lift shall be tested and achieve the specified compaction prior to the placement of additional lifts of material. Embankment material shall consist of the material excavated on site and placed to the lines and grades shown on the plans. If additional material is required, it will be excavated from an area adjacent to the site.

Liner material shall be compacted to meet all of the following criteria:

1. Density shall be at least 97% of the clay's maximum dry density value as determined by the Standard Proctor, ASTM D698.
2. The moisture content shall be -1% to +3% of the optimum moisture content as determined by the Standard Proctor ASTM D698.
3. The maximum permeability of the liner shall be 1×10^{-7} cm/sec.

All compaction tests shall be compared to the combined Proctor curve/permeability chart prepared by the material's testing agency to insure that the clay liner will function properly. If a greater degree of compaction is required to meet the permeability requirements, this work shall be done with no increase in the corresponding unit price for this work.

No liner material shall be brought to the site until it is determined from the soils investigation that the clay properties are satisfactory and sufficient material is available to complete the job if a site other than one of those listed is selected by the Contractor. This includes, but is not limited to, the combined Proctor/permeability curves for the liner material.

The liner material shall be excavated from a continuous, naturally-occurring deposit of silty clay, CL or CL-CH unified classification. Stockpiled material will not be accepted if a site other than one of those listed is selected by the Contractor.

Prior to placing any liner material, the embankment/cut slope subgrade shall be rolled smooth to eliminate intrusion of the sand into the clay.

The clay shall be placed in layers not to exceed six inches in thickness. The clay lift shall be extended up the face of the slope from the bottom to yield a continuous lift across the pond. Kneading action (sheepsfoot roller) shall be used to compact the clay. To prevent desiccation of the clay during construction, the liner will be built full depth (three feet) and full width, progressing from one end of the pond (north or south) to the other. The width of the swath should not exceed ± 150 ft. A sloped face of ± 75 ft. should be advanced as the full depth of the liner is achieved. Once the three foot thickness has been constructed, the clay shall be rolled smooth and a four mil, reinforced polyethylene plastic vapor barrier shall cover the clay. A one foot thick layer of loose sand

Phase 2: (cont'd)

shall be carefully dumped on the plastic to keep it from blowing or moving. If the plastic is damaged during construction, it shall be repaired at no cost to the Company.

If the clay dries to dust, the dust shall be removed until moist clay is exposed. The exposed clay shall be disced before any more material is placed on the liner. This work shall be considered incidental to the unit price for the liner material.

If the clay cracks, the clay shall be removed until moist clay is exposed that is not cracked. The exposed clay shall be disced before any more material is placed on the liner. This work shall be considered incidental to the unit price for the liner material.

Any construction activity that results in a vertical edge in the clay liner will require sloping of the clay face to provide a suitable bond between the existing clay and newly placed clay. The sloped face shall be disced and worked prior to placing the additional clay to provide for proper bonding of the new clay.

A manufactured bentonite/geotextile fabric mat will be bid as an alternate to the natural 3 ft. clay liner. The bentonite mat shall be installed per manufacturer's recommendations. Details for anchoring and lapping the mat shall be provided with the Contractor's bid.

All piping that penetrates the clay liner shall have a compacted clay-bentonite (90%-10% dry weight mix) backfill for 15 ft. beyond the clay liner into the embankment. The pipe installed in the berms shall be wrapped with a bentonite sheet (or bentomat) for its entire length. The bentonite sheet shall also be used to form a collar around the pipe on the inside of all ponds under the sand ballast.

Crushed stone aggregate shall be CA-6. The stone shall be compacted to 95% of its maximum dry density value as determined by ASTM D698.

Construction of the liner and pond berms shall be accomplished in one construction season.

Subsection 7 - Measurement section of the following standard (CS 6-7) is not applicable to this work. Measurement and payment will be in accordance with Section XIII - Bid Units.

Measurements of the clay liner shall be in square yards - three feet thick and based on as-built quantities.

Measurement of embankment shall be based on cubic yards of fill placed to the lines and grades shown on the plans.

Bentonite sheets (or bentomat) will be measured in square yards.

Stone will be measured in tons.

1. SCOPE

- 1.1 This specification covers the minimum performance requirements, materials, and references necessary to govern earthwork and related operations. Earthwork is the movement of soil, sand, or rock from one location to another, shaping the materials in accordance with the plans or specifications, and achieving the desired physical condition of the materials by various methods.

2. DEFINITIONS

- 2.1 Borrow Excavation: Work done in obtaining material for embankments or fills from a source other than required excavation. Included is the excavating, transporting, placing, and compacting of materials from locations furnished by the Contractor necessary for the construction of embankments, subgrade, shoulders, sub-base, intersections, approaches, entrances, and other items indicated on the plans or noted in the specifications.
- 2.2 Channel Excavation: The removal and satisfactory disposal of all materials encountered in the construction of ditches, stream channels, or swales.
- 2.3 Clay: An aggregate of microscopic and submicroscopic flake-shaped crystalline minerals characterized by the typical colloidal properties of cohesion, plasticity, and the ability to absorb ions conforming to the gradations set forth in the Unified Classification System.
- 2.4 Clearing: The removal and disposal of all obstructions such as fences, walls, foundations, buildings, trees, stumps, brush, accumulations of rubbish of whatever nature, and existing structures.
- 2.5 Construction Inspector: The Owner's on-site representative.
- 2.6 Contractor: The party or parties proposing to provide all labor, equipment and materials required to perform the work specified herein or on the plans.
- 2.7 Crushed Gravel: Fractured particles resulting from the crushing of gravel which, prior to crushing, would have been retained on a screen with an opening 1.5 times as large as the maximum size of the resulting crushed material.
- 2.8 Crushed Stone: Angular fragments resulting from the mechanical crushing of granite, limestone, or dolomite from undisturbed, consolidated deposits: (Dolomite shall be a carbonate rock containing 11.0% or more magnesium oxide (MgO). Limestone shall be a carbonate rock containing less than 11.0% magnesium oxide).
- 2.9 Engineer: The Owner's project engineer.

- 2.10 Embankment: Consists of the construction of fill areas (berms, road subgrade) by hauling depositing, placing and compacting the specified material above the natural surface or a specified grade line.
- 2.11 Footing Excavation: See Structure Excavation.
- 2.12 Gravel: Coarse, granular, unconsolidated material resulting from the reduction of rock by the action of the elements and having subangular to rounded surfaces conforming to the gradations set forth in the Unified Classification System.
- 2.13 Impervious Backfill: Fine aggregate (Silty Clay, CL to CL-CH) placed and compacted in excavations, around structures or other items as indicated in the plans and specifications.
- 2.14 Inorganic Silt: Fine grained soil possessing little or no plasticity or cohesion conforming to the gradations set forth in the Unified Classification System.
- 2.15 Owner: Illinois Power Company or its designated agent.
- 2.16 Pipe Excavation: The excavation, removal and satisfactory disposal of all materials encountered constructing a trench for installation of the specified pipe.
- 2.17 Porous Backfill: Fine aggregate (clean sand) placed and compacted in excavations, around structures or other items as indicated in the plans and specifications.
- 2.18 Rock: Natural aggregate of mineral grains connected by strong and permanent cohesive forces.
- 2.19 Sand: Fine granular material resulting from the natural disintegration of rock conforming to the gradations set forth in the Unified Classification System.
- 2.20 Soil: Natural aggregate of mineral grains, with or without organic constituents, that can be separated by gentle mechanical means such as agitation in water. Gravel and sand are coarse grained soils, while silts and clays are fine grained soils.
- 2.21 Stripping: The excavation, removal and satisfactory disposal (if required) of all materials taken between the original surface and the top of suitable material for the construction of embankments, subgrade, sub-base, shoulders, intersections, ditches, waterways, entrances, approaches and incidental work.
- 2.22 Structure Excavation: Removal of any and all materials encountered during installation of any designated structure and the satisfactory disposal of all materials.

- 2.23 Unclassified Excavation: The removal of any combination of topsoil, earth, rock, muck or obstacle carried out to the lines and grades specified or shown on the plans without regard to percentage of moisture and type of material found.

3. REFERENCES

- 3.1 The reference to specifications or organizations (such as ASTM) together with any diagrams, drawings or plans shall be considered as part of this specification. In the event of conflict between this specification and the referenced documents, the requirements of this specification shall take precedence. The following specifications, standards, and codes apply:
- 3.1.1 American Society for Testing and Materials (ASTM)
- 3.1.1.1 ASTM D75-82: Practice for Sampling Aggregates
 - 3.1.1.2 ASTM D420-69: Recommended Practice for Investigating and Sampling Soil and Rock for Engineering Purposes
 - 3.1.1.3 ASTM D421-58: Method for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants
 - 3.1.1.4 ASTM D422-63: Method for Particle-Size Analysis of Soils
 - 3.1.1.5 ASTM D653-85: Terms and Symbols Relating to Soil and Rock Mechanics
 - 3.1.1.6 ASTM D698-78: Test Methods for Moisture - Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb (2.49 kg) Rammer and 12-inch (305-mm) Drop
 - 3.1.1.7 ASTM D854-83: Test Method for Specific Gravity of Soils
 - 3.1.1.8 ASTM D1140-54: Test Method for Amount of Material in Soils Finer than the No. 200 (75- μ m) Sieve
 - 3.1.1.9 ASTM D1452-80: Practice for Soil Investigation and Sampling by Auger Borings
 - 3.1.1.10 ASTM D1556-82: Test Method for Density of Soil in Place by the Sand-Cone Method
 - 3.1.1.11 ASTM D1557-78: Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10-lb (4.5 kg) Rammer and 18-inch (457-mm) Drop

- 3.1.1.12 ASTM D1558-84: Test Method for Moisture Content Penetration Resistance Relationships of Fine Grained Soils
- 3.1.1.13 ASTM D1586-84: Method for Penetration Test and Split-Barrel Sampling of Soils
- 3.1.1.14 ASTM D1587-83: Practice for Thin-Walled Tube Sampling of Soils
- 3.1.1.15 ASTM D2167-84: Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
- 3.1.1.16 ASTM D2168-80: Methods for Calibration of Laboratory Mechanical-Rammer Soil Compactors
- 3.1.1.17 ASTM D2216-80: Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock and Soil Aggregate Mixtures
- 3.1.1.18 ASTM D2217-66: Method for Wet Preparation of Soil Samples for Particle Size Analysis and Determination of Soil Constants
- 3.1.1.19 ASTM D2487-83: Test Method for Classification of Soils for Engineering Purposes
- 3.1.1.20 ASTM D2922-81: Test Methods for Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
- 3.1.1.21 ASTM D3017-78: Test Method for Moisture Content of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
- 3.1.1.22 ASTM D3740-80: Practice for the Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
- 3.1.1.23 ASTM D4220-83: Practices for Preserving and Transporting Soil Samples
- 3.1.1.24 ASTM D4318-84: Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- 3.1.1.25 ASTM C29-78: Test Method for Unit Weight and Voids in Aggregate
- 3.1.1.26 ASTM C127-84: Test Method for Specific Gravity and Absorption of Coarse Aggregate

- 3.1.1.27 ASTM C128-84: Test Method for Specific Gravity and Absorption of Fine Aggregate
 - 3.1.1.28 ASTM C136-84: Method for Sieve Analysis of Fine and Coarse Aggregates
 - 3.1.1.29 ASTM C566-84: Test Method for Total Moisture Content of Aggregate by Drying
 - 3.1.1.30 ASTM C702-80: Methods for Reducing Field Samples of Aggregate to Testing Size
 - 3.1.1.31 ASTM D75-82: Practice for Sampling Aggregates
 - 3.1.1.32 ASTM E11-81: Specification for Wire-Cloth Sieves for Testing Purposes
 - 3.1.1.33 ASTM D3665-82: Practice For Random Sampling of Construction Materials
- 3.1.2 Standard Specifications for Road and Bridge Construction - Illinois Department of Transportation (IDOT) - October 1, 1983

4. MATERIALS

4.1 Acceptability -

4.1.1 Previous testing data will be considered in determining acceptability. No material will be brought to the construction site until it has been tested by the Owner, or the designated testing agency, and found suitable for the intended application. Material hauled to the site prior to the owner's approval may be rejected, and in such cases must be removed by the Contractor at his own expense.

4.1.2 All material shall come from the same location and exhibit similar characteristics.

4.2 The type of material and gradation to be used at a particular location will be designated in the General portion of the specifications or noted on the plans for a specific project.

4.2.1 In most instances coarse grained material (gravels, crushed stone, sand) will be designated by an IDOT gradation. Materials with these gradations are readily available state wide during the construction season.

4.2.2 Fine grained materials (clay, silty clay) will be designated by a Unified System Classification (ASTM D2487). See Figures 1 and 2.

4.3 Top soil shall be relatively free from large roots, sticks, weeds, brush or stones larger than 1 inch in diameter, or other litter and waste products. Top soil shall be a loamy mixture having the following characteristics:

1. At least 90% passing the No. 10 sieve.
2. Not less than 1% or more than 10 % organic matter.
3. Not less than 12% or more than 50% clay.
4. No more than 55% sand
5. A pH value between five and eight.

5. CONSTRUCTION REQUIREMENTS

- 5.1 Unless otherwise noted, compaction requirements for all phases of the work shall be 95% of the Maximum Dry Density and $\pm 2\%$ of the Optimum Moisture Content as determined by ASTM D698.
- 5.2 Compaction shall be obtained by mechanical means in a timely manner so as not to delay construction. Lift thicknesses may vary depending upon the condition of the material and equipment used, but should never exceed six inches. Each lift will be tested by the owner or an outside agency.
- 5.3 Material placed which does not meet the minimum compaction requirements shall be reworked as necessary to obtain the specified compaction at no extra cost to the Owner. No further placement of material will be allowed until the compaction requirements are met. If the material becomes unsuitable for use after placement, even if previously compacted to the specified percentage, it will be removed and replaced by suitable material which will be compacted in accordance with the specifications at no extra cost to the Owner.
- 5.4 No placement of material will be allowed on wet or frozen subgrade.
- 5.5 The Contractor will maintain his work in such a manner to prevent ponding of water in the project area. In excavations where water may collect the Contractor shall establish and maintain pumping capabilities to keep the excavation free of water. This includes a layer of oversize rock ($\pm 4"$) covered by a layer ($\pm 2"$) of crushed stone (CA-6 or CA-10) or a mud mat to allow work to proceed in the excavation without contamination by mud or water.
- 5.6 Erosion control is the responsibility of the Contractor.

- 5.7 Disposal of all unsuitable material in a legal, safe, and satisfactory manner is the responsibility of the Contractor. This includes, but is not limited to, materials resulting from clearing and stripping of a site.
- 5.8 The Contractor shall be responsible for, and shall take all necessary precautions to preserve and protect, all existing tile drains, sewers, other subsurface drains, underground utilities, above ground utilities, private transmission lines, and appurtenances which may be affected by his operations and shall repair, at his own expense, any and all damages resulting from his actions or negligence.
- 5.9 The Contractor shall notify the Construction Inspector two days in advance of beginning or resuming work.
- 5.10 Trenches for pipe installation shall be excavated to an elevation 4 inches below the bottom of the pipe such that the invert of the pipe will be at the depth and grade specified. The trench will be excavated 18 inches wider than the external diameter of the pipe, or more if necessary, to permit through tamping under the haunches and around the pipe. Where a firm foundation is not encountered at the grade established all such unsuitable soil shall be removed for the width of the trench and replaced with well compacted bedding material or suitable compacted aggregate. In areas requiring impervious backfill, the trench bottom will be shaped to conform to the pipe's shape in lieu of bedding. In general, areas subject to traffic, right of ways, public property, load bearing areas and other heavily used areas shall be backfilled with porous backfill compacted to the requirements of 5.1.
- 5.11 Access to the project site will be maintained at all times. If the work is being performed at an existing facility the Contractor shall make the necessary arrangements to maintain access to vital areas of the yard.
- 5.12 Various portions of the work will require testing by I.P. personnel or an outside testing agency. The Contractor will cooperate with the testing program and make his work accessible at all times.
- 5.13 Stripping and clearing of the borrow site is incidental to the contract. The Contractor shall be responsible for acquiring the legal rights to a borrow site and any ramifications resulting from the removal of the material.
- 5.14 If the work generates sufficient dust to cause complaints to be received by the Owner, the Contractor shall alleviate the situation at no cost to the Owner.

- 5.15 Unless otherwise specified, the entire subgrade (fill or existing), including substation sites, shall meet the compaction requirements stated in Section 5.1. All holes, ruts, soft places, and other defects shall be corrected. In no case shall the surface course, base course, or other items be placed on soft or unstable material or over areas that are not properly drained.
- 5.15.1 In cut sections the Contractor will be required to make the following efforts to obtain compaction of the material in accordance with the requirements of 5.1:
1. Cut plan ditches, which drain the area, to grade at least two weeks prior to starting work on the subgrade.
 2. Air dry the top 8 inches of subgrade, including at least two eight-inch depth processings utilizing discs or tillers each day for three consecutive good drying days.
 3. Recompact the layer processed in the above paragraphs to achieve compaction results stated in 5.1. When the above work has failed to produce satisfactory work, contact the Engineer to review the circumstances.
- 5.15.2 The subgrade shall be constructed so that after being compacted it will conform to the alignment, grade, and cross section shown on the plans. Equipment of such weight or used in such a way as to cause a rut in the finished subgrade of one inch or more in depth shall be removed from the work or the rutting shall otherwise be prevented. Rutted areas shall be graded and rerolled with a smooth-wheeled roller.
- 5.16 A smooth surface is desired at the termination point of each type of material used whether it is virgin subgrade, embankment material, crushed stone, or other construction materials. When a sheepsfoot roller is used, the area must be leveled at the finished grade. The interface between continuing layers of embankment are not to be leveled and are expected to exhibit a normal amount of "fluff" associated with an ongoing fill operation.
- 5.17 Unless specifically called out in the plans or specifications no sheet piling will be required. If, as construction proceeds, it becomes apparent sheet piling or a larger area will be needed for excavation contact the Engineer to review the situation and determine how to proceed.
- 5.18 Traffic control, including provisions for the necessary barricades, flagmen and other items, is the responsibility of the Contractor.

5.19 Embankment operations shall comply with the following requirements:

1. Before any embankment is placed, all clearing and stripping over the entire area shall be performed. The top six inches of the exposed surface shall be disced, and then compacted to meet the requirements of 5.1. When construction is resumed after any freezing weather the top eight inches of all partially completed embankments will be reworked and compacted to meet the requirements of 5.1 prior to placing more fill.
2. Embankment material will be specified in the General Section of the specifications. If required, the material shall be disced sufficiently to break down oversize clods, mix the material, secure a uniform moisture content, and insure uniform density and compaction. Each layer of material shall extend the entire length and width of embankment, if possible, and shall be leveled when placed. Embankment around structures is not to be placed until the concrete has attained its specified strength. Any rock larger than six inches in diameter will be removed from the fill.
3. If an embankment is to be constructed on an existing slope the existing slope shall have steps cut into it prior to starting construction of the embankment.

5.20 Topsoil shall not be placed until the area to be covered has been shaped, trimmed, and finished. All irregularities in the surface shall be filled or smoothed out before the top soil is placed. If the existing surface has become hardened or crusted it shall be disced or raked until broken up to provide a bond with the top soil. One rolling by a smooth drum of the surface will be required. All unsuitable debris and stones larger than three inches in diameter shall be removed from the area.

5.21 Base course shall consist of crushed stone aggregate as specified in the General Section, bid units, or on the plans. The aggregate shall be deposited full-lane width directly on the subgrade, geotextile fabric (if specified), or previous layer of compacted base course in such a way to prevent segregation and require a minimum amount of blade work. Immediately after placement of the material it shall be compacted by a rubber tired roller or vibratory smooth steel drum machine to the requirements of 5.1. If any subgrade material is worked into the base material during the operations all granular material affected will be removed and replaced with new aggregate at no cost to the owner.

6. INSPECTION BY OWNER

6.1 The Owner is responsible for testing the project materials and results of the work performed at regular intervals.

- 6.2 The Contractor will cooperate with the Owner at all times to provide access to the materials and site for testing purposes.
- 6.3 The Contractor shall submit the following information for each material within two weeks of the contract award:
1. Supplier's Name, Address and Telephone Number.
 2. Pit/Facility Name, Address and Telephone Number.
 3. Person in Charge at Pit/Facility.
 4. Map, with Directions, Indicating Pit/Facility Location.

7. MEASUREMENT

- 7.1 The right is reserved to increase or decrease quantities, as required, with no increase in the unit price.
- 7.2 Items measured in units of weight may be paid for on a dry-weight basis at the discretion of the Engineer if the moisture content is found to be excessive. The bid units will not be affected unless the moisture content of coarse grained soils exceeds 12%, or 20% for fine grained soils.
- 7.3 Clearing will not be measured for payment and is incidental to the contract.
- 7.4 Pipe excavation and furnishing, placing, and compacting bedding will not be measured for payment and are to be included in the price bid per lineal foot of the pipe specified.
- 7.5 Cross section measurements and the average end area method shall be used to determine volumes of excavations or required material for embankments.
- 7.6 Embankment quantities shall be cubic yards of compacted material at the project site. The plan quantities will be used for bidding purposes. If there is a discrepancy between the successful bidder's take off quantities of more than plus 5% the Contractor shall notify the Engineer in writing prior to starting work. Arrangements will be made to cross section the project area after the embankment work is completed and the volume determined in accordance with these specifications. If the Contractor's quantities are less than 105% of the estimated contract quantities he shall be paid the contract quantities when the project is constructed to the lines and grades shown in the plans and specifications.

7.7 The following items will be measured in cubic yards:

1. Embankment.
2. Channel Excavation.
3. Structure Excavation.
4. Unclassified Excavation.

7.8 The following items will be measured in tons:

1. Sand
2. Gravel
3. Crushed Gravel
4. Crushed Stone Aggregate

7.9 Impervious backfill will not be measured for payment and will be considered incidental to the contract.

7.10 Porous backfill will be measured in tons of the specified material.

7.11 Stripping will be measured in cubic yards. The average depth of material to be removed and use of this material will be noted in the General Section at the beginning of the specification.

7.12 Top soil will be measured in square yards and include furnishing, excavating, transporting, placing, and grading the material as indicated in the plans and specifications. Depth of top soil will be 4 inches.

7.13 Geotextile fabric will be measured in square yards, not including laps or portions anchored in trenches.

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TABLE 1 Soil Classification Chart

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^a				Soil Classification	
				Group Symbol	Group Name ^b
Coarse-Grained Soils More than 50 % retained on No. 200 sieve	Gravels More than 50 % of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5 % fines ^c	$C_u \geq 4$ and $1 \leq C_c \leq 3^d$ $C_u < 4$ and/or $1 > C_c > 3^d$	GW	Well-graded gravel ^f
		Gravels with Fines More than 12 % fines ^e	Fines classify as ML or MH Fines classify as CL or CH	GP	Poorly graded gravel ^f
				GM	Silty gravel ^{f,GM}
	Sands 50 % or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5 % fines ^d	$C_u \geq 6$ and $1 \leq C_c \leq 3^d$ $C_u < 6$ and/or $1 > C_c > 3^d$	SW	Well-graded sand
		Sands with Fines More than 12 % fines ^e	Fines classify as ML or MH Fines classify as CL or CH	SP	Poorly graded sand ^f
				SM	Silty sand ^{f,SM}
Fine-Grained Soils 50 % or more passes the No. 200 sieve	Silt and Clays Liquid limit less than 50	inorganic	$P_l > 7$ and plots on or above "A" line ^g $P_l < 4$ or plots below "A" line ^g	CL	Lean clay ^{h,CL}
		organic	Liquid limit - oven dried Liquid limit - not oven	ML	Silt ^{h,ML}
	Silt and Clays Liquid limit 50 or more	inorganic	P_l plots on or above "A" line P_l plots below "A" line	CH	Fat clay ^{h,CH}
		organic	Liquid limit - oven dried Liquid limit - not oven	MH	Elastic silt ^{h,MH}
				OH	Organic clay ^{h,OH}
					Organic silt ^{h,OH}
Highly organic soils	Primarily organic matter, dark in color, and organic odor		PT	Peat	

^a Based on the material passing the 3-in. (75-mm) sieve.

^b If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^c Gravels with 5 to 12 % fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

^d Sands with 5 to 12 % fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

^e $C_u = D_{60}/D_{10}$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

^f If soil contains ≥ 15 % sand, add "with sand" to group name.
^g If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
^h If fines are organic, add "with organic fines" to group name.
ⁱ If soil contains ≥ 15 % gravel, add "with gravel" to group name.
^j If Atterberg limits plot in hatched area, soil is a CL-ML silty clay.
^k If soil contains 15 to 29 % plus No. 200, add "with sand" or "with gravel," whichever is predominant.
^l If soil contains ≥ 30 % plus No. 200, predominantly sand, add "sandy" to group name.

^m If soil contains ≥ 30 % plus No. 200, predominantly gravel, add "gravelly" to group name.
ⁿ $P_l \geq 4$ and plots on or above "A" line.
^o $P_l < 4$ or plots below "A" line.
^p P_l plots on or above "A" line.
^q P_l plots below "A" line.

FIGURE 1

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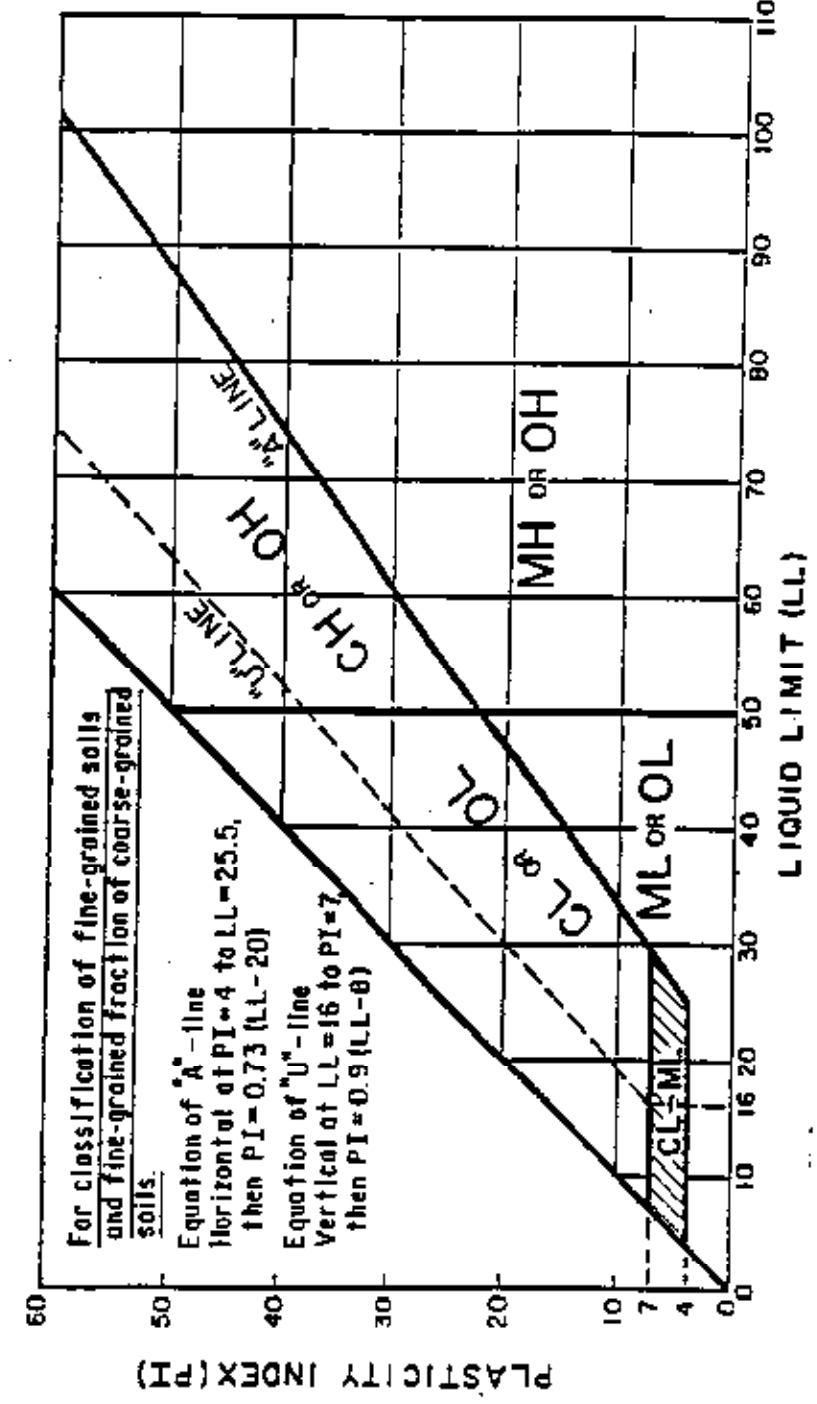


FIGURE 2

SECTION IV
Foundation Specifications

Phases 2 & 3:

Portions of this work require the installation of reinforced concrete structures, pads, and foundations. This work shall be covered by the following specification.

Exposed edges shall be chamfered 1 inch and extended 12 inches below grade.

Blocking for pipes shall be un-reinforced concrete.

1. SCOPE

- 1.1 This specification covers the minimum requirements for concrete foundation installation.
- 1.2 Except as noted otherwise, the Contractor shall furnish all labor, material, tools, and equipment necessary for concrete work shown on the drawings and specified herein.

2. DEFINITIONS

- 2.1 The term "Contractor", as used in this specification, shall refer to the party or parties proposing to perform the work and provide the material herein specified.
- 2.2 The term "Owner", as used in this specification, shall refer to Illinois Power or its designated agent.
- 2.3 The term "Engineer", as used in this specification, shall refer to the Owner's Project Engineer.
- 2.4 All design terms and symbols shall be as defined in ACI 318.

3. REFERENCES

- 3.1 Any specification or document referred to in this specification is to be considered as part of this specification. In the event of conflict between this specification and referenced documents, the requirements of this specification shall take precedence. The following specifications, standards, and codes apply:
- 3.1.1 American Concrete Institute (ACI)
- 3.1.1.1 ACI 305R-77 - Recommended Practice for Hot-Weather Concreting.
- 3.1.1.2 ACI 306-66 - Recommended Practice for Cold-Weather Concreting.
- 3.1.1.3 ACI 308-71 - Recommended Practice of Curing Concrete.
- 3.1.1.4 ACI 315R-80 - Manual of Standard Practice for Detailing Reinforced Concrete Structures.
- 3.1.1.5 ACI 318-83 - Building Code Requirements for Reinforced Concrete.
- 3.1.1.6 ACI 347-78 - Recommended Practice for Concrete Formwork.

- 3.1.2 American Society for Testing and Materials (ASTM)
 - 3.1.2.1 ASTM A82-76 - Cold-Drawn Steel Wire for Concrete Reinforcement.
 - 3.1.2.2 ASTM A615-78 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 3.1.2.3 ASTM C31-69 - Making and Curing Concrete Test Specimens in the Field.
 - 3.1.2.4 ASTM C33-78 - Concrete Aggregates.
 - 3.1.2.5 ASTM C94-78 - Ready-Mixed Concrete.
 - 3.1.2.6 ASTM C150-78 - Portland Cement.
 - 3.1.2.7 ASTM C171-69 - Sheet Materials for Curing Concrete.
 - 3.1.2.8 ASTM C309-74 - Liquid Membrane - Forming Compounds for Curing Concrete.
 - 3.1.2.9 ASTM C494-77 - Chemical Admixtures for Concrete.
- 3.1.3 Illinois Department of Transportation (IDOT) - 1983 Specifications for Roads and Bridges.

4. WORK NOT INCLUDED IN THIS SECTION

- 4.1 Illinois Power will furnish all anchor bolts (when required), elevation reference stakes, and location stakes.

5. GENERAL REQUIREMENTS

- 5.1 All concrete work shall conform to ACI 347 unless otherwise specified. This work shall also be performed under the personal and constant supervision of a competent Construction Superintendent or Foreman experienced in concrete work.
- 5.2 The Contractor shall provide forms for all concrete work above and below ground.
- 5.3 The Company reserves the right to inspect all materials and make concrete tests.
- 5.4 If requested, the Contractor shall provide concrete test cylinders in accordance with ASTM C31 (two from each truckload) from the concrete placed for the structure foundations. Cylinders shall be dated and labeled as to the foundation and truckload number.

- 5.5 If the concrete test cylinders, whether made by the Contractor or a testing agency, fail to meet specified compressive strength, the Contractor shall replace any and all affected areas at his own cost.

6. MATERIALS

- 6.1 Cement shall be Portland Cement conforming to ASTM C150, Type I.
- 6.2 Fine aggregate shall be sand - clean, hard, durable, uncoated grains, free from deleterious substances, conforming to ASTM C33.
- 6.3 Coarse aggregate shall be washed gravel or crushed limestone - clean, hard, durable uncoated particles without flat or elongated pieces. Aggregate shall be free from deleterious materials and shall conform to ASTM C33. Gradation shall be No. 467 (1-1/2 inch) to No. 4 for all foundations except drilled piers. Gradation shall be No. 67 (3/4 inch) to No. 4 for drilled piers.
- 6.4 Water shall be clean and free from injurious amounts of oils, acids, salts, organic, or other deleterious matter.
- 6.5 Reinforcing bars shall conform to ASTM A615, Grade 60 unless otherwise noted on the foundation drawings. Reinforcing wire shall conform to ASTM A82. All reinforcing shall be free from hard rust, dirt, and oil.
- 6.6 Removable forms shall be wood, metal, approved fiber tubes, or other approved materials. Forms for exposed concrete surfaces shall be moisture-resistant concrete form plywood, uniformly thick boards lined with moisture-resistant concrete form plywood, or lined with hard, pressed, treated fiberboard.
- 6.7 Curing materials shall conform to ASTM C171. Curing compounds shall conform to ASTM C309.
- 6.8 Water-reducing admixtures shall conform to ASTM C494.
- 6.9 CA-6 road mix shall conform to IDOT specifications.

7. EXCAVATION

- 7.1 All excavated material shall be removed from the site and disposed of by the Contractor. Any affected ground area shall be returned to its former condition. Seeding and/or sodding may be required.

When soil conditions demand, casing will be allowed to help excavation. This casing shall be removed during placement of the concrete.

- 7.2 The actual depth of the foundation dig shall be within ± 6 inches from the required foundation depth given on the drawings. This depth shall be measured from an elevation reference stake provided at each structure.
- 7.3 If over-excavation occurs, the hole shall be filled with compacted CA-6 road mix up to the required depth.

8. FORMS

- 8.1 Forms shall conform to the shape, line, and dimensions of the members indicated on the drawings, and shall be substantial and tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain position and shape. Lumber, once used in forms, shall have nails withdrawn, and the surfaces to be exposed to concrete shall be carefully cleaned before reuse.
- 8.2 Forms for exposed surfaces shall be coated with nonstaining mineral oil, applied before the reinforcing steel is placed. Before concrete is placed, surplus oil shall be removed from the contact face of forms and from reinforcing steel and other surfaces requiring bond with the concrete.
- 8.3 Forms shall not be disturbed until the concrete has adequately hardened and has gone through the first stage of curing, a minimum of 16 hours. Care shall be taken to avoid spalling the concrete surfaces. Wood forms and all particles of wood shall be completely removed.

9. REINFORCING

- 9.1 All bars shall be bent accurately, placed in position as shown on the drawings, securely tied with #16 gauge black, annealed wire at all intersections, and securely held in place by spacers, chairs, or other approved supports in accordance with ACI 315R. At time of placing concrete, all reinforcing shall be free of loose rust, scale, oil, paint, mud, or other coatings which will destroy or reduce the concrete bond. Unless otherwise shown on the drawings or specified, the spacing, amount of concrete coverage, splicing, and bending of reinforcing steel shall conform to the requirements of ACI 318.
- 9.2 Reinforcing shall not be welded unless approved by the Engineer.
- 9.3 Anchor bolts (when used) shall be a minimum of 6" from the bottom of the foundation. All steel shall have a minimum of 3" concrete cover.
- 9.4 Lap splices for reinforcement shall conform to requirements of ACI 318 Class B splices.

9.5 All anchor bolt threads shall be taped to protect them from dirt or concrete during construction.

10. TOLERANCES

10.1 Formwork shall be set and maintained so as to insure completed concrete work within tolerance limits.

10.2 Forms used for the round tops of drilled piers shall be placed concentric to the structure and to the rest of the foundation, and shall extend at least 6 inches but not more than 18 inches below ground (final grade).

10.3 Anchor bolts shall be secured plumb and true by use of a template at the top. Secure wiring or open steel template shall be used at the bottom of the anchor bolts.

10.4 If templates are not supplied with the anchor bolts, the Contractor shall furnish them. Template anchor bolt spacing shall not vary more than $\pm 1/16$ inch.

10.5 Anchor bolts which are not plumb shall not be corrected by bending the tops of the bolts. Incorrectly located or out-of-plumb anchor bolts shall be corrected by removing and repouring the concrete containing the bolts.

10.6 Centerlines of anchor bolt groups shall not vary more than $\pm 1/8$ inch.

10.7 Anchor bolt elevations shall not vary by more than $\pm 1/8$ inch. The anchor bolts shall extend out of the foundation a distance equal to the thread length unless otherwise specified.

10.8 Top elevation of the finished foundation shall not vary more than $\pm 1/4$ inch from the elevation indicated on the drawings. Foundation elevations for the same structure shall not vary more than $\pm 1/8$ inch.

11. CONCRETE MIX

11.1 All concrete shall have a minimum compressive strength of 3500 psi at 28 days. The mix shall have a minimum of $5 \frac{1}{2}$ sacks of cement per cubic yard and a maximum water cement ratio of .50 (by weight).

11.2 All concrete shall have 5 to 7 per cent entrained air.

11.3 All concrete except for drilled piers shall have a slump of 4 to 5 inches. Concrete for drilled piers shall have a slump of 5 to 7 inches.

11.4 Water-reducing admixtures may be used to help meet the above concrete mixture specifications, following admixture manufacture recommendations.

12. MIXING CONCRETE

12.1 Unless otherwise approved by Engineer, "Ready-Mixed" concrete shall be used for all concrete. It shall be mixed and delivered in accordance with the requirements set forth in ASTM C94.

13. PREPARATION FOR PLACING CONCRETE

13.1 Water shall be removed from excavations before depositing concrete unless a tremie chute is properly used to avoid mixing of fresh concrete with ground water. Any water flow shall be diverted through a proper side drain to prevent washing over freshly deposited concrete. Hardened concrete, ice, debris, and foreign materials shall be removed from form interiors and from mixing and conveying equipment.

13.2 The Owner shall be notified sufficiently in advance of the scheduled time for concrete placement to permit examination of forms and reinforcement. No concrete shall be poured until the Owner has approved reinforcing and forms. This inspection is a precautionary measure and in no way relieves the Contractor of responsibility for the accuracy of form and reinforcement.

14. PLACING OF CONCRETE

14.1 Equipment for conveying concrete shall be of such size and design as to insure a continuous flow of concrete without material separation at the delivery end.

14.2 Concrete shall be conveyed from the mixer as rapidly as practicable without segregation or loss of ingredients. Concrete shall be placed in forms as nearly as practicable in final position to avoid rehandling. Vibrators shall not be used to transport concrete within forms. The concreting shall be carried on at such a rate that the concrete is at all times plastic and flows readily into the spaces between the reinforcing bars. No concrete that has partially hardened, been contaminated by foreign materials, or retempered shall be used. Immediately after depositing, concrete shall be compacted in an approved manner by spading, rodding, forking, or vibrating to eliminate air pockets. Concrete placed in drilled piers below ten feet is not required to be compacted as previously described. All concrete shall be worked into corners around reinforcement and inserts to prevent voids, trapped water, or stone pockets.

- 14.3 Care shall be exercised in use of a vibrator to prevent segregation, sand pockets, or bleeding. The vibrator shall be moved continuously in and out of concrete, remaining stationary only a few seconds in any position.
- 14.4 Concrete shall be placed through a hopper to control the direction of fall and shall not strike the sides of the dig, reinforcement, or anchor bolts during placement. Chutes, if used, must slope sufficiently to insure flow of properly proportioned concrete.
- 14.5 Once concreting has begun, it shall be carried on as a continuous operation until the placing of the foundation is completed.
- 14.6 Adjacent surfaces shall be protected from concrete drippings, spillage, or splashes. Damaged surfaces shall be cleaned immediately.
- 14.7 Care shall be taken during placement of concrete in the forms at the top of each drilled pier such that no concrete ledges, caused by leakage of the mixture from below the forms, will remain below ground when forms are removed. If any such concrete ledges form, they shall be chopped flush with the surrounding pier surface.
- 14.8 If casing is used, the concrete level shall be maintained above the bottom of the casing until the groundline has been reached.
15. HOT-WEATHER REQUIREMENTS
- 15.1 All hot-weather concreting shall conform to ACI 305R unless otherwise specified.
- 15.2 The maximum temperature of mixed concrete shall be 90⁰F. Temperature of aggregates and mixing water shall be reduced by the use of chilled water or ice.
16. COLD-WEATHER REQUIREMENTS
- 16.1 All cold-weather concreting shall conform to ACI 306 unless otherwise specified.
- 16.2 Concrete damaged by freezing shall be removed and replaced.
17. CURING AND PROTECTION
- 17.1 All curing shall conform to ACI 308 unless otherwise specified.
- 17.2 After the concrete is placed, the structure shall not be erected for a minimum of 7 days and no load shall be applied to the structure for a minimum of 30 days, unless approved by the Engineer.

18. CONCRETE FINISHES

- 18.1 Tops of all foundations shall be floated and brought to a true level or sloped slightly, with a 1-inch beveled or rounded edge. Foundation tops shall be steel-troweled to obtain a smooth, dense surface.
- 18.2 Exposed formed surfaces shall be rubbed to the extent of removing small irregularities. Minor voids may be filled with cement mortar. The surface shall not be brush-coated with a cement paste after rubbing.

19. JOINTS

- 19.1 Construction joints shall not be allowed unless otherwise shown on the drawings or as directed and approved by the Engineer. Where a joint is to be made, a cross-type impression shall be formed in the concrete before it hardens. The impression length shall be a minimum of 2/3 of the foundation dimension in each direction and shall be 4 inches deep.
- 19.2 Immediately before the placing of new concrete, the hardened concrete surface shall be thoroughly cleaned, all laitance removed, and the surface slushed with a coat of cement grout.

SECTION V

Stone Riprap SpecificationsPhase 1:

Temporary erosion controls (type, implementation, and maintenance), necessary to limit erosion from the site, are the responsibility of the Contractor.

Phase 2:

Portions of this work require installation of erosion control measures. This work is governed by the following specification.

A firm base should be provided for erosion control measures. Cut areas of the subgrade should be rolled to provide a smooth, straight surface. Fill areas shall be adequately compacted to provide a firm, smooth surface.

Temporary erosion controls (type, implementation, and maintenance), necessary to limit erosion from the site, are the responsibility of the Contractor.

Phase 3:

Temporary erosion controls (type, implementation, and maintenance), necessary to limit erosion from the site, are the responsibility of the Contractor.

1. SCOPE

- 1.1 This specification covers the minimum requirements for furnishing, transporting, and placing a protective course of stone as riprap on slopes or in channels.
- 1.2 Except as noted otherwise, the Contractor shall furnish all labor, material, tools, and equipment necessary for riprap work shown on the drawings and specified herein.

2. DEFINITIONS

- 2.1 The term "Contractor", as used in this specification, shall refer to the party or parties proposing to perform the work and provide the material herein specified.
- 2.2 The term "Owner", as used in this specification, shall refer to Illinois Power or its designated agent.
- 2.3 The Term "Engineer", as used in this specification, shall refer to the Owner's Project Engineer.

3. REFERENCES

- 3.1 The reference to specifications or organizations together with any diagrams, drawings, or plans shall be considered as a part of this specification. In the event of conflict between this specification and the referenced documents, this specification shall take precedence. The following specifications, standards, and codes apply:
 - 3.1.1. American Society for Testing and Materials (ASTM)
 - 3.1.1.1 ASTM D-751-79: Standard Methods of Testing Coated Fabrics
 - 3.1.1.2 ASTM D-1682-64: Standard Test Methods for Breaking Load and Elongation of Textile Fabrics
 - 3.1.1.3 ASTM D-1777-64: Standard Method for Measuring Thickness of Textile Materials
 - 3.1.1.4 ASTM D-3776-85: Standard Test Methods for Mass Per Unit Area (Weight) of Woven Fabric
 - 3.1.1.5 ASTM D-3786-87: Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Non-woven Fabrics - Diaphragm Bursting Strength Tester Method
 - 3.1.1.6 ASTM D-3884-80: Standard Test Method for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)

4. GENERAL REQUIREMENTS

- 4.1 This work shall be performed under the personal and constant supervision of a competent Construction Superintendent or Foreman experienced in this type of work.
- 4.2 The Owner reserves the right to inspect all materials and reject all substandard materials and workmanship.

5. MATERIALS

- 5.1 Riprap shall be stone quarried from undisturbed, consolidated deposits of rock reasonably free of shale and shaly stone. The ledges shall be reasonably free of laminations, seams, cracks, and other structural defects or imperfections tending to destroy the stone's resistance to weather. Field stone or boulders will not be accepted.
- 5.2 The riprap stone shall be quarried from ledges for Portland cement concrete quality stone provided the ledges are sufficiently thick to produce the desired dimensions. The riprap stone and bedding shall conform to Coarse Aggregate, Class A quality:

Na ₂ SO ₄ Soundness - 5 cycle Max % Loss	15
Los Angeles Abrasion Max % Loss	40
Minus No. 200 Sieve Mat'l %	2.5
Max % Deleterious	
Shale Max %	1.0
Clay Lumps Max %	0.25
Coal & Lignite Max %	0.25
Soft & Unsound Fragments Max %	4.0
Other Deleterious Max %	4.0
Total Deleterious Max %	5.0

5.3 Gradation

- 5.3.1 The stone for 150 pound riprap shall have a maximum weight per piece of 150 pounds and not more than 5% shall weigh less than 3 pounds per piece. The material shall be evenly graded and 30 to 70% of the material shall weigh 60 pounds or more per piece.
- 5.3.2 The stone for 90 pound riprap shall have a maximum weight per piece of 90 pounds and not more than 5% shall weigh less than 3 pounds per piece. The material shall be evenly graded and 30 to 70% of the material shall weigh 36 pounds or more per piece.

5.3.3 Bedding material shall be well graded between the 3-inch and No. 4 sieves. 100% shall pass the 3-inch sieve with no more than 5% passing the No. 4 sieve. The bedding material shall be relatively free from thin, flat, and elongated pieces, and shall contain no organic matter or soft, friable particles in quantities considered objectionable by the Engineer.

5.4 Geotextile

In lieu of the aggregate bedding material, a non-woven geotextile meeting the following specifications may be used:

Weight, oz./sq.yd.	ASTM D-3776	8.00
Thickness, mils	ASTM D-1777	80.00
Tensile Strength, lbs.	ASTM D-1682	350.00
Puncture Strength, lbs.	ASTM D-751	150.00
Mullen Burst Strength	ASTM D-3786	450.00
Coefficient of Permeability, cm/sec Constant Head (50 mm)		0.22
Permittivity, sec ⁻¹	$\frac{\text{Coef of Permeability}}{\text{Thickness}}$	0.96
Abrasion Resistance, lbs.	ASTM D-3884	150.00

6. CONSTRUCTION REQUIREMENTS

6.1 The area to be riprapped shall be cleared of vegetation and other debris. The subgrade for the riprap shall be trimmed and shaped so that the finished surface shall conform to the lines specified.

6.2 Placed Riprap

6.2.1 A bedding layer will be required for placed riprap. Bedding material shall be spread uniformly on the prepared base, in a satisfactory manner, to the neat lines specified. Placing of material by methods that segregate particle sizes will not be permitted. Compaction of the bedding layers will not be required, but the surface shall be free of mounds, wind rows, or depressions. Bedding shall be a minimum of 4-inches thick.

6.2.2 Stone shall be placed on the bedding layer to produce a reasonably well-graded mass of rock with a minimum percentage of voids and constructed to the lines and grades shown.

6.2.3 Stone riprap shall be placed to its full course thickness at one operation and in such a manner as to avoid displacing the bedding material. Placing of the material shall start at the lower elevations and progress up the slope. The larger stones shall be well distributed and the entire mass of stones in their final positions shall be roughly graded to conform to the gradation specified. The finished riprap shall be free

from objectionable pockets of small stones and clusters of larger stones. Placing of material by methods that segregate particle sizes will not be permitted. Rearranging individual stones by mechanical equipment or by hand will be required to the extent necessary to obtain a reasonably well graded distribution of stone sizes as specified.

6.2.4 Placed riprap, 150 pound and 90 pound, shall be a minimum of 12-inches thick, exclusive of bedding.

6.3 Dumped Riprap

6.3.1 No bedding layer will be required for Dumped Riprap unless specifically called for in the plans and specifications.

6.3.2 Placement shall begin at the lower elevations and progress up the slope. Dumped riprap shall be placed by mechanical means. End dumping of material will be permitted provided excessive segregation of material does not occur. The finished riprap shall be reasonably free from objectionable pockets of small pieces and large pieces, and the surface shall be shaped to follow the grade of the slope or channel or as shown on the plans. Rearranging of the dumped riprap by mechanical means may be required to remove objectionable pockets of material or attain the desired slope.

6.3.3 The minimum thickness for 150 pound dumped riprap shall be 18-inches.

6.3.4 The minimum thickness for 90 pound dumped riprap shall be 12-inches.

6.4 Surplus or excess material resulting from clearing the work area and shaping of the subgrade shall be hauled off and legally disposed of by the Contractor. This work shall be incidental to the contract.

6.5 Any ruts, depressions, mounds, or other damage caused by the Contractor shall be repaired by the Contractor at no cost to the Owner. Repairs to improved areas shall be with like materials and workmanship as the adjacent areas.

7. MEASUREMENT

7.1 Riprap shall be measured in units of square yards along the slope.

7.2 Geotextile fabric shall be measured in units of square yards along the slope.

SECTION VI

Seeding SpecificationsPhases 1, 2 & 3:

The following specification covers the minimum requirements for seeding areas disturbed by construction activities, slope protection, and related operations.

The Company Representative shall sample the stockpiled topsoil to determine if additional ground limestone and fertilizer nutrients will need to be added to the topsoil prior to seeding the construction areas.

Fertilizer will be measured by weight in pounds of actual nutrients determined as follows:

(Total weight of mixed fertilizer - pounds) x (Percentage of each nutrient in fertilizer applied) = pounds of each nutrient

Agricultural ground limestone will be measured by weight in tons of agricultural ground limestone having an effective neutralizing value of 67.5 (four-year base, a source correction factor of 1.0). Applied quantity shall be the pay quantity multiplied by the source correction factor.

1. SCOPE

This specification covers the minimum requirements for seeding construction areas.

2. DEFINITIONS

- 2.1 The term "Contractor", as used in this specification, shall refer to the party or parties proposing to perform the work and provide the material herein specified.
- 2.2 The term "Owner", as used in this specification, shall refer to Illinois Power Company or its designated agent.

3. GENERAL REQUIREMENTS

- 3.1 All work shall be performed under the supervision of a competent Construction Superintendent or Foreman.
- 3.2 The Owner reserves the right to inspect all materials and perform all tests necessary to determine compliance with the specifications. If the materials or finished product fail to meet the controlling criteria for these tests, the Contractor shall replace all affected areas at the Contractor's expense.
- 3.3 Each lot of seed furnished shall be tested by a State Agriculture Department (including states other than Illinois).
- 3.4 Each bag shall be tagged or labeled as required by the Illinois Seed Law.

4. MATERIALS

4.1 Seeds

4.1.1 Seeding Mixtures shall be as follows:

(1) Grass	Seeds	lbs./Acre
Spring	Ky. Bluegrass	50
	Perennial Ryegrass	20
	Redtop or Creeping Red Fescue	10
	Ladino or White Dutch Clover	5
Fall	Ky. Bluegrass	50
	Perennial Ryegrass	20
	Redtop or Creeping Red Fescue	10
	Spring Oats	48

(2)	Low Maintenance Mix	Seeds	lbs./Acre
	Spring/Fall	Creeping Red Fescue	6
		Scaldis Hard Fescue	6
		Perennial Rye	20
		Buffalo Grass	15
		Blue Grama	1
(3)	Dwarf Prairie Mix	Seeds	lbs./Acre
	Spring/Fall	Blue Grama	1
		Buffalo Grass	23
(4)	Critical Area Mix	Seeds	lbs./Acre
	Fall	Brome	30
		Alfalfa	10
		Oats	32

- 4.1.2 Seed mixtures shall be proportioned by weight.
- 4.1.3 No seeds shall be sown until they have been tested for purity and until such tests indicate that the seeds do not contain any seeds of the noxious weeds classed as "Primary Noxious Weed Seed" in the existing Illinois Seed Law, and not more than the maximum number per ounce sample, specified in Table I on C/SE 6-13.5, "Secondary Noxious Weed Seed."
- 4.1.4 In determining the viable germination percent of legumes, the percent hard seed is to be added to the percent test germination; however, the percent hard seed added shall not exceed the maximum specified in Table I on C/SE 6-13.5 when planted in the fall season.
- 4.1.5 Seeds having a purity that is below the purity specified in Table I on C/SE 6-13.5 will be rejected. Seeds that fail to meet the requirements of Table I, "Maximum Weed Seed Percent" and "Remarks" will be rejected.
- 4.1.6 Pure, live seed shall be defined as the sproutable seed of a specified variety and calculated as the product of the viable germination times the purity. The seed weights per acre listed are designed to yield specific amounts of pure, live seed per acre based on the pure, live seed percent values listed in Table I on C/SE 6-13.5. Seed which has actual pure, live seed yield according to tests less than the intended yield will be rejected.

4.2 Slope Protection

- 4.2.1 Straw shall be stalks of air-dried wheat, rye, oats, or other approved straw.
- 4.2.2 Hay shall be air-dried. Hay shall be obtained from fields of timothy, redtop, or mature brome grass.
- 4.2.3 Paper mat shall consist of a knitted construction of polypropylene yarn with uniform openings interwoven with strips of biodegradable paper. The weight of the paper mat shall be approximately 0.2 pounds per square yard.

5. OPERATIONS

5.1 Seed Bed Preparation

- 5.1.1 Immediately prior to the seed bed preparation, fertilizer nutrients and agricultural limestone (if required - see plans) shall be uniformly spread at the designated rate over the areas indicated on the plans.
- 5.1.2 Stones, boulders, debris and similar material larger than two inches in diameter shall be removed from the seed bed area. The seed bed will be worked to a minimum depth of three inches, reducing all soil particles to a size smaller than two inches as the largest dimension. The prepared surface shall be relatively free from weeds, clods, stones, roots, sticks, rivulets, gullies, crusting, and caking.

5.3 Slope Protection - (Shall be used unless specified otherwise.)

- 5.3.1 Hay or straw mulch shall be hand or machine applied loose enough to permit air to circulate, but compact enough to prevent erosion. If baled material is used, care shall be taken that the material is in a loosened condition.
- 5.3.2 The mulch shall be stabilized by working the area with dull blades or disks.

5.4 Seeding

- 5.4.1 No seed will be sown during unfavorable climatic conditions or when the ground is not in a proper condition for seeding.
- 5.4.2 All seeded areas, including slopes up to 3 to 1 or flatter, shall be rolled at right angles within 12 hours of seeding to compact the seed bed and place the seed in contact with the soil. Slopes steeper than 3 to 1 do not need to be rolled.

6-12.4
3-22-91

**ILLINOIS
POWER**

CIVIL / STRUCTURAL

SPECIFICATION FOR SEEDING

- 5.4.3 The optimum depth for seeding shall be 1/4 inch.
- 5.4.4 All legumes shall be inoculated per the manufacturers recommendations immediately before sowing.
- 5.4.5 Seeding operations shall be between June 1 and December 1.
- 5.4.6 Within 24 hours from the time the seeding has been performed, the seed bed shall be given a covering of mulch. On slopes steeper than 3:1, mulch shall be applied on the same working day.

TABLE I

Variety of Seeds	Hard Seed	Purity	Pure, Live	Seed	Secondary	Remarks
	Percent	Percent	Seed Percent	Percent	Noxious Weeds	
	Maximum	Minimum	Minimum	Maximum	Number per Ounce Maximum Permitted*	
Alfalfa	20	92	89	0.50	6	Note 1
Brome Grass	-	75	68	2.00	5	-
Dawson Red Fescue	0	97	85	0.10	3	-
Fescue, Alta or KY. 31	-	92	88	1.00	6	-
Fescue, Creeping Red	-	75	82	1.00	6	-
Fults Salt Grass	0	98	85	0.10	2	-
Kentucky Bluegrass	-	75	72	0.50	7	Note 5
Lespedeza, Korean	20	92	84	0.50	6	Note 3
Oats	-	92	88	0.50	2	Note 4
Orchard Grass	-	75	70	1.50	5	Note 4
Redtop	-	75	78	1.80	5	Note 4
Reed Canary Grass	-	92	63	1.00	5	-
Ryegrass, Perennial, Annual	-	92	88	0.50	5	Note 4
Rye, Grain, Winter	-	92	83	0.50	2	Note 4
Scalds Hard Fescue	0	97	85	0.10	3	-
Timothy	-	92	84	0.50	5	Note 4
Wheat, Hard Red Winter	-	92	89	0.50	2	Note 4

Note 1. Shall be grown in Kansas or farther north; shall be free from any mixture with southern or foreign seeds, blends or adulterations with screenings, frosted or damaged seeds; and shall not contain more than 0.2 percent bur or sweet clover mixture.

Note 2. Shall be free from blends or adulterations with screenings, blasted, shriveled or immature seeds.

Note 3. Shall be hulled and free from blends or adulterations with blasted, shriveled or immature seeds.

Note 4. Shall be recleaned.

Note 5. Shall not contain more than 5 percent adulteration with Canada Blue Grass, Merion Blue Grass or other hybrids or varieties of blue grass.

* No primary Noxious Weeds are permitted.

SECTION VII

Piping Specifications

Pipe design details and layout schedule shall be prepared by the pipe manufacturer and submitted in duplicate for approval prior to shipping the pipe.

Pipe shall be measured in lineal feet including all fittings, special pipe, timber supports, and other appurtenances.

Phases 2 & 3:

The reinforced concrete pipe (ASTM C76) shall be Class V (IDOT) with spigot groove type joint with O-ring gasket (ASTM C443).

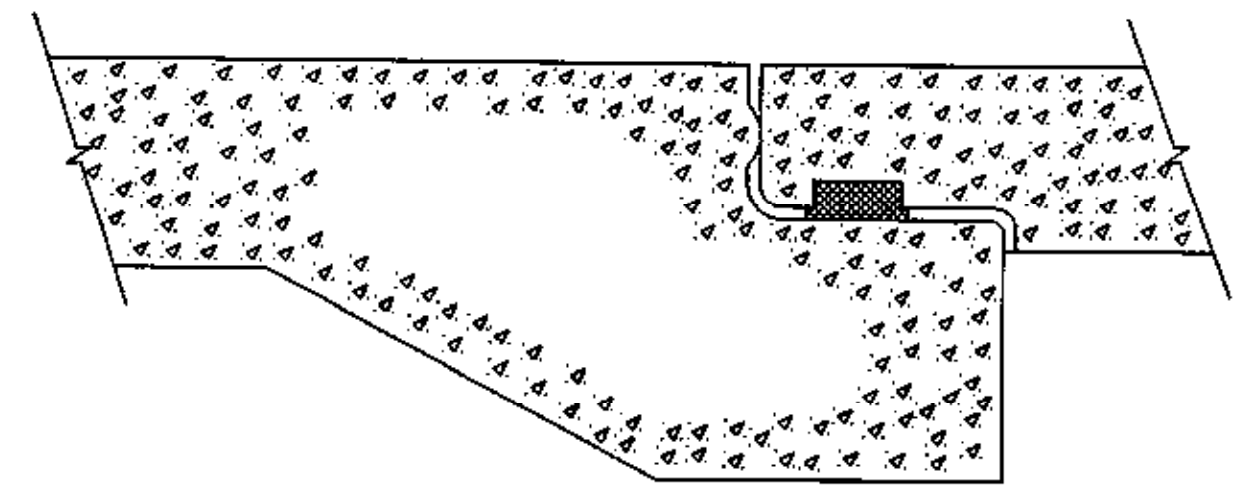
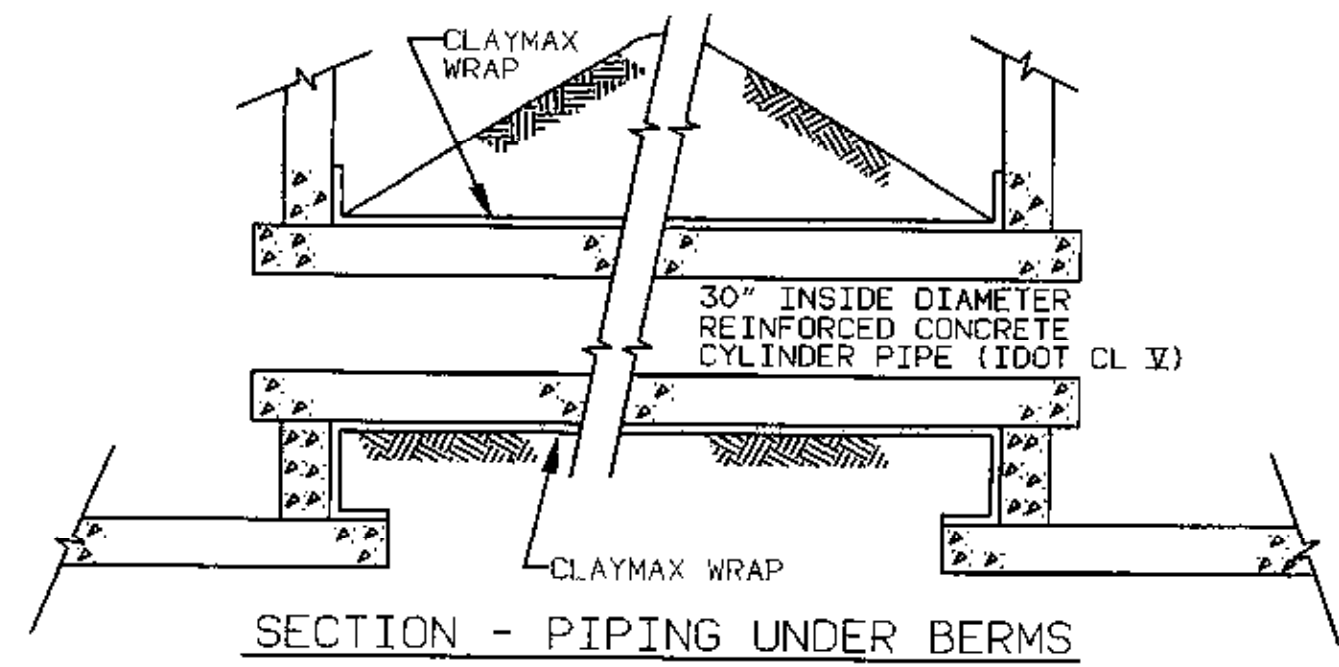
Basalt lined pipe, 14-1/2" OD x 12" ID, fixed flange, 18-1/4" bolt circle with 12 holes, 18 ft. lengths, shall be connected to the existing pipe south of the plant and laid east to the new pond as shown on the plans.

Mechanical joint 12" (nominal ID) ductile iron pipe (ANSI A21.51) and fittings (ANSI A21.10 and A21.11) shall be connected to the ash wetting pumps at the north ash pond and laid to the east pond.

Shop drawings for the ash sluice lines will be submitted to the Company, prior to shipping any of the pipe, detailing alignment and fittings used to construct the lines. A pipe sled will be required for each piece of pipe inside the casing to allow insertion and removal of the pipe without placing damaging stress on the basalt piping. A shop drawing and details of the pipe sled will be submitted prior to beginning any fabrication. The pipe sled shall have steel wheels with sealed, lifetime lubricated bearing to roll on. The pipe sled will support the full length of pipe and be strapped to the pipe.

Highway crossings shall be bored and cased. Casing shall be 36 (or as required to provide proper clearance between the basalt pipe and pipe sled and the casing) and 48 inches ID with a wall thickness of 0.25 inches. Casings shall be installed to the lines and grades shown on the plans. Immediately after the casing is installed, each end will be exposed and checked for location. If the alignment and elevation are not as shown on the plans, they will be corrected.

The pipes shall be flushed and tested prior to placing the pipes in service. Test pressure shall be 120% of the operating pressure and held for two hours. Leakage allowances for the ductile iron and basalt pipe shall be 20 gallons per inch of diameter per mile of pipe per 24 hours.



NO	DATE	DRF	DESCRIPTION	E	C	A	ILLINOIS POWER COMPANY DECATUR		
							RCCP PIPING DETAIL HAVANA ASH POND HAVANA POWER STATION		
							DR WJM	CAD WJM	DATE 2-13-91
							OK	OK	SCALE NONE
							APP	PLOTTED	
							APP	6-10-9	A-SK.25408-14

SECTION VIII
Fence Specifications

Phase 3:

Scope

This specification covers the minimum requirements for the installation of temporary and permanent fences.

General Requirements

All work shall be performed under the personal and constant supervision of a competent Construction Superintendent or Foreman.

The Company reserves the right to inspect and test all materials and work for compliance with the specifications.

Materials

Line fence posts shall be hot dip galvanized (ASTM A123) high strength H posts, 1.7" x 2.25".

Top rail shall be 1 5/8 inch (outside diameter) galvanized pipe, Schedule 40 and will match existing top rails. Six inch rail sleeve couplings, complying to ASTM F626, shall be used to connect top rails.

Terminal, corner, or gate posts shall meet the following specifications, if these types of posts are needed:

All end, corner, and pull posts shall be roll formed section 3.5" x 3.5" with minimum bending strength of 486 pounds on 6' cantilever load coated with 2.0 ounces of hot dipped zinc in accordance with ASTM A123 or 2 7/8" outside diameter galvanized standard weight pipe with minimum bending strength of 381 pounds on 6' cantilever load coated with 2.0 ounces of hot dipped zinc in accordance with ASTM A120. Gate posts shall be of the following sizes for single swing gates or one leaf of double gates:

<u>Leaf Width</u>	<u>Gate Post</u>	<u>Lbs/Lin. Ft.</u>
Up to 6'	3½" x 3½" roll formed section or 2 7/8" O.D. pipe	4.85
Over 6' to 13'	4" O.D. pipe	5.79
Over 13' to 18'	6 5/8" O.D. pipe	18.97
Over 18'	8 5/8" O.D. pipe	28.55

Six foot wide fabric, aluminum coated (ASTM A491 Class Z - .4 oz/sq.ft.) 9-gauge wire woven into a 2 inch chain link mesh shall be used, if required.

Tension bars shall be 1/4" x 3/4" galvanized steel bars (ASTM A153), if required.

Tension wire shall be #7 gauge aluminum coated steel wire (ASTM A491 Class Z - 9.4 oz/sq.ft.).

Barbed wire shall be aluminum coated double strand 12 1/2 gauge aluminum coated twisted steel wire with 14 gauge, 4 point pattern, aluminum bards spaced on five inch centers (ASTM A585).

All fittings (barbed arm, post tops) shall be pressed steel, minimum 14 gauge, hot dip galvanized and match existing fittings.

Concrete shall be a 3500 psi mix.

Reinforcement shall be Grade 60, deformed bars.

Installation

Spacing of permanent fence posts shall be a maximum of 10 ft., 0 in. center-to-center. Evenly space posts throughout each length of the line to be replaced.

Material removed from the post hole excavations may be used in other areas of the project, if suitable.

Temporary fence installations do not require concrete around the fence posts unless it is necessary to provide proper performance of the temporary fence.

All concrete shall have a minimum compressive strength of 3500 psi at 28 days and 6±1 percent entrained air. Unless otherwise approved by the Company's Construction Inspector, "Ready-Mixed" concrete shall be used. The concrete shall be mixed and delivered in accordance with ASTM C94-78.

Water shall be removed from the post holes before depositing the concrete. Any water flow shall be diverted through a proper side drain to prevent washing over freshly deposited concrete. Slope top of concrete to drain. Sidewalls of the fence post hole shall be supported to prevent sloughing of the material into the hole. Concrete shall be formed for the top six inches of the post foundation to prevent "mushrooming" of the concrete.

Fence posts shall be supported in straight alignment until the concrete has hardened sufficiently to support the posts. Fabric and hardware will not be attached to the posts for seven days. If the foundation concrete should be exposed along the sides, it shall be formed by using a 12 inch diameter cylinder, for the necessary height. The forms may be removed after three days.

The bottom of the fence fabric shall be installed to maintain a three inch clearance above grade.

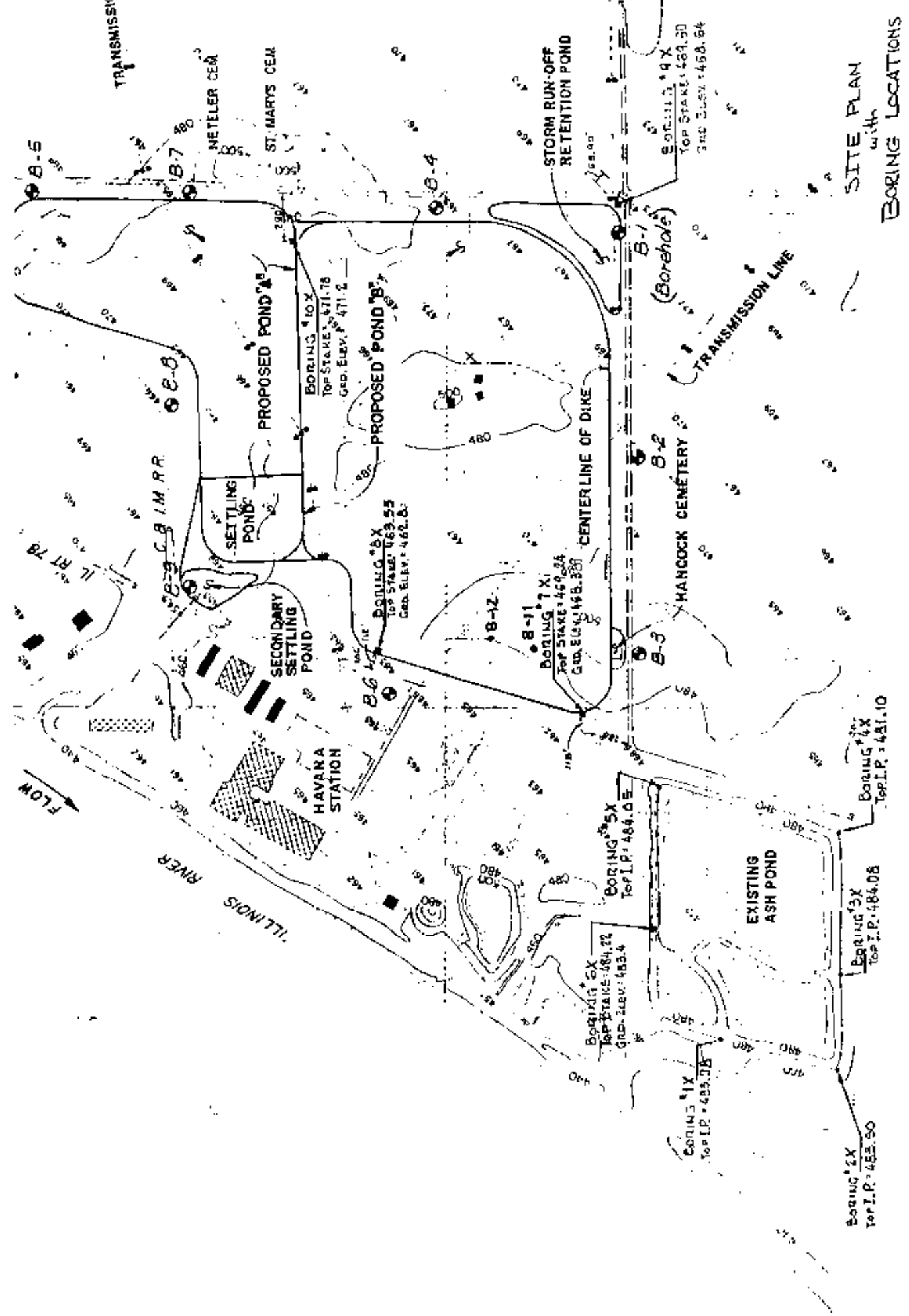
Top rails are to be held straight but not necessarily level in the horizontal plane, between corners or break points in the fence. Necessary break point posts shall be installed to follow the contour of the finished grade, particularly where change in grade exceeds 15°.

The fence contractor is responsible for storage, transportation, etc., of all new fence materials. Shipment to IP storeroom is not acceptable.

SECTION IX

Soil Borings

The following soil borings are provided as general information concerning the project. Any interpretation and use of the information is at the user's risk.



SITE PLAN
with
BORING LOCATIONS

Illinois Power Company
 FDR Decatur, Illinois
 BORING NO. 7-X SHT. 1 OF 2
 LOCATION As Per I.P. Co. Plan *
 SURFACE ELEV. 467.9
 * Offset 22' W of Stake

TEST BORING LOG

Borrow Area
 Havana Power Station
 Havana, Illinois
 PROJECT
 PROJECT NO. 18-73593-267
 DATE September 10, 1987
 WEATHER Cloudy, Warm
 DEPTH TO WATER 17.5' during drilling
 DEPTH TO WATER @ _____ HRS.

S	N	Q _u	W	PPR	DESCRIPTION & UNIFIED SOIL CLASSIFICATION
1	20				Brown, dry, medium dense clayey fine sand SC
2	34				moist dense
3	15				medium dense
4	9				loose
11.0					
5	24				Brown, moist, medium dense, fine sand SP
6	22				fine to medium sand water encountered
7	17				
19.5					
8	16				Brown, saturated, medium dense, fine to coarse sand, trace gravel
9	46				dense, little gravel
26.0					
10	27				medium dense

Continued on Sheet 2

N - BLOWS/FOOT, 140 LB. HAMMER, 30" DROP, 2" O.D. SAMPLER
 S - SAMPLE NUMBER
 W - WATER CONTENT, % DRY WEIGHT
 Q_u - UNCONFINED COMPRESSIVE STRENGTH, TONS PER SQUARE FOOT
 PPR - POCKET PENETROMETER READING, TONS PER SQUARE FOOT
 ST - THIN-WALLED TUBE SAMPLE
 LL - LIQUID LIMIT
 PL - PLASTIC LIMIT
 P - PLASTICITY INDEX
 γ_d - UNIT DRY WEIGHT, LBS. PER CUBIC FOOT

2880 N. Broadway • P.O. Box 2233 • Decatur, Illinois, 62526 • 217/877-2100

FOR _____
 BORING NO. 7-X SHT. 2 OF 2
 LOCATION _____
 SURFACE ELEV. 467.9

PROJECT _____
 PROJECT NO. 18-73593-267
 DATE _____
 WEATHER _____
 DEPTH TO WATER _____ @ _____ HRS.
 DEPTH TO WATER _____ @ _____ HRS.

S	N	Q _u	W	PPR	DESCRIPTION & UNIFIED SOIL CLASSIFICATION
					Continued from Sheet 1
		26.0			Brown, saturated, medium dense, fine to coarse sand, little gravel
11	32				dense
12	32	29.5			Brown, saturated, dense, fine to medium sand
13	19				medium dense
14	19	39.5			Brown, saturated, medium dense, fine to coarse sand, little gravel
15	50				very dense
16	44	51.0			dense
					Borehole backfilled with Volclay grout

N - BLOWS/FOOT, 140 LB. HAMMER, 30" DROP, 2" O.D. SAMPLER
 S - SAMPLE NUMBER
 W - WATER CONTENT, % DRY WEIGHT
 Q_u - UNCONFINED COMPRESSIVE STRENGTH, TONS BY SQUARE FOOT
 PPR - POCKET PENETROMETER READING, TONS BY SQUARE FOOT
 ST - THIN-WALLED TUBE SAMPLE
 LL - LIQUID LIMIT
 PL - PLASTIC LIMIT
 P - PLASTICITY INDEX
 γ_d - UNIT DRY WEIGHT, LBS. BY CUBIC FOOT

FOR Illinois Power Company
 Decatur, Illinois

BORING NO. 8-X SHT. 1 OF 2
 LOCATION As Per I.P. Co. Plan *
 SURFACE ELEV. 462.8

TEST BORING LOG

Borrow Area
 Havana Power Station
 PROJECT Havana, Illinois
 PROJECT NO. 18-73593-267
 DATE September 9, 1987
 WEATHER Sunny, Warm
 DEPTH TO WATER 18.0' @ 0 HRS.
 DEPTH TO WATER _____ @ _____ HRS.

S	N	Q _u	W	PPR	DESCRIPTION & UNIFIED SOIL CLASSIFICATION
1	10				Brown, moist, loose, clayey fine sand SC
2	8				
3	7				
4	5	10.0			Brown, moist, loose, fine sand SP
5	7				
6	7				
7	11				
8	9				
9	23				
10	25	26.0			
Continued on Sheet 2					

N - BLOWS/FOOT, 140 LB. HAMMER, 30" DROP, 2" O.D. SAMPLER
 S - SAMPLE NUMBER
 ST - THIN-WALLED TUBE SAMPLE
 Q_u - UNCONFINED COMPRESSIVE STRENGTH, TONS per SQUARE FOOT
 W - WATER CONTENT, % DRY WEIGHT
 LA - LIQUID LIMIT
 PL - PLASTIC LIMIT
 PI - PLASTICITY INDEX
 PPR - POCKET PENETROMETER READING, TONS per SQUARE FOOT
 γ_d - UNIT DRY WEIGHT, LBS. per CUBIC FOOT

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FOR _____
 BORING NO. 8-X SHT. 2 OF 2
 LOCATION _____
 SURFACE ELEV. 462.8

PROJECT _____
 PROJECT NO. IB-73593-267
 DATE _____
 WEATHER _____
 DEPTH TO WATER _____ @ _____ HRS.
 DEPTH TO WATER _____ @ _____ HRS.

S	N	Q _u	W	PPR	DESCRIPTION & UNIFIED SOIL CLASSIFICATION
					Continued from Sheet 1
					Brown, saturated, medium dense, fine to medium sand
11	31				Brown, saturated, dense, fine to coarse sand, trace gravel
12	38				
13	29				
14	34				
15	34				Brown, saturated, dense, fine to coarse sand with gravel
16	34				Borehole backfilled with Volclay grout

N - BLOWS/FOOT, 140 LB. HAMMER, 30" DROP, 2" O.D. SAMPLER
 S - SAMPLE NUMBER
 W - WATER CONTENT, % DRY WEIGHT
 Q_u - UNCONFINED COMPRESSIVE STRENGTH, TONS PER SQUARE FOOT
 PPR - POCKET PENETROMETER READING, TONS PER SQUARE FOOT
 LL - LIQUID LIMIT
 PL - PLASTIC LIMIT
 PI - PLASTICITY INDEX
 ST - THIN-WALLED TUBE SAMPLE
 γ_d - UNIT DRY WEIGHT, LBS. PER CUBIC FOOT

FOR Illinois Power Company
Decatur, Illinois

BORING NO. 9-X SHT. 1 OF 2

LOCATION As Per I.P. Co. Plan *

SURFACE ELEV. 468.6

* Offset 8' S of Stake

TEST BORING LOG

Borrow Area
 Havana Power Station
 PROJECT Havana, Illinois

PROJECT NO. I8-73593-267

DATE September 9, 1987

WEATHER Sunny, Warm

DEPTH TO WATER 10.0' @ 0 HRS.

DEPTH TO WATER _____ @ _____ HRS.

S	N	Q _u	W	PPR	DESCRIPTION & UNIFIED SOIL CLASSIFICATION
1	9				Brown, moist, loose, clayey fine sand watered encountered saturated
2	12				
3	7				
4	3				
5	16				Brown, saturated, medium dense, fine to medium sand trace gravel
6	19				
7	27				
8	26				
9	32				
10	24				

N - BLOWS/FOOT, 140 LB. HAMMER, 30" DROP, 2" O.D. SAMPLER
 S - SAMPLE NUMBER
 W - WATER CONTENT, % DRY WEIGHT
 ET - THIN-WALLED TUBE SAMPLE
 Q_u - UNCONFINED COMPRESSIVE STRENGTH, TONS PER SQUARE FOOT
 PPR - POCKET PENETROMETER READING, TONS PER SQUARE FOOT
 LL - LIQUID LIMIT
 PL - PLASTIC LIMIT
 PI - PLASTICITY INDEX
 γ - UNIT DRY WEIGHT, LBS. PER CUBIC FOOT

Continued on Sheet 2

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FOR _____
 BORING NO. 9-X SHT. 2 OF 2
 LOCATION _____
 SURFACE ELEV. 468.6

PROJECT _____
 PROJECT NO. I8-73593-267
 DATE _____
 WEATHER _____
 DEPTH TO WATER _____ @ _____ HRS.
 DEPTH TO WATER _____ @ _____ HRS.

S	N	Q _u	W	PPR	DESCRIPTION & UNIFIED SOIL CLASSIFICATION
					Continued from Sheet 1
11	18				Brown, saturated, medium dense, fine to medium sand, trace gravel SP
12	23				gray
13	43				dense
14	50				very dense
15	36				dense
16	38				
					Borehole backfilled with Volclay grout

N - BLOWS/FOOT, 140 LB. HAMMER, 30" DROP, 2" O.D. SAMPLER
 S - SAMPLE NUMBER
 W - WATER CONTENT, % DRY WEIGHT
 ST - THIN-WALLED TUBE SAMPLE
 Q_u - UNCONFINED COMPRESSIVE STRENGTH, TONS PER SQUARE FOOT
 PPR - POCKET PENETROMETER READING, TONS PER SQUARE FOOT
 LL - LIQUID LIMIT
 PL - PLASTIC LIMIT
 PI - PLASTICITY INDEX
 γ_d - UNIT DRY WEIGHT, LBS. PER CUBIC FOOT

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FOR Illinois Power Company
Decatur, Illinois

BORING NO. 10-X SHT. 1 OF 2

LOCATION As Per I.P. Co. Plan *

SURFACE ELEV. 479.8

* Offset 5' W of Stake

Borrow Area
 Havana Power Station
 PROJECT Havana, Illinois
 PROJECT NO. 18-73593-267
 DATE September 10, 1987
 WEATHER Cloudy, Warm
 DEPTH TO WATER 18.0' @ 0 HRS.
 DEPTH TO WATER _____ @ _____ HRS.

S	N	Q _u	W	PPR	DESCRIPTION & UNIFIED SOIL CLASSIFICATION
1	14				Brown, moist, medium dense, clayey fine sand SC
2	15				
3	11				
4	6	9.5			Brown, moist, loose, fine sand SP
5	24				
6	21				Brown, saturated, medium dense, fine to medium sand, water encountered
7	11	17.0			
8	19				
9	18				
10	25	26.0			fine to coarse sand

Continued on Sheet 2

N - BLOWS/FOOT, 148 LB. HAMMER, 30" DROP, 2" O.D. SAMPLER
 S - SAMPLE NUMBER
 W - WATER CONTENT, % DRY WEIGHT
 ST - THIN-WALLED TUBE SAMPLE
 Q_u - UNCONFINED COMPRESSIVE STRENGTH, TONS PER SQUARE FOOT
 PPR - POCKET PENETROMETER READING, TONS PER SQUARE FOOT
 LL - LIQUID LIMIT
 PL - PLASTIC LIMIT
 I_p - PLASTICITY INDEX
 γ_d - UNIT DRY WEIGHT, LBS. PER CUBIC FOOT

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PROJECT _____
 PROJECT NO. I8-73593-267
 DATE _____
 WEATHER _____
 DEPTH TO WATER _____ @ _____ HRS.
 DEPTH TO WATER _____ @ _____ HRS.

FOR _____
 BORING NO. 10-X SHT. 2 OF 2
 LOCATION _____
 SURFACE ELEV. 479.8

S	N	Q _u	W	PPR	DESCRIPTION & UNIFIED SOIL CLASSIFICATION
					Continued from Sheet 1
		26.0			Brown, saturated, medium dense, fine to coarse sand
11	16	27.0			Brown, saturated, medium dense, fine sand
		29.5			
12	12				Brown, saturated, medium dense, clayey fine sand
		34.5			
13	24				Brown, saturated, medium dense, fine to coarse sand, trace gravel
14	29				
15	34				
16	35				
		51.0			
					Borehole backfilled with Volclay grout

N - BLOW/FOOT, 140 LB. HAMMER, 30" DROP, 2" O.D. SAMPLER
 S - SAMPLE NUMBER
 ST - THIN-WALLED TUBE SAMPLE
 Q_u - UNCONFINED COMPRESSIVE STRENGTH, TONS PER SQUARE FOOT
 W - WATER CONTENT, % DRY WEIGHT
 LL - LIQUID LIMIT
 PL - PLASTIC LIMIT
 PI - PLASTICITY INDEX
 PPR - POCKET PENETROMETER READING, TONS PER SQUARE FOOT
 U - UNIT DRY WEIGHT, LBS. PER CUBIC FOOT

TEST BORING LOGS

PROJECT Illinois Power Company
 PROJECT NO. IR-73593-67
 FOR Illinois Power Company
 DATE February 29, 1988
 WEATHER Fair, Cool
 DEPTH TO WATER Dry @ ∅ HRS.
 DEPTH TO WATER BF @ ∅ HRS.

BORING NO. 11
 LOCATION Havana Power Station Borrow Area
 SURFACE ELEV. 503.0

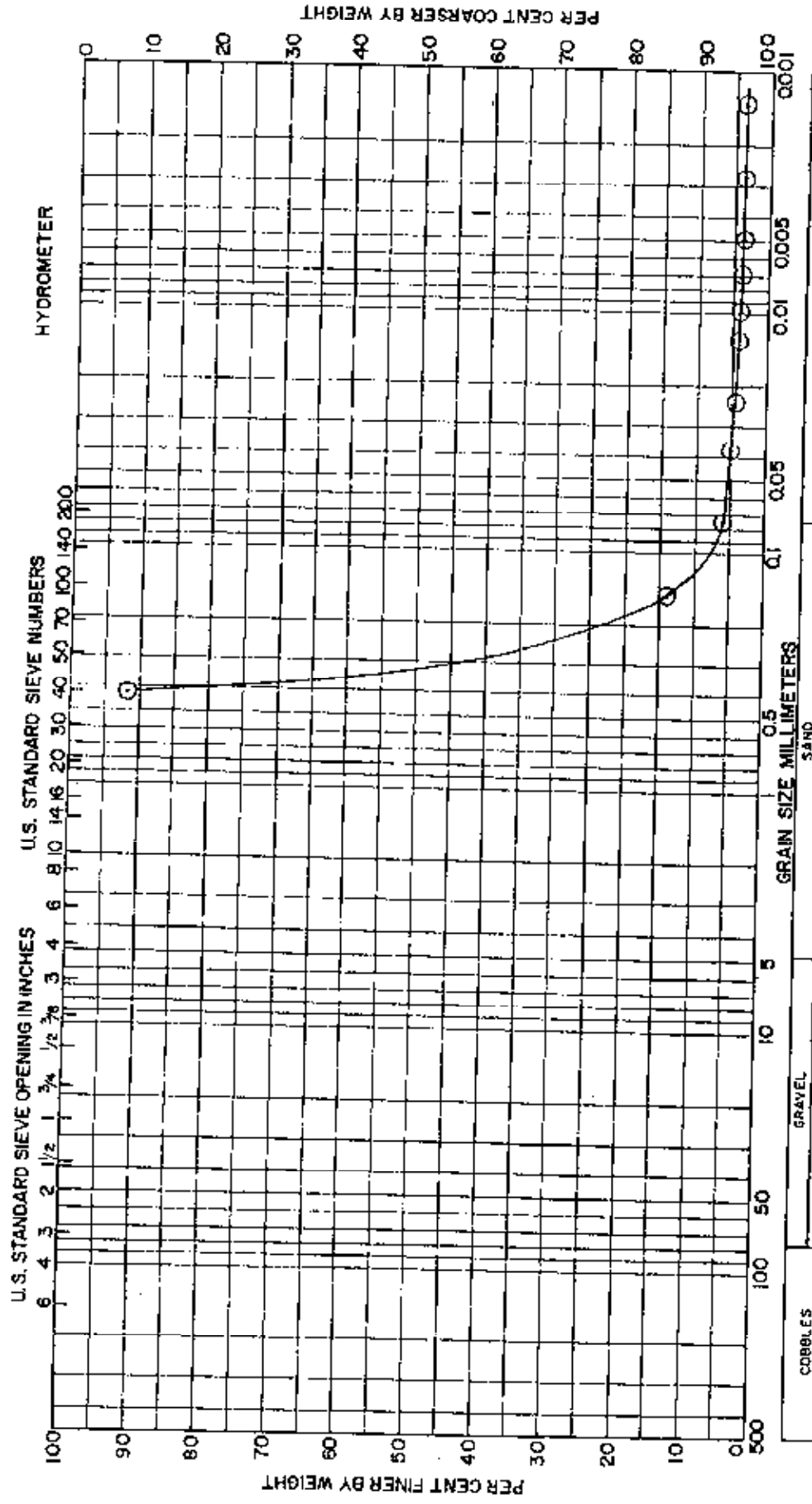
S	DEPTH, FT.		SAMPLE DESCRIPTION
	FROM	TO	
1	0	1.0	Dark brown, moist, loose sand, clay loam, trace root fiber
2	1.0	7.5	Brown, moist, loose, fine to medium sand
3	7.5	17.0	Brown, slightly moist, loose, fine sand
4	17.0	35+	Brown, moist, loose, fine sand

BORING NO. 12
 LOCATION Havana Power Station Borrow Area
 SURFACE ELEV. 493.5

DATE March 3, 1988
 WEATHER Fair, Cool
 DEPTH TO WATER Dry @ ∅ HRS.
 DEPTH TO WATER BF @ ∅ HRS.

S	DEPTH, FT.		SAMPLE DESCRIPTION
	FROM	TO	
1	0	0.5	Dark brown, moist, loose sand, clay loam, trace root fiber
2	0.5	15.0	Brown, moist, loose, fine to medium sand
3	15.0	35+	Brown, slightly moist, loose fine sand

GRAIN SIZE DISTRIBUTION



BORING NO. SAMPLE NO.	SYMBOL	ELEV./DEPTH	USC	DESCRIPTION	SILT OR CLAY	
					NAT. W%	PI
11 & 12 Composite	⊙	0' - 35'	SP	Brown, fine sand, trace medium sand, trace silt & clay	Dry to	Non-Plastic
					Moist	

Borrow Area
 Havana Power Station
 Illinois Power Company

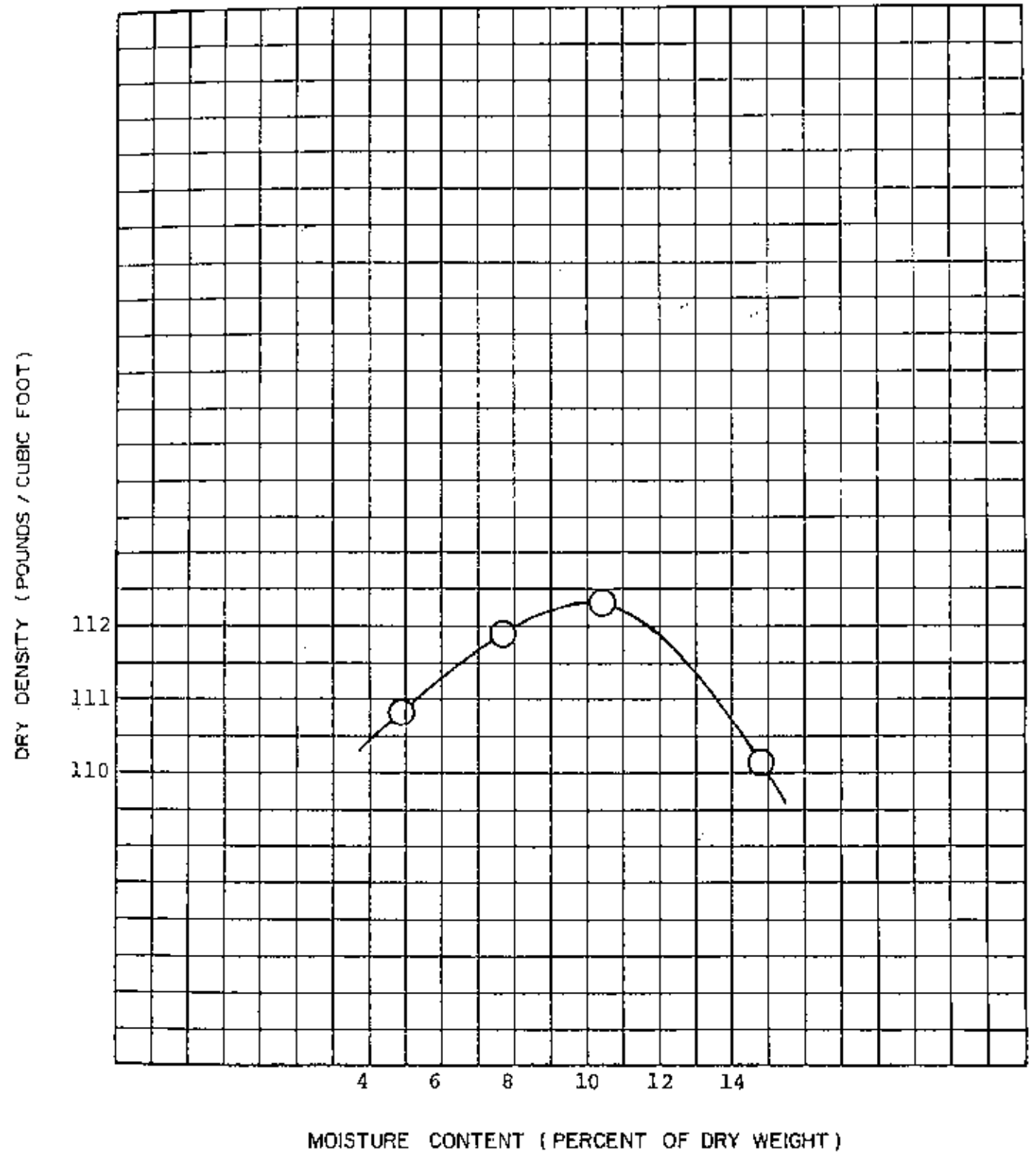


73593

PROJECT NO.: 73593 DATE: 3/9/88

MOISTURE DENSITY RELATIONSHIP

TEST METHOD: ASTM D1557 Method "A"



MAXIMUM DRY DENSITY (Lbs./Cu. Ft.): 112.3
OPTIMUM MOISTURE CONTENT (%): 10.1

TYPE OF MATERIAL: Brown, fine sand,
trace silty clay
composite sample from B-11 & B-12

HAVANA POWER STATION
ILLINOIS POWER COMPANY

SKS shaffer·krimmel·silver
& ASSOCIATES, INC. CONSULTING ENGINEERS
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SRS AND ASSOCIATES
CONSULTING ENGINEERS

2900 N. Broadway • P.O. Box 2233 • Decatur, Illinois 62526 • 217/877-2100

Illinois Power Company
Decatur, Illinois

**PERMEABILITY & CLASSIFICATION
TEST RESULTS**

Borrow Area; Havana, IL
Power Station

Proj. No.: 18-73593-67

Date: March 14, 1988

SAMPLE IDENTIFICATION		Composite Sample Obtained From Borings 11 & 12	
DEPTH/ELEVATION		0.5' to 35'	
CLASSIFICATION: USCS		SP	
USDA			
DESCRIPTION		Brown, fine sand, trace medium sand, trace silt & clay	
SOIL PARTICLE SIZES	GRAVEL	%	
	SAND	%	94
	SILT	%	3
	CLAY	%	3
NATURAL MOISTURE		%	Dry to Moist
LIQUID LIMIT		%	Non Plastic
PLASTICITY INDEX		%	Non Plastic
NATURAL DENSITY		lbs/ft ³	
OPTIMUM WATER CONTENT		%	10.1
COMPACTION (ASTM D-1557)		lbs/ft ³	112.3
PERMEABILITY (k)		cm/sec	5.8×10^{-5}

Permeability (k) has been determined with the use of a triaxial cell utilizing a 20 psi confining pressure. A constant pressure (head) of 15 psi was applied to the sample, utilizing tap water as the permeate. Prior to flow measurements, the sample was back-pressured to achieve saturation for a minimum of 24 hours. The flow rate was measured for a minimum of 8 hours or until the flow through the sample became constant.

REMARKS: Permeability test was performed on a remolded specimen compacted to 95% modified Proctor compaction and tested at a constant pressure head of 5 psi.

SECTION X

Open Burning Standard Conditions

The Contractor shall notify the Engineer one day in advance of burning landscape waste resulting from the work.



STANDARD CONDITIONS
FOR
OPEN BURNING

July 1, 1985

The Illinois Environmental Protection Act (Illinois Revised Statutes, Chapter 111-1/2, Section 1039) authorizes the Environmental Protection Agency to impose conditions on permits which it issues.

The following conditions are applicable unless superseded by special permit condition(s).

1. The open burning site shall be established on a cleared area and access by unauthorized personnel shall be adequately restricted.
2. The open burning site shall be provided with adequate fire protection and with such equipment as is necessary to control the fire. Open burning shall be conducted with appropriate safety considerations.
3. Materials to be open burned are expressly limited to those stated in the application for a permit to open burn and shall be confined to the smallest possible area.
4. The materials used to promote combustion shall be of no lesser quality than number 2 fuel oil.
5. The open burning of any materials capable of producing obnoxious odors or emitting an excessive amount of particulate matter is expressly forbidden.
6. Open burning shall be conducted only between the hours of 8:00 A.M. and 4:00 P.M. during those months that Central Standard Time is in effect and 9:00 A.M. and 5:00 P.M. during those months Central Daylight Savings Time is in effect.
7. Open burning shall be conducted only when the wind velocity exceeds 5 miles per hour.
8. Open burning shall be conducted in such a manner as to not create a visibility hazard on roadways, railroad tracks or air fields.
9. Open burning conducted under this permit shall be supervised at all times.
10. Ashes, residue, etc., shall be disposed of in a manner consistent with requirements of the Environmental Protection Act and regulations promulgated thereunder.
11. If this permit is for open burning of landscape waste with the aid of an air curtain destructor or comparable device, the following additional conditions shall apply:
 - a. Access to the burning site shall be restricted to prevent the dumping of refuse or waste; and
 - b. The operation and maintenance of the air curtain destructor or comparable device shall be in accordance with the manufacturer's instructions.
12. The Agency has issued this permit based upon information submitted by the permittee in the permit application. Any misinformation, false statement or misrepresentation in the application shall be grounds for revocation under 35 Ill. Adm. Code 237.207.

13. There shall be no deviations from the approved application unless a written request for a revised permit has been submitted to the Agency and a revised written permit issued.
14. The permittee shall allow any duly authorized agent of the Agency upon the presentation of credentials, at reasonable times:
- a. to enter the permittee's property where actual or potential effluent, emission or noise sources are located or where any activity is to be conducted pursuant to this permit,
 - b. to have access to and to copy any records required to be kept under the terms and conditions of this permit,
 - c. to inspect the open burning authorized under this permit, or any equipment required to be kept, used, operated, calibrated and maintained under this permit,
 - d. to obtain and remove samples of any discharge or emission of pollutants, and
 - e. to enter and utilize any photographic, recording, testing, monitoring or other equipment for the purpose of preserving, testing, monitoring or recording any activity, discharge or emission authorized by this permit.
15. Pursuant to 35 Ill. Adm. Code 237.206 this permit is subject to revision by the Illinois Environmental Protection Agency as deemed necessary to fulfill the intent and purpose of the Environmental Protection Act and regulations promulgated thereunder.
16. The issuance of this permit covers open burning taking place on or after the effective date of the permit. The issuance of this permit does not cover and in no way condones or approves open burning which took place before the effective date of the permit.
17. The issuance of this permit:
- a. shall not be considered in any manner affecting the title of the premises upon which the permitted open burning is conducted,
 - b. does not release the permittee from any liability for damage to person or property caused by or resulting from open burning,
 - c. does not release the permittee from compliance with other applicable statutes and regulations of the United States, of the State of Illinois, or with applicable local laws, ordinances or regulations,
 - d. does not take into consideration or attest to the structural stability of any equipment or facilities associated with the open burning,
 - e. in no manner implies or suggests that the Agency (or its officers, agents or employees) assumes any liability, directly or indirectly, for any loss due to open burning.

SECTION XI

Payment/Invoice Section

Prior to submitting any statements or invoices to the Company, the Contractor shall review the units to be billed with the Company's Representative. The quantities shall be agreed upon by the parties, to be invoiced for that pay period and the Contractor shall submit a typed statement plus three copies. These shall be signed by the Contractor and Company Representative. The Company's cover form shall be used. The executed forms shall be forwarded to the Supervisor of Construction for processing.

Any invoices or statements submitted directly to Accounts Payable will not be paid and no penalty shall accrue due to the delay in payment resulting from noncompliance with the above procedure.

SECTION XII

Approved Borrow Sites
for Clay Liner Material

Phase 2

Not available at this time.

SECTION XIII

Bid Units

	<u>Unit Price</u>	<u>Est. No. of Units</u>	<u>Est. Total Price</u>
<u>Phase 1:</u>			
1. Clearing borrow area including legal disposal of vegetation and deleterious material (per acre)		7	
2. Stripping earth berm construction area of aggregate/topsoil (per acre)		17	
3. Embankment, including all hauling, depositing, grading, and compacting (per cubic yard)		315,000	
4. Overburden removal, including all hauling & grading (per cubic yard)		50,000	
5. Four inches of topsoil on new embankments, including all material, hauling, depositing, placing, and grading (per acre)		8	
6. Grass mixture seeding and straw mulch, including all material, labor, & equipment (per acre)		8	
7. Crushed stone aggregate, including all hauling, depositing, grading, and compacting CA-6 (per ton)		400	

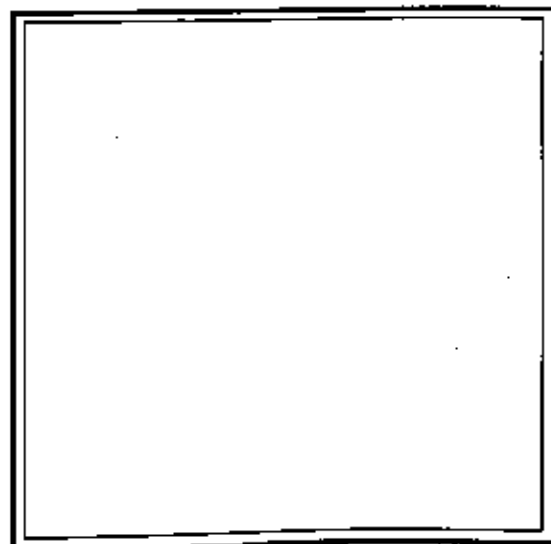


**SPECIFICATIONS FOR
EAST ASH POND CELL #2
PHASE 2
HAVANA POWER STATION**

W.O. 26650

JUNE, 1998

**Civil/Structural Engineering
Engineering and Technical Services
Illinois Power Company
500 South 27th Street
Decatur, Illinois 62525**



Section 2
GENERAL CONDITIONS
FOR CONSTRUCTION PROJECTS

1. SCOPE

- 1.1. This section covers the general performance conditions for construction projects.
- 1.2. Except as noted otherwise, the Contractor shall furnish all tools, equipment, transportation, materials, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, other incidentals and supervision necessary for the construction of the project described in this specification and on the drawings listed in the Table of Contents.

2. DEFINITIONS

- 2.1. Contractor - The party or parties proposing to perform the work and provide the material specified herein.
- 2.2. Company - Illinois Power or it's designated agent.
- 2.3. Engineer - The Company's Project Engineer.
- 2.4. On-Site Representative - The Company's On-Site Construction Representative.
- 2.5. Tester - The Company's designated testing agency (including concrete and soil testing).

3. PRELIMINARY MATTERS

- 3.1. The Company will provide the Contractor with plans and specifications with which to construct this project. Six sets of drawings and specifications will be furnished. Additional copies can be requested through the On-Site Representative.
- 3.2. Wherever a standard or code is referenced within these specifications or on the plans, it shall be understood to be the latest edition unless specifically noted otherwise.
- 3.3. Proof of the insurance requirements listed on the "Request for Quotation" form accompanying these specifications will be required before awarding the contract.

- 3.4. Pre-bid and/or pre-construction conferences will be held, at the Company's discretion, to clarify the requirements for this project. Notification of such conferences will be made separately.
- 3.5. The Contractor shall examine the work site and requirements. The Contractor will be held responsible for any loss or error resulting from ignorance concerning the requirements of the work or any foreseeable difficulties encountered. The Contractor (including field personnel) shall be familiar with the conditions and difficulties to be encountered in the work.
- 3.6. The Contractor shall submit a list of subcontractors (if any) with his bid. The Company reserves the right to reject specific subcontractors, but will cover the cost differential required for the use of an alternate subcontractor.

4. GENERAL CONSTRUCTION

- 4.1. A detailed description of this project is given in Section 1 of these specifications.
- 4.2. An On-Site Representative will be assigned to the project to ensure that the facilities constructed meet the Company's requirements.
- 4.3. The Company will cooperate in any way possible with technical or practical construction advice requested by the Contractor. However, the methods used to meet these specifications are the sole responsibility of the Contractor. The Contractor is in charge of the work and is responsible for safety.
- 4.4. The Company, unless noted otherwise, will have a Tester check any concrete properties, soil compaction, or other material/performance requirements at the Company's expense.
- 4.5. Drawings are listed in the Table of Contents of these specifications. Any questions concerning these drawings shall be directed to the On-Site Representative. The Contractor shall not take advantage of errors and/or omissions in these documents and/or discrepancies between the plans and specifications. The Company will make corrections and supply information omitted to the plans and specifications with the Company's interpretation being final. Any addenda issued during the time of bidding are considered a part of these specifications.

Section 4
SUBMITTALS

1. Contractor shall provide submittals for the items listed below prior to their use on this project. Installation of these items will not start until after their submittals have been approved by the Owner.
2. Submittals shall be made in a timely manner to insure the job is not delayed. The Contractor must allow the Owner up to two weeks to approve submittals. Submittals are to be sent directly to the Engineer.
3. The Owner will keep two copies of all submittals and return the rest to the Contractor. The Contractor shall submit three or more copies based on his needs for marked copies to be return by the Owner.
4. Submittals include shop drawings, product data and test results, samples, photos, and other materials that show the quality, quantity, and layout of the materials to be used in the work. All submittals shall provide adequate detail to insure materials and layout will comply with the bid documents and field conditions.
5. Items requiring submittals:
 - 5.1. Pipe and fittings (all types provided by Contractor)
 - 5.2. Concrete and reinforcement
 - 5.3. Structural and miscellaneous steel
 - 5.4. Bearing pads for tube structure
 - 5.5. Grating and walkway channel
 - 5.6. Paint
 - 5.7. All components of the electrical work
 - 5.8. Timbers for ash pipe support
 - 5.9. Seed and fertilizer
 - 5.10. Crushed stone

END OF SECTION

Section 5
CLEARING, GRUBBING, AND DEMOLITION

1. The Contractor shall do all clearing and grubbing of vegetation and all demolition required to complete this project.
2. All trees, brush, and other vegetation must be cleared prior to final grading of ash pipe line route. Such vegetation may be burnt on power plant property in a location approved by the Owner provided all Fire Marshal requirements are met. Vegetation that is not burnt, must be removed from power plant property, or if approved by the Owner, disposed of on site in a location to be selected by the Owner.
 - 2.1. Burning must comply with IEPA requirements entitled "Standard Conditions for Open Burning."
3. It is anticipated that the top six to eight inches of soil will be contaminated with and excessive amount of roots and organic matter and will be unfit to use as fill. This soil is to be stripped and stockpiled for use as topsoil for the final dressing of disturbed areas. Such final dressing of disturbed areas shall be considered incidental to the earthwork activities. Soils too contaminated with debris or vegetation for use as fill or topsoil shall be disposed of on site in a location selected by the Owner.

END OF SECTION

Section 6
EARTHWORK

1. SCOPE

- 1.1. This specification covers the minimum performance requirements, materials, and references necessary to govern earthwork and related operations. Earthwork is the movement of soil, sand, or rock from one location to another, shaping the materials in accordance with the plans and specifications, and achieving the desired physical condition of the materials by various methods.
- 1.2. Earthwork shall be considered incidental to performing other work and shall not be measured or paid for separately from the pay items listed on the bid form.

2. DEFINITIONS

- 2.1. **Borrow Excavation:** Work done in obtaining material for embankments or fills from a source other than required excavation. Included is the excavating, transporting, placing, and compacting of materials from locations furnished by the Contractor necessary for the construction of embankments, subgrade, shoulders, sub-base, intersections, approaches, entrances, and other items indicated on the plans or noted in the specifications.
- 2.2. **Channel Excavation:** The removal and satisfactory disposal of all materials encountered in the construction of ditches, stream channels, or swales.
- 2.3. **Clay:** An aggregate of microscopic and submicroscopic flake-shaped crystalline minerals characterized by the typical colloidal properties of cohesion, plasticity, and the ability to absorb ions conforming to the gradations set forth in the Unified Classification System.
- 2.4. **Clearing:** The removal and disposal of all obstructions such as fences, walls, foundations, buildings, trees, stumps, brush, accumulations of rubbish of whatever nature, and existing structures.
- 2.5. **Construction Inspector:** The Owner's on-site representative.
- 2.6. **Contractor:** The party or parties proposing to provide all labor, equipment and materials required to perform the work specified herein or on the plans.

- 2.7. **Crushed Gravel:** Fractured particles resulting from the crushing of gravel which, prior to crushing, would have been retained on a screen with an opening 1.5 times as large as the maximum size of the resulting crushed material.
- 2.8. **Crushed Stone:** Angular fragments resulting from the mechanical crushing of granite, limestone, or dolomite from undisturbed, consolidated deposits: (Dolomite shall be a carbonate rock containing 11.0% or more magnesium oxide (MgO). Limestone shall be a carbonate rock containing less than 11.0% magnesium oxide).
- 2.9. **Engineer:** The Owner's project engineer.
- 2.10. **Embankment:** Consists of the construction of fill areas (berms, road subgrade) by hauling depositing, placing and compacting the specified material above the natural surface or a specified grade line.
- 2.11. **Footing Excavation:** See Structure Excavation.
- 2.12. **Gravel:** Coarse, granular, unconsolidated material resulting from the reduction of rock by the action of the elements and having subangular to rounded surfaces conforming to the gradations set forth in the Unified Classification System.
- 2.13. **Impervious Backfill:** Fine-grained soils (Silty Clay, CL to CL-CH) placed and compacted in excavations, around structures or other items as indicated in the plans and specifications.
- 2.14. **Inorganic Silt:** Fine-grained soil possessing little or no plasticity or cohesion conforming to the gradations set forth in the Unified Classification System.
- 2.15. **Owner:** Illinois Power Company or its designated agent.
- 2.16. **Pipe Excavation:** The excavation, removal and satisfactory disposal of all materials encountered constructing a trench for installation of the specified pipe.
- 2.17. **Porous Backfill:** Fine aggregate (clean sand) placed and compacted in excavations, around structures or other items as indicated in the plans and specifications.
- 2.18. **Rock:** Natural aggregate of mineral grains connected by strong and permanent cohesive forces.

- 2.19. **Sand:** Fine granular material resulting from the natural disintegration of rock conforming to the gradations set forth in the Unified Classification System.
- 2.20. **Soil:** Natural aggregate of mineral grains, with or without organic constituents, that can be separated by gentle mechanical means such as agitation in water. Gravel and sand are coarse-grained soils, while silts and clays are fine-grained soils.
- 2.21. **Stripping:** The excavation, removal and satisfactory disposal (if required) of all materials taken between the original surface and the top of suitable material for the construction of embankments, subgrade, sub-base, shoulders, intersections, ditches, waterways, entrances, approaches and incidental work.
- 2.22. **Structure Excavation:** Removal of any and all materials encountered during installation of any designated structure and the satisfactory disposal of all materials.
- 2.23. **Unclassified Excavation:** The removal of any combination of topsoil, earth, rock, muck or obstacle carried out to the lines and grades specified or shown on the plans without regard to percentage of moisture and type of material found.

3. REFERENCES

- 3.1. The reference to specifications or organizations (such as ASTM) together with any diagrams, drawings or plans shall be considered as part of this specification. In the event of conflict between this specification and the referenced documents, the requirements of this specification shall take precedence. The latest editions of the following specifications, standards, and codes apply:
- 3.2. American Society for Testing and Materials (ASTM)
- ASTM D75: Practice for Sampling Aggregates
- ASTM D420: Recommended Practice for Investigating and Sampling Soil and Rock for Engineering Purposes
- ASTM D421: Method for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants
- ASTM D422: Method for Particle-Size Analysis of Soils

- ASTM D653: Terms and Symbols Relating to Soil and Rock Mechanics
- ASTM D698: Test Methods for Moisture - Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb (2.49 kg) Rammer and 12-inch Drop
- ASTM D854: Test Method for Specific Gravity of Soils
- ASTM D1140: Test Method for Amount of Material in Soils Finer than the No. 200 (75- μ m) Sieve
- ASTM D1452: Practice for Soil Investigation and Sampling by Auger Borings
- ASTM D1556: Test Method for Density of Soil in Place by the Sand-Cone Method
- ASTM D1557: Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10-lb (4.5-kg) Rammer and 18-inch (457-mm) Drop
- ASTM D1558: Test Method for Moisture Content Penetration Resistance Relationships of Fine Grained Soils
- ASTM D1586: Method for Penetration Test and Split-Barrel Sampling of Soils
- ASTM D1587: Practice for Thin-Walled Tube Sampling of Soils
- ASTM D2167: Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
- ASTM D2168: Methods for Calibration of Laboratory Mechanical-Rammer Soil Compactors
- ASTM D2216: Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock and Soil Aggregate Mixtures
- ASTM D2217: Method for Wet Preparation of Soil Samples for Particle Size Analysis and Determination of Soil Constants

- ASTM D2487: Test Method for Classification of Soils for Engineering Purposes
- ASTM D2922: Test Methods for Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
- ASTM D3017: Test Method for Moisture Content of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
- ASTM D3740: Practice for the Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
- ASTM D4220: Practices for Preserving and Transporting Soil Samples
- ASTM D4318: Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM C29: Test Method for Unit Weight and Voids in Aggregate
- ASTM C127: Test Method for Specific Gravity and Absorption of Coarse Aggregate
- ASTM C128: Test Method for Specific Gravity and Absorption of Fine Aggregate
- ASTM C136: Method for Sieve Analysis of Fine and Coarse Aggregates
- ASTM C566: Test Method for Total Moisture Content of Aggregate by Drying
- ASTM C702: Methods for Reducing Field Samples of Aggregate to Testing Size
- ASTM D75: Practice for Sampling Aggregates
- ASTM E11: Specification for Wire-Cloth Sieves for Testing Purposes
- ASTM D3665: Practice for Random Sampling of Construction Materials

- 3.3. Standard Specifications for Road and Bridge Construction - Illinois Department of Transportation (IDOT)

4. MATERIALS

4.1. Acceptability -

4.1.1. Previous testing data will be considered in determining acceptability. No material will be brought to the construction site until it has been tested by the Owner, or the designated testing agency, and found suitable for the intended application. Material hauled to the site prior to the Owner's approval may be rejected, and in such cases must be removed by the Contractor at his own expense.

4.1.2. All material shall come from the same location and exhibit similar characteristics.

4.2. The type of material and gradation to be used at a particular location will be as designated in Part 1 of this section, other portions of the specifications, or on the plans for the project or specific portions thereof.

4.2.1. In most instances coarse grained material (gravels, crushed stone, sand) will be designated by an IDOT gradation. Materials with these gradations are readily available state wide during the construction season.

4.2.2. Fine grained materials (clay, silty clay) will be designated by a Unified System Classification (ASTM D2487).

4.3. Top soil shall be relatively free from large roots, sticks, weeds, brush or stones larger than 1 inch in diameter, or other litter and waste products. Top soil shall be a loamy mixture having the following characteristics:

- At least 90% passing the No. 10 sieve.
- Not less than 1% or more than 10% organic matter.
- Not less than 12% or more than 50% clay.
- No more than 55% sand
- A PH value between five and eight

5. CONSTRUCTION REQUIREMENTS

- 5.1. Unless otherwise noted, compaction requirements for all phases of the work shall be 95% or greater of the maximum dry density and within $\pm 2\%$ of the optimum moisture content as determined by ASTM D698 (commonly referred to as the Standard Proctor test).
- 5.2. Compaction shall be obtained by mechanical means in a timely manner so as not to delay construction. Lift thickness may vary depending upon the condition of the material and equipment used, but should never exceed six inches. Each lift will be tested by the owner or an outside agency.
- 5.3. Material placed which does not meet the minimum compaction requirements shall be reworked as necessary to obtain the specified compaction at no extra cost to the Owner. No further placement of material will be allowed until the compaction requirements are met. If the material becomes unsuitable for use after placement, even if previously compacted to the specified percentage, it will be removed and replaced by suitable material which will be compacted in accordance with the specifications at no extra cost to the Owner.
- 5.4. No placement of material will be allowed on wet or frozen subgrade.
- 5.5. The Contractor will maintain his work in such a manner to prevent ponding of water in the project area. In excavations where water may collect the Contractor shall establish and maintain pumping capabilities to keep the excavation free of water. This includes a layer of oversize rock ($\pm 4''$) covered by a layer ($\pm 2''$) of crushed stone (CA-6 or CA-10) or a mud mat to allow work to proceed in the excavation without contamination by mud or water.
- 5.6. Erosion control is the responsibility of the Contractor.
- 5.7. Disposal of all unsuitable material in a legal, safe, and satisfactory manner is the responsibility of the Contractor. This includes, but is not limited to, materials resulting from clearing and stripping of a site.
- 5.8. The Contractor shall be responsible for, and shall take all necessary precautions to preserve and protect, all existing tile drains, sewers, other subsurface drains, underground utilities, above ground utilities, private transmission lines, and appurtenances which may be affected by his operations and shall repair, at his own expense, any and all damages resulting from his actions or negligence.

- 5.9. The Contractor shall notify the Construction Inspector two days in advance of beginning or resuming work.
- 5.10. Trenches for pipe installation shall be excavated to an elevation 4 inches below the bottom of the pipe such that the invert of the pipe will be at the depth and grade specified after bedding materials are placed. The trench will be excavated 18 inches wider than the external diameter of the pipe, or more is necessary, to permit through tamping under the haunches and around the pipe. Where a firm foundation is not encountered at the grade established all such unsuitable soil shall be removed for the width of the trench and replaced with well compacted bedding material or suitable compacted aggregate. In general, all pipe trenches shall be backfilled with on-site materials compacted to the requirements of 5.1.
- 5.11. Access to the project site will maintained at all times. If the work is being performed at an existing facility the Contractor shall make the necessary arrangements to maintain access to vital areas.
- 5.12. Various portions of the work will require testing by I.P. personnel or an outside testing agency. The Contractor will cooperate with the testing program and make his work accessible at all times.
- 5.13. Stripping and clearing of the borrow site is incidental to the contract.
- 5.14. If the work generates sufficient dust to cause complaints to be received by the Owner, the Contractor shall alleviate the situation at no cost to the Owner.
- 5.15. Unless otherwise specified, the entire subgrade (fill or existing) shall meet the compaction requirements stated in Section 5.1. All holes, ruts, soft places, and other defects shall be corrected. In no case shall the surface course, base course, or other items be placed on soft or unstable material or over areas that are not properly drained.
- 5.15.1. In cut sections where excessively wet soil is encountered the Contractor will be required to make the following efforts to dry the soil and to obtain compaction of the material in accordance with the requirements of 5.1:
- 5.15.1.1. Cut ditches shown on the plans that drain the area to grade at least two weeks prior to starting work on the subgrade.
- 5.15.1.2. Air dry the top 8 inches of subgrade, including at least two eight-inch depth processings utilizing discs or tillers each day for three consecutive good drying days.

- 5.15.1.3. Recompact the layer processed in the above paragraphs to achieve compaction results stated in 5.1. When the above work has failed to produce satisfactory work, contact the Engineer to review the circumstances.
- 5.15.2. The subgrade shall be constructed so that after being compacted it will conform to the alignment, grade, and cross section shown on the plans. Equipment of such weight or use in such a way as to cause a rut in the finished subgrade of one inch or more in depth shall be removed from the work or the rutting shall otherwise be prevented. Rutted areas shall be graded and rerolled with a smooth-wheeled roller.
- 5.16. A smooth surface is desired at the termination point of each type of material used whether it is virgin subgrade, embankment material, crushed stone, or other construction materials. When a sheepsfoot roller is used, the area must be leveled at the finished grade. The interface between continuing layers of embankment are not to be leveled and are expected to exhibit a normal amount of "fluff" associated with an ongoing fill operation.
- 5.17. Unless specifically called out in the plans or specifications no sheet piling will be required. If, as construction proceeds, it becomes apparent sheet piling or a larger area will be needed for excavation, contact the Engineer to review the situation and determine how to proceed.
- 5.18. Traffic control, including provisions for the necessary barricades, flagmen and other items, is the responsibility of the Contractor.
- 5.19. Embankment operations shall comply with the following requirements:
- 5.19.1. Before any embankment is placed, all clearing and stripping over the entire area shall be performed. The top six inches of the exposed surface shall be disked, and then compacted to meet the requirements of 5.1. When construction is resumed after any freezing weather the top eight inches of all partially completed embankments will be reworked and compacted to meet the requirements of 5.1 prior to placing more fill.
- 5.19.2. Embankment material will be as specified in Part 1 of this section, other portions of the specifications, or on the plans for the project or specific portions thereof. If required, the material shall be disked sufficiently to break down oversize clods, mix the material, secure a uniform moisture content, and insure uniform density and

compaction. Each layer of material shall extend the entire length and width of embankment, if possible, and shall be leveled when placed. Embankment around structures is not to be placed until the concrete has attained its specified strength. Any rock larger than six inches in diameter will be removed from the fill.

- 5.19.3. If an embankment is to be constructed on an existing slope the existing slope shall have steps cut into it prior to starting construction of the embankment.
- 5.20. Topsoil shall not be placed until the area to be covered has been shaped, trimmed, and finished. All irregularities in the surface shall be filled or smoothed out before the top soil is placed. If the existing surface has become hardened or crusted it shall be disked or raked until broken up to provide a bond with the top soil. One rolling by a smooth drum of the top soil surface will be required. All unsuitable debris and stones larger than three inches in diameter shall be removed from the area.
- 5.21. Base course shall consist of crushed stone aggregate as specified in Part 1 of this section, other portions of the specifications, or on the plans for the project or specific portions thereof. The aggregate shall be deposited full-lane width directly on the subgrade, geotextile fabric (if specified), or previous layer of compacted base course in such a way to prevent segregation and require a minimum amount of blade work. Immediately after placement of the material it shall be compacted by a rubber tired roller or vibratory smooth steel drum machine to the requirements of 5.1. If any subgrade material is worked into the base material during the operations all granular material affected will be removed and replaced with new aggregate at no cost to the owner.
6. INSPECTION BY OWNER
- 6.1. The Owner is responsible for testing the project materials and results of the work performed at regular intervals.
- 6.2. The Contractor will cooperate with the Owner at all times to provide access to the materials and site for testing purposes.

END OF SECTION

Section 7
CONCRETE

1. SCOPE

- 1.1. This specification covers the minimum requirements for concrete foundation installation.
- 1.2. Except as noted otherwise, the Contractor shall furnish all labor, material, tools, and equipment necessary for concrete work shown on the drawings and specified herein.
- 1.3. Exceptions to the requirements of this specification will be considered only if submitted in writing with the bid and an increase (or decrease) in cost for complying with the requirements of this specification is provided.

2. DEFINITIONS

- 2.1. Contractor - The party or parties proposing to perform the work and provide the material specified herein.
- 2.2. Company - Illinois Power or its designated agent.
- 2.3. Engineer - The Company's Project Engineer.
- 2.4. On-Site Representative - The Company's On-Site Construction Representative.
- 2.5. Tester - The Company's designated testing agency (including concrete and soil testing).
- 2.6. All design terms and symbols shall be defined in ACI 318.

3. REFERENCES

- 3.1. Any specification or document referred to in this specification is to be considered as part of this specification. In the event of conflict between this specification and referenced documents, the requirements of this specification shall take precedence. The following specifications, standards, and codes apply:

3.1.1. American Concrete Institute (ACI)

ACI 305R - Recommended Practice for Hot-Weather Concreting.

ACI 306 - Recommended Practice for Cold-Weather Concreting.

ACI 308 - Recommended Practice of Curing Concrete.

ACI 315R - Manual of Standard Practice for Detailing Reinforced Concrete Structures.

ACI-318 - Building Code Requirements for Reinforced Concrete.

ACI 347 - Recommended Practice for Concrete Formwork.

3.1.2. American Society for Testing and Materials (ASTM)

ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.

ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

ASTM C31 - Making and Curing Concrete Test Specimens in the Field.

ASTM C33 - Concrete Aggregates.

ASTM C94 - Ready-Mixed Concrete.

ASTM C150 - Portland Cement.

ASTM C171 - Sheet Materials for Curing Concrete.

ASTM C309 - Liquid Membrane - Forming Compounds for Curing Concrete.

ASTM C494 - Chemical Admixtures for Concrete.

3.1.3. Illinois Department of Transportation (IDOT) - 1983
Specifications for Roads and Bridges.

4. GENERAL REQUIREMENTS

- 4.1. All concrete work shall conform to ACI 347 unless otherwise specified. This work shall also be performed under the personal and constant supervision of a competent Construction Superintendent or Foreman experienced in concrete work.

- 4.2. The Contractor shall provide forms for all concrete work above and below ground. Forms for piers and caissons need only extend several inches below existing grade.
- 4.3. The Company reserves the right to inspect all materials and make concrete tests. For most projects, a Tester will be on-site the day of the pour to test the concrete.
- 4.4. If requested, the Contractor shall provide concrete test cylinders in accordance with ASTM C31 (two from each truckload) from the concrete placed for the structure foundations. Cylinders should be dated and labeled as to the foundation and truckload number.
- 4.5. If the concrete test cylinders, whether made by the Contractor or a testing agency, fail to meet specified compressive strength, the Contractor shall replace any and all affected areas at his own cost.
- 4.6. The On-Site Representative will schedule the Tester.

5. MATERIALS

- 5.1. Cement shall be Portland Cement conforming to ASTM C150, Type I.
- 5.2. Fine aggregate shall be sand - clean, hard, durable, uncoated grains, free from deleterious substances, conforming to ASTM C33. Gradation shall conform to IDOT specifications.
- 5.3. Coarse aggregate shall be natural rock or crushed limestone - clean, hard, durable uncoated particles without flat or elongated pieces. Aggregate shall be free from deleterious materials and shall conform to ASTM C33. Gradation shall conform to IDOT specifications.
- 5.4. Water shall be clean and free from injurious amounts of oils, acids, salts, organic, or other deleterious matter.
- 5.5. Reinforcing bars shall conform to ASTM A615, Grade 60 unless otherwise noted on the foundation drawings. Reinforcing wire shall conform to ASTM A82. All reinforcing shall be free from hard rust, dirt and oil.
- 5.6. Removable forms shall be wood, metal, approved fiber tubes, or other approved materials. Wood forms for exposed concrete surfaces shall be uniformly thick boards lined with moisture-resistant concrete form plywood, or lined with hard, pressed, treated fiber board.

- 5.7. Water-reducing admixtures shall conform to ASTM C494.
- 5.8. Mix water conditioner shall be Protecrite-MWC as manufactured by Applied Concrete Technology, Inc., PO Box 4015, Arlington Heights, IL 60004, telephone (800)228-6694.
- 5.9. Sealing/curing material shall be Protecrite-CDS (concrete densifier sealer) as manufactured by Applied Concrete Technology, Inc., PO Box 4015, Arlington Heights, IL 60004, telephone (800)228-6694.
- 5.10. CA-6 road mix for backfill material shall conform to IDOT specifications.
- 5.11. As a by-product of electric power generation, large quantities of flyash are produced at Illinois Power's coal fired plants. Flyash can be a positive supplement to concrete providing better workability and higher strengths at a reduced cost. Illinois Power flyash shall be incorporated into ready-mixed concrete supplied to company projects where practical. Use of Illinois Power flyash in the concrete should be noted by the Contractor at the end of the bid sheet. Proper testing of the concrete mix design and determination of the material proportions are required. Use of Illinois Power flyash in the concrete should be noted by the Contractor at the end of the bid sheet.

6. EXCAVATION

- 6.1. All excavated materials shall be removed from the area and disposed of by the Contractor, unless otherwise noted on the plans or in the specifications. Any affected ground area shall be returned to its former condition. Seeding and/or sodding may be required.
- 6.1.1. The Owner will designate one or more areas on plant property for disposal of excavated soil not needed for fill on the project.
- 6.2. When soil conditions demand, casing and/or shoring will be allowed to help excavation. This casing shall be removed during placement of the concrete.
- 6.3. The actual depth of the foundation dig shall be within three inches (3") from the required foundation depth given on the drawings. This depth shall be measured from an elevation reference stake provided by the Company.
- 6.4. If over-excavation occurs, the hole will be filled, at the Contractor's expense, up to the required depth with compacted CA-6 road mix or additional concrete.
- 6.4.1. If caisson excavations are over excavated, additional concrete is the only acceptable fill.

7. FORMS

- 7.1. Forms shall conform to the shape, line, and dimensions of the members indicated on the drawings, and shall be substantial and tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain position and shape. Lumber, once used in forms, shall have nails withdrawn, and the surfaces to be exposed to concrete shall be carefully cleaned before reuse.
- 7.2. Forms for exposed surfaces shall be coated with nonstaining mineral oil, applied before the reinforcing steel is placed. Before concrete is placed, surplus oil shall be removed from the contact face of forms and from reinforcing steel and other surfaces requiring bond with concrete.
- 7.3. Forms shall not be disturbed until the concrete has adequately hardened and has gone through the first stage of curing, a minimum of 16 hours. Care shall be taken to avoid spalling the concrete surfaces. Wood forms and all particles of wood shall be completely removed.

8. REINFORCING

- 8.1. All bars shall be bent accurately, placed in position as shown on the drawings, securely tied with #16 gauge black, annealed wire at all intersections, and securely held in place by spacers, chairs, or other approved supports in accordance with ACI 315R. At time of placing concrete, all reinforcing shall be free of loose rust, scale, oil, paint, mud, or other coatings which will destroy or reduce the concrete bond. Unless otherwise shown on the drawings or specified, the spacing, amount of concrete coverage, splicing, and bending of reinforcing steel shall conform to the requirements of ACI 318.
- 8.2. Reinforcing shall not be welded unless approved by the Engineer.
- 8.3. Anchor bolts (when used) shall be a minimum of 6" from the bottom of the foundation unless otherwise noted on drawings. All steel shall have a minimum of 3" concrete cover unless otherwise noted on drawings.
- 8.4. Lap splices for reinforcement shall conform to requirements of ACI 318 Class B splices.
- 8.4.1. Vertical bars in caissons shall be continuous from top to bottom without slices.
- 8.5. All anchor bolt threads shall be taped to protect them from dirt and concrete during construction.

9. TOLERANCES

- 9.1. Formwork shall be set and maintained so as to insure completed concrete work within tolerance limits.
- 9.2. Forms used for the round tops of drilled piers and caissons shall be placed concentric to the structure and to the rest of the foundation, and shall extend at least 6 inches but not more than 18 inches below ground (final grade).
- 9.3. Anchor bolts shall be secured plumb and true by use of a template at the top. If templates are not supplied with the anchor bolts, the Contractor shall furnish them. Secure wiring or open steel template shall be used at the bottom of the anchor bolts.
- 9.4. Anchor bolts which are not plumb shall not be corrected by bending the tops of the bolts. Incorrectly located or out-of-plumb anchor bolts shall be corrected by removing and replacing the concrete containing the bolts.
- 9.5. Anchor Bolt Dimensions
- 9.5.1. Elevation of the top of anchor bolts shall not vary more than + 1/4" from design elevation. The anchor bolt shall extend out of the foundation a distance equal to the thread length unless otherwise specified.
- 9.5.2. Centerlines of anchor bolt groups shall not vary more than + 1/8" from design location of the structure foundation's centerline.
- 9.5.3. Anchor bolt centers shall not vary more than + 1/16" from the design center of the group.
- 9.6. Top elevation of the finished foundation shall not vary more than + 1/4 inch from the elevation indicated on the drawings. Elevations for the footings of the same structure shall not vary more than + 1/8 inch.

10. CONCRETE MIX

- 10.1. The concrete mix design(s) to be used on the project shall be supplied to the Company by the Contractor 2 weeks prior to any concrete placement at the job site or at the pre-construction meeting. All materials incorporated into the concrete mix shall be identified by brand name, gradation, and the supplier.
- 10.2. All concrete shall have a minimum compressive strength of 4000 psi at 28 days. The mix shall have a maximum water cement ration of 0.45 (by weight).

- 10.3. Concrete mix shall contain Protecrete-MWC (mix water conditioner) as manufactured by Applied Concrete Technology, Inc., PO Box 4015, Arlington Heights, IL 60004, telephone (800)228-6694. MWC shall be incorporated into the mix water in a manner approved by the manufacturer and at a rate recommended by the manufacturer.
- 10.4. All concrete shall have 5 to 7 per cent entrained air.
- 10.5. All concrete except for drilled piers and caissons shall have a slump of 4 to 5 inches. Concrete for drilled piers and caissons shall have a slump of 6 to 8 inches.
- 10.6. Water-reducing admixtures may be used to help meet the above concrete mixture specifications, following admixture manufacturer recommendations.

11. MIXING CONCRETE

- 11.1. Unless otherwise approved by Engineer, "Ready-Mixed" concrete shall be used for all concrete. It shall be mixed and delivered in accordance with the requirements set forth in ASTM C94. For high-slump concrete, plasticizer may be added at site just prior to final mixing and placement of concrete. Final mixing shall be sufficient to fully incorporate plasticizer.

12. PREPARATION FOR PLACING CONCRETE

- 12.1. Water shall be removed from excavations before depositing concrete unless a tremie chute is properly used to avoid mixing of fresh concrete with ground water. Any water flow shall be diverted through a proper side drain to prevent washing over freshly deposited concrete. Hardened concrete, ice, debris, and foreign materials shall be removed from form interiors and from mixing and conveying equipment.
- 12.2. The Owner shall be notified sufficiently in advance of the scheduled time for concrete placement to permit examination of forms and reinforcement. No concrete shall be poured until the Owner has approved reinforcing and forms. This inspection is a precautionary measure and in no way relieves the Contractor of responsibility for the accuracy of form and reinforcement.

13. PLACING OF CONCRETE

- 13.1. Equipment for conveying concrete shall be of such size and design as to insure a continuous flow of concrete without material separation at the delivery end.
- 13.2. Concrete shall be conveyed from the mixer as rapidly as practicable without segregation or loss of ingredients. Concrete shall be placed in forms as nearly

as practicable in final position to avoid rehandling. Vibrators shall not be used to transport concrete within forms. The concreting shall be carried on at such a rate that the concrete is at all times plastic and flows readily into the spaces between the reinforcing bars. No concrete that has partially hardened, been contaminated by foreign materials, or retempered shall be used. Immediately after depositing, concrete shall be compacted in an approved manner by spading, rodding, forking, or vibrating to eliminate air pockets. Concrete placed in drilled piers below ten feet is not required to be compacted as previously described. All concrete shall be worked into corner's around reinforcement and inserts to prevent voids, trapped water, or stone pockets.

- 13.3. Care should be exercised in use of a vibrator to prevent segregation, sand pockets, or bleeding. The vibrator shall be moved continuously in and out of concrete, remaining stationary only a few seconds in any position.
- 13.4. Concrete shall be placed through a hopper to control the direction of fall and shall not strike the sides of the dig, reinforcement, or anchor bolts during placement. Chutes, if used, must slope sufficiently to insure flow of properly proportioned concrete.
- 13.5. Once concreting has begun, it shall be carried on as a continuous operation until the placing of the foundation is completed.
- 13.6. Adjacent surfaces shall be protected from concrete drippings, spillage, or splashes. Damaged surfaces shall be cleaned immediately.
- 13.7. Care shall be taken during placement of concrete in the forms at the top of each drilled pier such that no concrete ledges, caused by leakage of the mixture from below the forms will remain above ground when forms are removed. If any such concrete ledges form, they shall be ground flush with the surrounding pier surface.
- 13.8. If casing is used, the concrete level shall be maintained above the bottom of the casing until the groundline has been reached.

14. HOT-WEATHER REQUIREMENTS

- 14.1. All hot-weather concreting shall conform to ACI 305R unless otherwise specified.
- 14.2. The maximum temperature of mixed concrete shall be 90°F. Temperature of aggregates and mixing water shall be reduced by the use of chilled water or ice.

15. COLD-WEATHER REQUIREMENTS

- 15.1. All cold-weather concreting shall conform to ACI 306 unless otherwise specified.
- 15.2. Concrete damaged by freezing shall be removed and replaced.

16. CURING AND PROTECTION

- 16.1. Cure all exposed concrete surfaces with application of Protecrete-CDS (concrete densifier sealer) as manufactured by Applied Concrete Technology, Inc., PO Box 4015, Arlington Heights, IL 60004, telephone (800)228-6694. Apply as soon as exposed surfaces have been given a final trowel finish. Apply per manufacturer's recommendations. On formed surfaces, apply within 4 hours of removing forms. CDS is to be applied to all formed surfaces upon removal of forms regardless of less of time forms are left in place.
- 16.2. After the concrete is placed, the structure shall not be erected for a minimum of 7 days unless approved by the Engineer.

17. CONCRETE FINISHES ON EXPOSED SURFACES

- 17.1. Tops of all foundations shall be floated and brought to a true level with a 1-inch beveled or rounded edge. Foundation tops shall be steel-troweled to obtain a smooth, dense surface.
- 17.2. Exposed formed surfaces shall be rubbed to the extent of removing small irregularities. Minor voids may be filled with cement mortar. The surface shall not be brush-coated with a cement paste after rubbing.

18. JOINTS

- 18.1. Construction joints shall not be allowed unless otherwise shown on the drawings or as directed and approved by the Engineer. Where a joint is to be made, an approved key shall be formed in the concrete. Bonding agents will be used if required by the Engineer.
- 18.2. Immediately before the placing of new concrete, the hardened concrete surface shall be thoroughly cleaned, all laitance removed, and the surface slushed with a coat of cement grout.

END OF SECTION

Section 8
STRUCTURAL AND MISCELLANEOUS
STEEL

1. SCOPE

- 1.1. This specification covers the minimum requirements for the design, material, fabrication, inspection, protective coating, drawings, and delivery of steel hardware.
- 1.1.1. See sheet MSK-26650-26 for additional requirements pertaining to the highway crossing structure.
- 1.2. In the event of discrepancies between the Contractor's proposal and this specification, the terms of this specification shall govern unless written exception is provided by the Contractor and approved by the Engineer. Exceptions to this specification will not be considered unless submitted in writing with the bid.

2. DEFINITIONS

- 2.1. The term "Contractor", as used in this specification, shall refer to the party or parties proposing to perform the work and provide the material herein specified. The term "Contractor" shall include, but not necessarily be limited to, the general contractor, subcontractors, steel erectors, and fabricators.
- 2.2. The term "Owner", as used in this specification, shall refer to Illinois Power Company or its designated agent.
- 2.3. The term "Engineer", as used in this specification, shall refer to the Owner's Project Engineer.
- 2.4. All design terms and symbols shall be as defined in the AISC - Steel Construction Manual.

3. REFERENCES

- 3.1. The reference to specifications of organizations (such as ASTM), together with any diagrams, drawings, and loading schedules, shall be considered part of this specification. In the event of conflict between this specification and referenced documents, the requirements of this specification shall take precedence. The following specifications, standards, and codes apply:

3.1.1. American Society for Testing and Materials (ASTM)

ASTM A6 - General Requirements

ASTM A143 - Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

ASTM A194 - Carbon and Alloy Steel Nuts for Bolts for High Pressure and High-Temperature Service.

ASTM A-325 - High Strength Bolts for Structural Steel Joints.

ASTM A384 - Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.

3.1.2. American Institute of Steel Construction (AISC)

AISC - Steel Construction Manual, 8th Edition

3.1.3. Steel Structures Painting Council Surface Preparation Specification (SSPC-SP)

SSPC-SP6 - No. 6 Commercial Blast Cleaning Rev. 1-1-71

3.1.4. American National Standards Institute (ANSI)

National Electrical Safety Code (NESC) Part 2

ANSI C135.1 - American National Standard for Galvanized Steel Bolts and Nuts for Overhead Line Construction

4. DESIGN CONSIDERATIONS

- 4.1. The general outline of the structures and the load requirements are shown on the attached diagrams and drawings. The connections and hardware shall be designed to meet all the loading conditions as described, using the criteria described in this section and appropriate references.

5. DRAWINGS

- 5.1. After acceptance of a proposal, the Contractor shall submit to the Engineer three prints of each erection and detail drawing. One set of these drawings will be returned to the Contractor with indication of approval or approved as noted. Where a correction is required, a set of revised prints plainly

marked "Revised" and dated shall be approved by the Engineer before fabrication begins.

- 5.2. Engineer's approval of Contractor drawings is approval of intent of design and detail only, and in no way relieves the Contractor of responsibility for design adequacy or the correctness of dimensions and details.
- 5.3. Prior to delivery, and after final approval of the drawings, detail drawings for each hardware type shall be forwarded to the Engineer. If errors are found in detail or erection drawings, the Contractor shall correct and revise the drawings and furnish new drawings without cost to the Owner.
- 5.4. Each detail drawing shall include, as a minimum, the following information:
 Dimensions, including length.
 Description and strength of material.
 Size, description, quantity, and location of all holes and hardware.
 Any other special information.
- 5.5. Drawings shall become the property of the Owner.

6. MATERIAL

- 6.1. All structural plate material shall be selected with sufficient ductility to avoid brittle fracture.
- 6.2. The Contractor shall use suitable quality control procedures to insure that the correct steel strength is used in the fabrication of the hardware.
- 6.3. Materials the Contractor proposes to substitute for those stated herein shall be identified with the applicable ASTM or ANSI designation and shall be subject to the approval of the Engineer.
- 6.4. Fasteners
- 6.4.1. All bolts shall conform to ASTM A325. Nuts shall conform to ASTM A194 grade 2, and shall be tapped .020 in. oversize for pitch and major diameter.
- 6.4.1.1. For galvanized hardware, nuts and bolts shall be galvanized in accordance with ASTM standards, but hot-dip galvanizing will not be allowed for any material with a yield strength greater than 100 ksi.

6.4.1.2. Galvanized material will have threads "chased" to insure that excess material is removed and proper fit-up is achieved.

6.4.2. All bolts of any one diameter and similar length shall be of the same type and strength.

6.4.3. All bolt locations shall permit easy wrench access to both the bolt head and the nut.

6.4.4. All bolted connections shall have a minimum of two bolts.

7. FABRICATION AND QUALITY CONTROL

- 7.1. Except as provided below, fabrication tolerances will be in accordance with ASTM A6.
- 7.1.1. Location of a drilled hole in a piece $\pm 1/8"$.
- 7.1.2. Spacing between holes (non-accumulative) $\pm 1/16"$.
- 7.1.3. Angles $\pm 1 1/2^\circ$.
- 7.2. Fabrication shall be in strict accordance with shop detail drawings prepared by the Contractor and approved by the Engineer.
- 7.3. Straightening Material - Before being laid out or worked in any manner, structural material shall conform to ASTM A6 for permissible variations in straightness. If straightening is necessary, it shall be done by methods that will not injure the metal. Members which are bent or warped or otherwise improperly fabricated will be rejected by the Owner.
- 7.4. Bending - All forming or bending during fabrication shall be done by methods that will prevent embrittlement or loss of strength in the material being worked.
- 7.5. Holes for connection bolts shall be 1/16 inch larger than the nominal diameter of the bolts unless shown otherwise on the plans. (Base plates shall have oversize holes consistent with AISC recommendations for base plates.) The details of all connections and splices shall be subject to the approval of the Engineer. Connections shall be detailed in accordance with AISC 1.1.5.2 to avoid rust expansion (pack-out).
- 7.6. All holes shall be cylindrical, perpendicular to the member, clean-cut, and chamfered (when specified). Where necessary to avoid hole distortion,

holes close to the points of bends shall be made after bending. The use of a burning torch for cutting holes will not be permitted without approval from the Engineer.

7.7. All Tubular Sections (TS) are to be seal welded at both ends and are to have no penetrations in order to keep all moisture out of the interior of the section. Non-structural cap plates shall have a minimum thickness of 12 gage plate.

8. PROTECTIVE COATINGS

- 8.1. All fabricated steel shall have a protective coating applied prior to shipment to the job site. Coating shall be as specified in the following paragraphs.
- 8.1.1. Hollow structural sections shall be shop painted after fabrication. (Note that all HSS pieces are to be seal welded at both ends and are to have no penetrations in order to keep all moisture out of the interior of the section. Hot dipped galvanizing of these sections will not be possible.)
- 8.1.2. The tubular highway crossing structure shall be painted per the notes on sheet MSK-26650-26.
- 8.1.3. All other structural shapes and pieces shall be hot dipped galvanized after fabrication.
- 8.1.4. Bolts, nuts, and washers shall be zinc plated.
- 8.1.5. Anchor bolts shall have at least the top 12 inches hot dipped galvanized. The threads shall be chased prior to shipment to insure the nut will readily thread onto the bolt.
- 8.2. Surface preparation
- 8.2.1. For painted steel, all fabricated components shall be blast cleaned in accordance with SSPC-SP6 Commercial Blast.
- 8.2.2. For galvanized steel, all fabricated components shall be blast cleaned in accordance with SSPC-SP6, or cleaned with an acid-pickling procedure with approval from the Owner.

8.3. Painting

8.3.1. Paint the tubular highway crossing structure per the requirements on sheet MSK-26650-26.

8.3.2. For all other pieces to be painted, coating shall consist of a single coat of a single-component, zinc-rich, moisture curing urethane coating. Coating shall have a minimum DFT of 3 mils.

8.3.2.1. Acceptable coating shall be Wasser MC-Zinc (Wasser High-Tech Coatings, Kent, Washington, phone (206)850-2967). Use of any other coating acceptable only upon approval of Owner.

8.3.3. Paint all accessible surfaces in the shop. Paint bottom of base plates and other surfaces hidden or inaccessible after erection. Fabricator shall provide extra coating for field touch-up to be shipped with or before the first delivery of steel to the site.

8.3.4. Touch up all damage surfaces in the field. Areas inaccessible after erection shall be touched up prior to erection. If contaminated or badly rusted, clean damaged areas prior to touch-up.

8.4. Galvanizing

8.4.1. Hardware shall be galvanized in accordance with the applicable ASTM standard and shall remain corrosion-free for 10 years.

8.4.2. Precautions shall be taken against embrittlement, warpage, and distortion in accordance with ASTM A143 and in accordance with ASTM A384.

9. SHIPPING

9.1. The hardware is to be shipped disassembled. Hardware shall be suitably protected to prevent damage to the surface finish during shipment.

9.2. Each shipment and each invoice shall be accompanied by a check list of all parts on that particular shipment. Bolts, nuts, and other hardware shall be either boxed or bundled.

10. INSPECTION BY OWNER

10.1. Materials and workmanship shall, at all times, be open to inspection and acceptance or rejection by the Owner either at the Contractor's plant or at

the point of delivery. Any omission or failure on the part of the Owner to disapprove or reject any work or materials at the time of inspection shall not be construed as an acceptance of any defective work or materials.

10.2. The Owner shall have free entry to all parts of the Contractor's plant at all times while work is being carried on. The Contractor shall afford the Owner reasonable facilities, without charge, to satisfy Owner that the materials are being furnished strictly in accordance with this specification. The Owner will comply with the Contractor's safety rules.

10.3. The Owner reserves the right to make additional tests and/or inspections deemed necessary to verify compliance with this specification. Generally, the cost of these tests and inspections shall be borne by the Owner. However, the direct cost of all tests directly related to, and indicating noncompliance with this specification shall be borne by the Contractor.

END OF SECTION

Section 9
SPECIFICATION FOR SEEDING

1. SCOPE

- 1.1. This specification covers the minimum requirements for seeding construction areas.
- 1.2. Seed all areas along the pipe line route that are disturbed by grading or pipe installation. Do not seed under the ash pipes laid on grade. The Owner will determine the extent of area to be seeded. The area will then be surveyed to determine its area for the basis of payment to the Contractor. The Contractor shall order materials in appropriate quantities based on the area to be seeded.
- 1.3. The Contractor shall avoid excess damage to existing grass. Areas where grass is damaged by carelessness or neglect on the part of the Contractor shall be reseeded per these specifications at the Contractor's expense.
- 1.4. Use the seed mixture as indicated on the plans or herein specified. Compositions of seed mixtures are given in Part 4 of this specification. Fertilizer requirements are given in Part 5 of this specification.

2. DEFINITIONS

- 2.1. The term "Contractor", as used in this specification, shall refer to the party or parties proposing to perform the work and provide the material herein specified.
- 2.2. The term "Owner", as used in this specification, shall refer to Illinois Power Company or its designated agent.

3. GENERAL REQUIREMENTS

- 3.1. All work shall be performed under the supervision of a competent Construction Superintendent or Foreman.
- 3.2. The Owner reserves the right to inspect all materials and perform all tests necessary to determine compliance with the specifications. If the materials or finished product fail to meet the controlling criteria for these tests, the Contractor shall replace all affected areas at the Contractor's expense.
- 3.3. Each lot of seed furnished shall be tested by a State Agriculture Department (including states other than Illinois)

- 3.4. Each bag shall be tagged or labeled as required by the Illinois Seed Law.

4. SEEDS

- 4.1. **Low Maintenance Mix** seeding Mixtures shall be as follows for both spring and fall planting:

Seed	lbs./Acre
Creeping Red Fescue	6
Scaldis Hard Fescue	6
Perennial Rye	20
Buffalo Grass	15
Blue Grama	1

- 4.2. Seed mixtures shall be proportioned by weight.
- 4.3. No seeds shall be sown until they have been tested for purity and until such tests indicate that the seeds do not contain any seeds of the noxious weeds classed as "Primary Noxious Weed Seed" in the existing Illinois Seed Law, and not more than the maximum number per ounce sample, specified in Table 1 of this specification, "Secondary Noxious Weed Seed."
- 4.4. In determining the viable germination percent of legumes, the percent hard seed is to be added to the percent test germination; however, the percent hard seed added shall not exceed the maximum specified in Table 1 of this specification when planted in the fall season.
- 4.5. Seed having a purity that is below the purity specified in Table 1 of this specification will be rejected. Seeds that fail to meet the requirements of Table 1, "Maximum Weed Seed Percent" and "Remarks" will be rejected.
- 4.6. Pure, live seed shall be defined as the sproutable seed of a specified variety and calculated as the product of the viable germination times the purity. The seed weights per acre listed are designed to yield specific amounts of pure, live seed per acre based on the pure, live seed percent values listed in Table 1 of this specification. Seed which has actual pure, live seed yield according to tests less than the intended yield will be rejected.
5. FERTILIZER
- 5.1. Fertilizer shall be applied at the rates given below. Fertilizer will be measured by weight (in pounds) of actual nutrients supplied. Weight of each nutrient shall be determined by the following formula:

(total wt. of fertilizer)x(percent of nutrient in fertilizer)=(wt. of nutrient provided)

- 5.2. Fertilizer shall be supplied in either liquid or granular form. It shall be properly incorporated into the soil during application or immediately afterwards.
- 5.3. Fertilizer shall contain the following nutrients: Nitrogen (N), Phosphorus (P_2O_5), and Potassium (K_2O).
- 5.3.1. From 30 to 40% of the total nitrogen provided shall be in a slow-release form.
- 5.4. Provide 60 pounds of nitrogen (N) per acre, 20 pounds of phosphorus (P_2O_5) per acre, and 40 pounds of potassium (K_2O) per acre for all areas to be seeded.
- 5.5. No lime is required.

6. EROSION PROTECTION

- 6.1. Straw shall be stalks of air-dried wheat, rye, oats, or other approved straw.

7. OPERATIONS

7.1. Seed Bed Preparation

- 7.1.1. Immediately prior to the seed bed preparation, fertilizer nutrients and agricultural limestone (if required) shall be uniformly spread at the designated rate over the areas indicated on the plans.
- 7.1.2. Stones, boulders, debris and similar material larger than two inches in diameter shall be removed from the seed bed area. The seed bed will be worked to a minimum depth of three inches, reducing all soil particles to a size smaller than two inches as the largest dimension. The prepared surface shall be relatively free from weeds, clods, stones, roots, sticks, rivulets, gullies, crusting, and caking.

7.2. Seeding

- 7.2.1. No seed will be sown during unfavorable climatic conditions or when the ground is not in a proper condition for seeding.

- 7.2.2. All seeded areas, including slopes up to 4 to 1 or flatter, shall be rolled at right angles within 12 hours of seeding to compact the seed bed and place the seed in contact with the soil. Slopes steeper than 4 to 1 do not need to be rolled.
- 7.2.3. Seeding shall be done in a way that incorporates the seed at the optimum depth of 1/4 inch.
- 7.2.4. All legumes shall be inoculated per the manufacturers recommendations immediately before sowing.
- 7.2.5. Seeding shall be done between April 1 and December 1.
- 7.2.6. Within 24 hours from the time the seeding has been performed, the seed bed shall be given a covering of mulch. On slopes steeper than 3:1, mulch shall be applied on the same working day.

7.3. Mulching shall be used on all seeded area not specified otherwise.

- 7.3.1. Straw mulch shall be hand or machine applied loose enough to permit air to circulate, but compact enough to prevent erosion. If baled material is used, care shall be taken that the material is in a loosened condition.
- 7.3.2. The mulch shall be stabilized by working the area with dull blades or disks.

TABLE 1

Variety of Seeds	Hard Seed	Purity	Pure, Live	Weed	Secondary	Remarks
	Percent	Percent	Seed Percent	Percent	Noxious Weeds	
	Maximum	Minimum	Minimum	Maximum	Number per Ounce	
					Maximum Permitted*	
Alfalfa	20	92	89	0.50	6	Note 1
Brome Grass	--	75	68	2.00	5	--
Dawson Red Fescue	0	97	85	0.10	3	--
Fescue, Alto or KY. 31	--	92	88	1.00	6	--
Fescue, Creeping Red	--	75	82	1.00	6	--
Fults Salt Grass	0	98	85	0.10	2	--
Kentucky Bluegrass	--	75	72	0.50	7	Note 5
Lespedeza, Korean	20	92	84	0.50	6	Note 3
Oats	--	92	88	0.50	2	Note 4
Orchard Grass	--	75	70	1.50	5	Note 4
Redtop	--	75	78	1.80	5	Note 4
Reed Canary Grass	--	92	63	1.00	5	--
Ryegrass, Perennial, Annual	--	92	88	0.50	5	Note 4
Rye, Grain, Winter	--	92	83	0.50	2	Note 4
Scaldis Hard Fescue	0	97	85	0.10	3	--
Timothy	--	92	84	0.50	5	Note 4
Wheat, Hard Red Winter	--	92	89	0.50	2	Note 4

Note 1. Shall be grown in Kansas or farther north; shall be free from any mixture with southern or foreign seeds, blends or adulterations with screenings, frosted or damaged seeds; and shall not contain more than 0.2 percent bur or sweet clover mixture.

Note 2. Shall be free from blends or adulterations with screenings, blasted, shriveled or immature seeds.

Note 3. Shall be hulled and free from blends or adulterations with blasted, shriveled or immature seeds.

Note 4. Shall be re-cleaned.

Note 5. Shall not contain more than 5 percent adulteration with Canada Blue Grass, Merion Blue Grass or other hybrids or varieties of blue grass.

- No primary Noxious Weeds are permitted.

END OF SECTION

Section 10
BASALT-LINED ASH PIPE

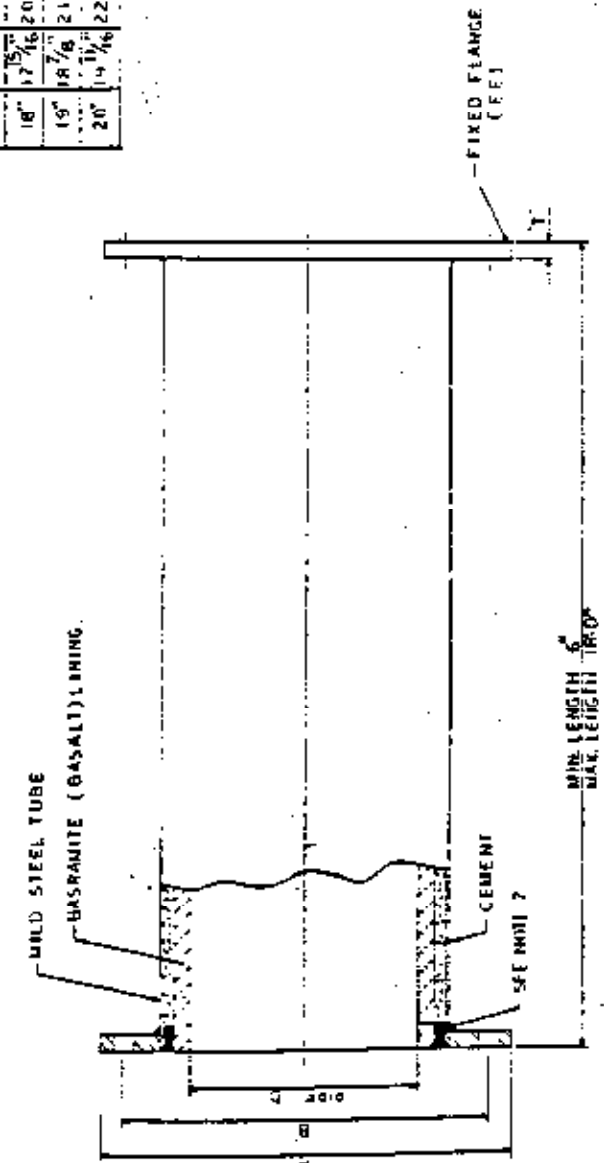
- Contractor shall relocate existing basalt-lined ash pipe to the location shown on the plans. Sequence of work shall be coordinated with plant to maintain two working ash lines at all times. The Contractor shall use equipment that can safely handle the 1500-pound pipe sections (18-ft long) without damaging them.
- Owner shall provide to the Contractor new fittings and spool pieces that may be required. In addition, the Owner will provide new gaskets. **Existing gaskets are not to be reused.**
- The Contractor shall provide new bolts, nuts, and washers. New bolts shall be grade A325 high-strength bolts or equal. Nuts and washers shall be of appropriated matching grades. Existing bolts, nuts, and washers shall not be reused. All bolts are to be installed with a torque wrench to the torque specified by the pipe manufacturer.
- Contractor shall utilize existing pipe sections and fittings to the fullest extent possible. Work shall be coordinated with a pipe manufacturer engineer (C.B.P. Engineering Corp.) to insure proper and efficient installation.
 - The Owner shall coordinate all services and materials provided by C.B.P. The Owner will pay C.B.P. directly.
 - During bidding the questions concerning the basalt-lined pipe may be directed to Don Halulko, CBP Engineering Corp., 185 Plumpton, Ave., Washington, PA 15301, phone (412)229-1180.
- The pipe details attached at the end of this section are from the manufacturer's published product information. These details shall be used as appropriate for the various portions of the ash pipe work as directed by the pipe manufacturer engineer.
- The lining within basalt-lined ash pipe is fragile and will crack if subject to impacts. Contractor shall use due care to protect pipe during all operations. Protection of the pipe ends is especially important.
- Prior to the pipe being removed, the entire pipe shall receive a match mark for reinstallation. All parts must be reassembled as they were removed regarding top, bottom, sides, and direction of flow. Existing pipe shall be reinstalled with the existing bottom rotated up 90-degrees.
- No cutting of basalt-lined ash pipe is permitted.

9. Alternate bid - painting of basalt-lined ash pipe.
 - 9.1. Contractor shall provide an alternate bid for painting all basalt-lined ash pipe both existing and new.
 - 9.2. Bottom half of pipe (in final position) shall be painted prior to installation. Top half may be painted before or after installation.
 - 9.3. Painting shall not cover match marks required above until after installation.
 - 9.4. Clean pipe of all oil, dirt, etc. For existing pipe, remove flaking rust, loose paint, etc., with a wire brush prior to painting. Tight rust may be left on pipe to be painted. New pipe will come with a shop primer coating.
 - 9.5. Paint shall be Sherwin Williams DTM Acrylic Primer/Finish or equal approved by the Owner. Apply one coat with a minimum dry thickness of 5 mils. Application shall conform to the manufacturer's recommendations.

END OF SECTION

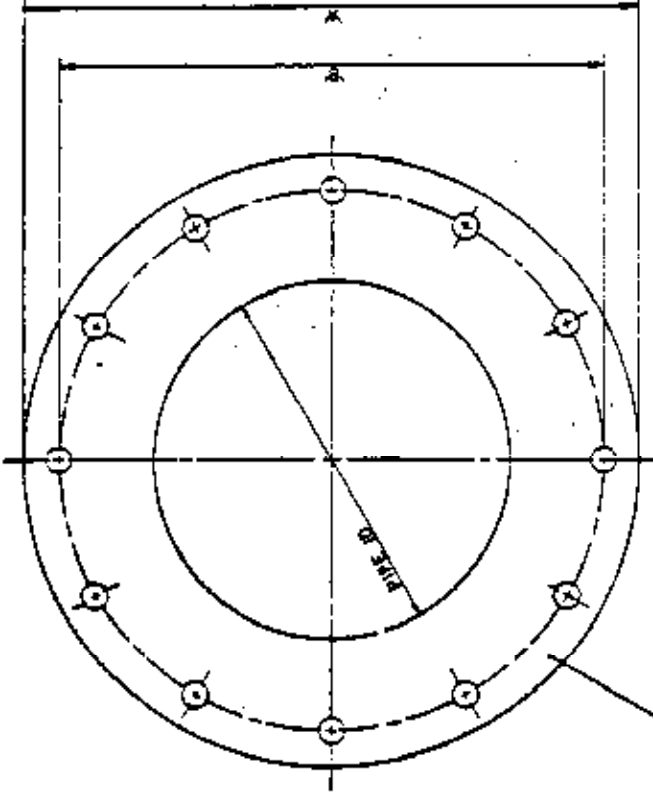
NOTE: 1) DRAWING IS FOR 1/2" THICK SERRATED HOLLOW MILD STEEL PIPE.
 2) JOINTS ARE BUTT JOINTS WELDED WITH ACID AND CHEMICAL RESISTANT CEMENT.
 3) MINIMUM BASALT LINER THICKNESS IS 3/8".
 4) JOINT SURFACE TO BE PAINTED WITH RED OXIDE PRIMER INCLUDING PRIMER ON JOINT SURFACE.
 5) ITEM NUMBER TO BE IDENTIFIED BY WELD DEPOSIT.
 6) MINIMUM 1" FROM ENDS OF PIPE TO BE BULK FILLED WITH ACID AND CHEMICAL RESISTANT CEMENT.
 7) OXYGEN PAINT TO BE APPLIED TO INTERIOR SURFACE PRIOR TO LINING.
 8) PIPE ENDS CAN BE SUPPLIED WITH FIXED COUSE OR LEVEL FLANGES. ENDS CAN BE SUPPLIED SUITABLE FOR USE WITH VIC HAULIC AND PRESSER COUPLINGS, OR TO SUIT YOUR REQUIREMENTS.

NO.	PIPE SIZE	PIPE OD	PIPE WALL THICKNESS	DIM. A	DIM. B	DIM. C	PIPE WEIGHT (LBS)	PIPE LENGTH (FEET)	EST. STOCK QUANTITY
28	3"	3 1/2"	3/8"	10"	11 1/2"	9"	3.4	A	28
29	4"	4 1/2"	3/8"	10 1/2"	12 1/2"	9 1/2"	3.4	B	29
30	5"	5 1/2"	3/8"	11"	13 1/2"	10"	3.4	R	30
31	6"	6 1/2"	3/8"	11 1/2"	14 1/2"	11 1/2"	3.4	B	31
32	7"	7 1/2"	3/8"	12 1/2"	15 1/2"	12 1/2"	3.4	B	32
33	8"	8 1/2"	3/8"	13 1/2"	16 1/2"	13 1/2"	3.4	R	33
34	9"	9 1/2"	3/8"	14 1/2"	17 1/2"	14 1/2"	3.4	R	34
35	10"	10 1/2"	3/8"	15 1/2"	18 1/2"	15 1/2"	3.4	R	35
36	11"	11 1/2"	3/8"	16 1/2"	19 1/2"	16 1/2"	3.4	R	36
37	12"	12 1/2"	3/8"	17 1/2"	20 1/2"	17 1/2"	3.4	R	37
38	13"	13 1/2"	3/8"	18 1/2"	21 1/2"	18 1/2"	3.4	R	38
39	14"	14 1/2"	3/8"	19 1/2"	22 1/2"	19 1/2"	3.4	R	39
40	15"	15 1/2"	3/8"	20 1/2"	23 1/2"	20 1/2"	3.4	R	40
41	16"	16 1/2"	3/8"	21 1/2"	24 1/2"	21 1/2"	3.4	R	41
42	17"	17 1/2"	3/8"	22 1/2"	25 1/2"	22 1/2"	3.4	R	42
43	18"	18 1/2"	3/8"	23 1/2"	26 1/2"	23 1/2"	3.4	R	43
44	19"	19 1/2"	3/8"	24 1/2"	27 1/2"	24 1/2"	3.4	R	44
45	20"	20 1/2"	3/8"	25 1/2"	28 1/2"	25 1/2"	3.4	R	45



ENGINEERING COMP.
 600 N. W. 13th St., Ft. Lauderdale, FL 33305
 TEL: (305) 555-1234
 FAX: (305) 555-1234
 DATE: 11/15/80
 DRAWN: JUD
 CHECKED: JUD
 PROJECT: BASALT LINED STRAIGHT PIPE
 SHEET NO: 51.D.22

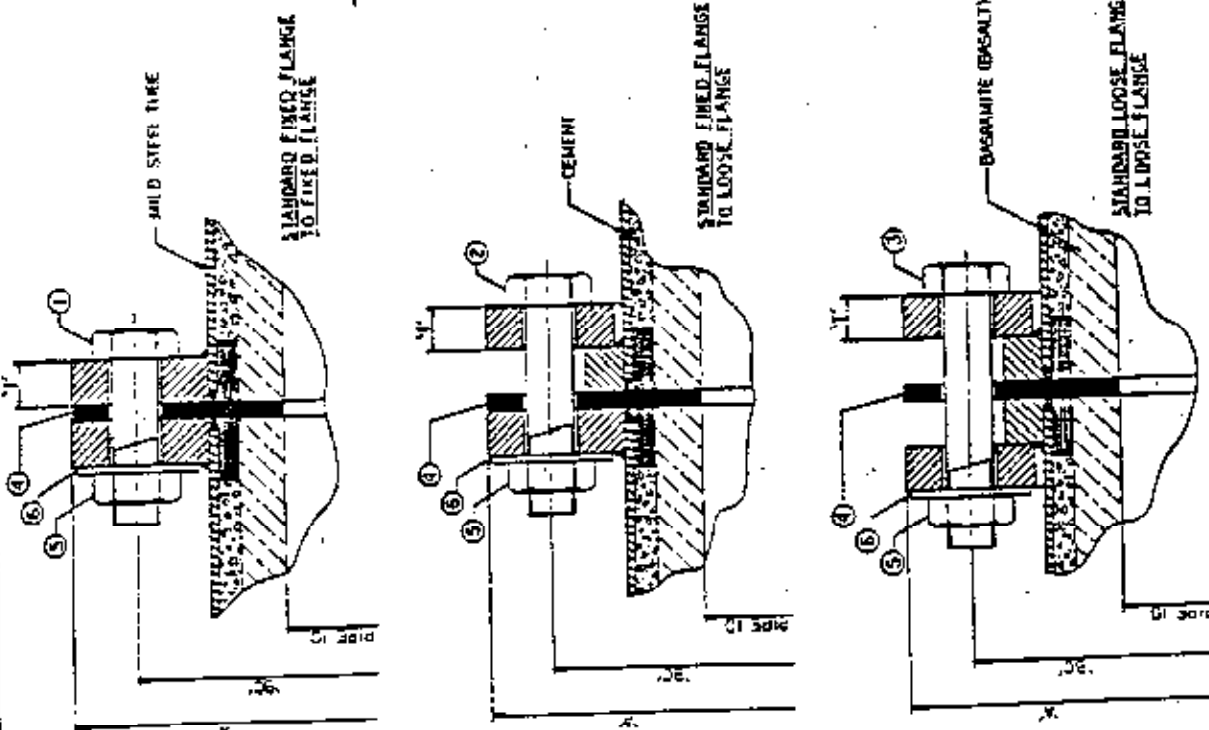
PIPE SIZE	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"	13"	14"	15"	16"	17"	18"	19"	20"	21"	22"	23"	24"	25"	26"	27"	28"	29"	30"		
OD	3.50	4.50	5.50	6.625	7.625	8.625	9.625	10.75	11.75	12.75	13.75	14.75	15.75	16.75	17.75	18.75	19.75	20.75	21.75	22.75	23.75	24.75	25.75	26.75	27.75	28.75	29.75	30.75		
WALL THICKNESS	0.25	0.3125	0.375	0.4375	0.500	0.5625	0.625	0.6875	0.750	0.8125	0.875	0.9375	1.000	1.0625	1.125	1.1875	1.250	1.3125	1.375	1.4375	1.500	1.5625	1.625	1.6875	1.750	1.8125	1.875	1.9375	2.000	
WALL WEIGHT	10.98	15.43	19.88	24.33	28.78	33.23	37.68	42.13	46.58	51.03	55.48	59.93	64.38	68.83	73.28	77.73	82.18	86.63	91.08	95.53	100.00	104.45	108.90	113.35	117.80	122.25	126.70	131.15	135.60	140.05



RED RUBBER GASKET - 1/4" THK.
OTHER MATERIALS AND THICKNESSES
AVAILABLE.

COMP ENGINEERING CORP.
1000 UNIVERSITY AVENUE - BOSTON, MASSACHUSETTS
GASKET USED WITH STANDARD FLANGES

DATE: 12/15/54
JOB: 12266
SHEET: 1 OF 2

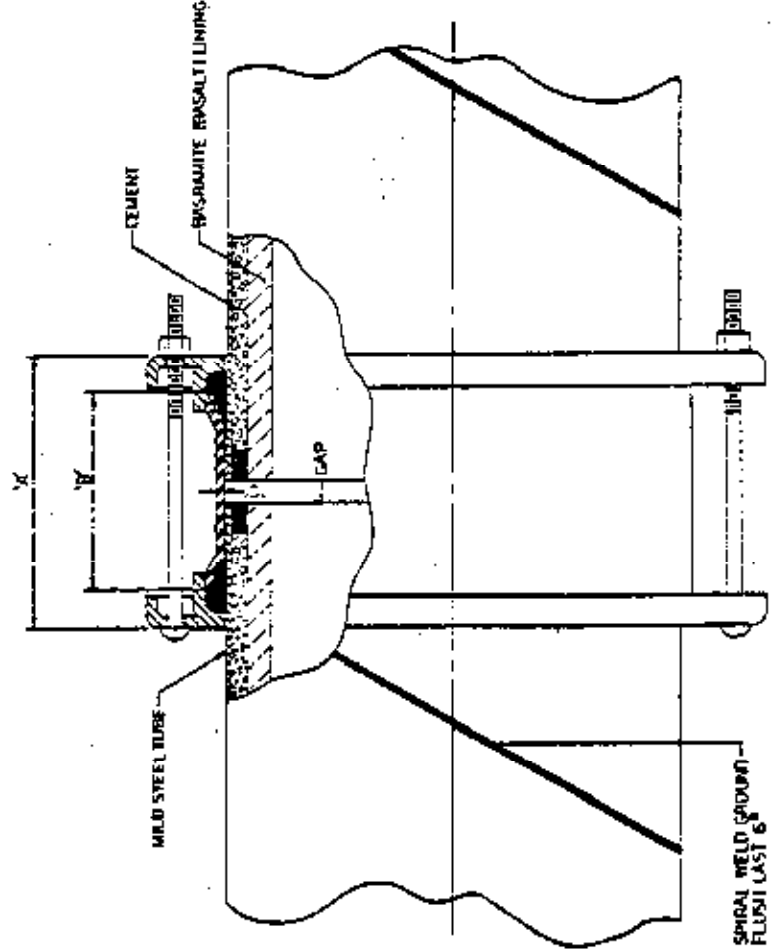


PIPE SIZE	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"	13"	14"	15"	16"	17"	18"	19"	20"	21"	22"	23"	24"	25"	26"	27"	28"	29"	30"	
PIPE ID	3.50	4.50	5.50	6.625	7.625	8.625	9.625	10.75	11.75	12.75	13.75	14.75	15.75	16.75	17.75	18.75	19.75	20.75	21.75	22.75	23.75	24.75	25.75	26.75	27.75	28.75	29.75	30.75	
FLANGE ID	4.50	5.50	6.50	7.625	8.625	9.625	10.75	11.75	12.75	13.75	14.75	15.75	16.75	17.75	18.75	19.75	20.75	21.75	22.75	23.75	24.75	25.75	26.75	27.75	28.75	29.75	30.75	31.75	
FLANGE WALL THICKNESS	0.375	0.4375	0.500	0.5625	0.625	0.6875	0.750	0.8125	0.875	0.9375	1.000	1.0625	1.125	1.1875	1.250	1.3125	1.375	1.4375	1.500	1.5625	1.625	1.6875	1.750	1.8125	1.875	1.9375	2.000	2.0625	
FLANGE WEIGHT	15.43	19.88	24.33	28.78	33.23	37.68	42.13	46.58	51.03	55.48	59.93	64.38	68.83	73.28	77.73	82.18	86.63	91.08	95.53	100.00	104.45	108.90	113.35	117.80	122.25	126.70	131.15	135.60	140.05

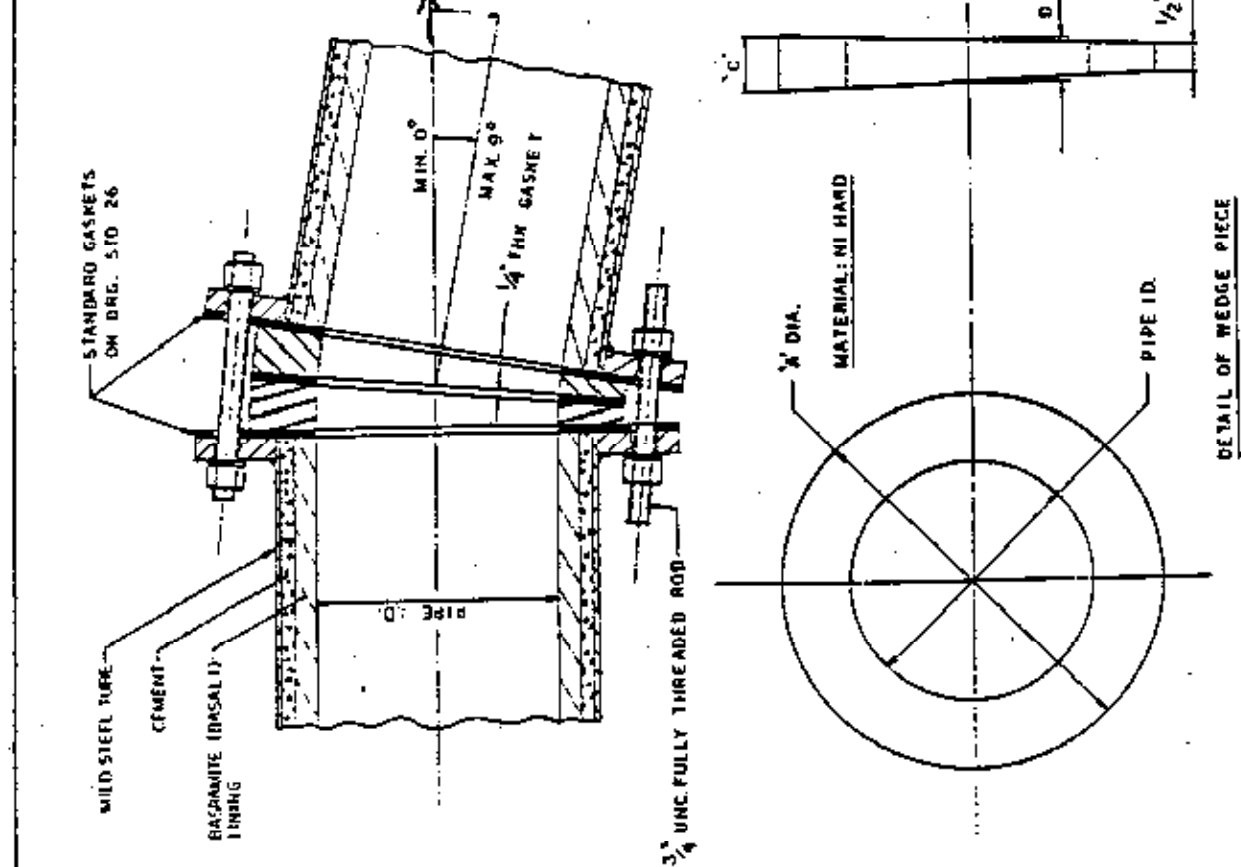
COMP ENGINEERING CORP.
1000 UNIVERSITY AVENUE - BOSTON, MASSACHUSETTS
STANDARD FLANGE CONNECTION DETAILS

DATE: 12/15/54
JOB: 12266
SHEET: 1 OF 2

NOM. SIZE	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"	13"	14"	15"	16"	17"	18"	19"	20"
OR FWA STRAIGHTS OR FOR DEPTHS	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"	13"	14"	15"	16"	17"	18"	19"	20"
GAP	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
DIA. "A"	3 1/8"	4 1/8"	5 1/8"	6 1/8"	7 1/8"	8 1/8"	9 1/8"	10 1/8"	11 1/8"	12 1/8"	13 1/8"	14 1/8"	15 1/8"	16 1/8"	17 1/8"	18 1/8"	19 1/8"	20 1/8"
DIA. "B"	3 1/8"	4 1/8"	5 1/8"	6 1/8"	7 1/8"	8 1/8"	9 1/8"	10 1/8"	11 1/8"	12 1/8"	13 1/8"	14 1/8"	15 1/8"	16 1/8"	17 1/8"	18 1/8"	19 1/8"	20 1/8"
EST. WT. LBS.	28	33	35	40	44	51	57	65	60	71	70	75	81	86	98	110	130	150
WORKING 18 S&K PISA PIPE ID.	2 5/8"	3 15/16"	4 1/8"	5 1/8"	6 1/8"	7 1/8"	8 1/8"	9 1/8"	10 1/8"	11 1/8"	12 1/8"	13 1/8"	14 1/8"	15 1/8"	17 1/8"	18 1/8"	19 1/8"	20 1/8"



CRP ENGINEERING CORP.
 1000 N. 10TH ST., SUITE 100, DENVER, CO 80202
 TELEPHONE: 333-1111
 TELEFAX: 333-1111
 E-MAIL: CRP@CRPENGINEERING.COM
 WWW: WWW.CRPE.COM



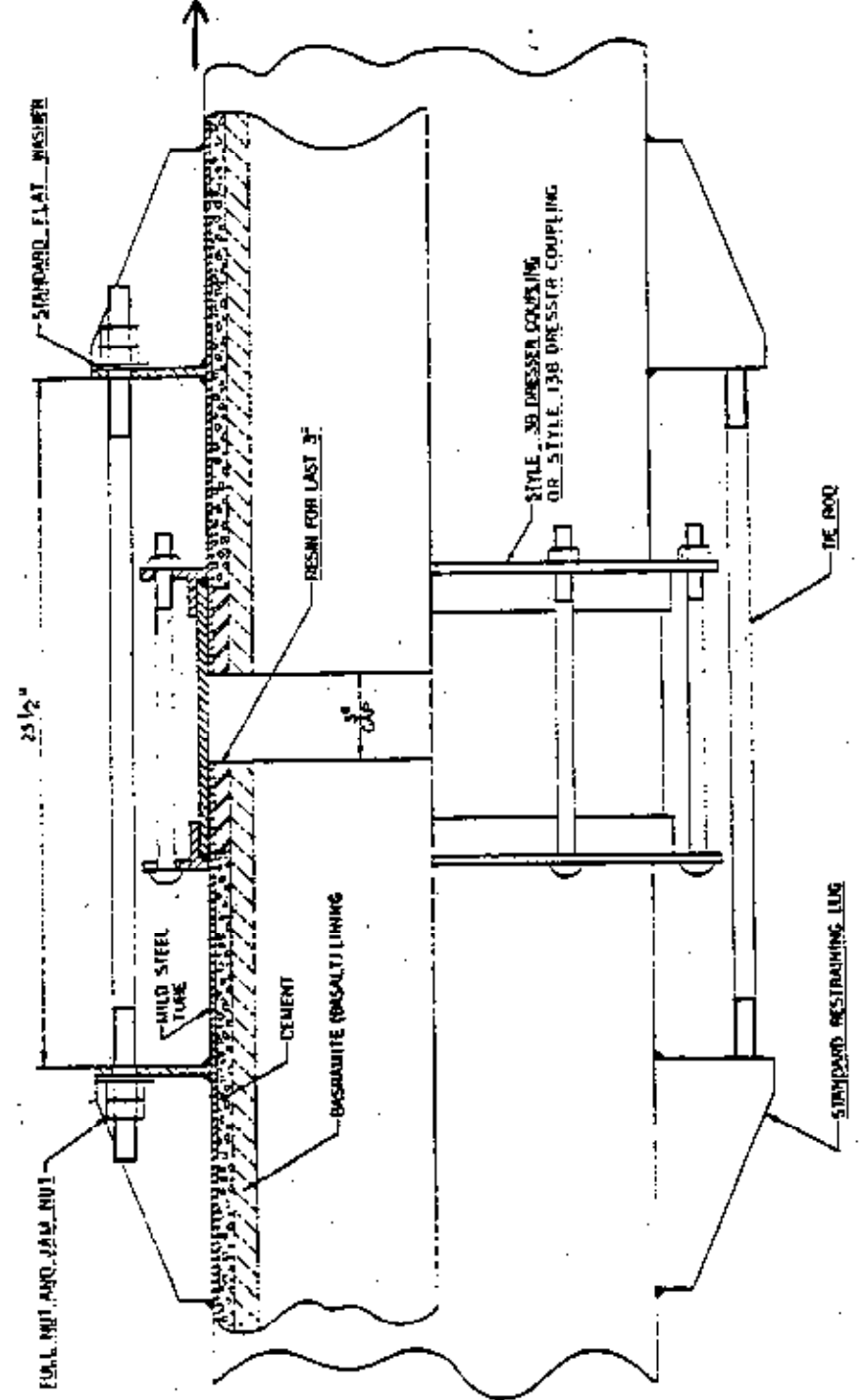
NOTES:
 1) LF DENOTES- LOOSE FLANGE.
 2) FF DENOTES- FIXED FLANGE.
 3) 500 MINIMUM DRIN.

NOM. SIZE	WEDGE ID.	WEDGE STOCK REF. NOS.	NO. AND LENGTH OF RODS REQUIRED		DIM. "A"	DIM. "B"	DIM. "C"	RUBBER GASKETS REQUIRED	GASKET STOCK REF. NO.
			1-1-1	FF-1F					
3"	2 5/8"		0-9 1/4"	0-7 1/2"	7"	3 3/4"	1"	7" OD X 3" ID	
4"	3 15/16"		0-9 1/2"	0-7 3/4"	7 3/4"	13 1/16"	1 1/8"	7 3/4" OD X 4" ID	
5"	4 15/16"		0-9 3/4"	0-8"	9 1/8"	7 1/8"	1 1/4"	9 1/4" OD X 5" ID	
6"	5 7/8"		0-9 3/4"	0-8 1/4"	9 3/4"	7 1/8"	1 1/4"	9 3/4" OD X 6" ID	
7"	6 7/8"		0-9"	0-8 1/2"	11 1/2"	15 1/16"	1 3/8"	11 1/2" OD X 7" ID	
8"	8 1/16"		0-9 1/4"	0-8 1/2"	12 1/2"	1"	1 1/2"	12 1/2" OD X 8" ID	
9"	8 7/8"		0-9 1/2"	0-8 3/4"	13 5/8"	1 1/16"	1 5/8"	13 5/8" OD X 9" ID	
10"	10"		0-9 1/2"	0-8 3/4"	14 7/8"	1 1/16"	1 5/8"	14 7/8" OD X 10" ID	
11"	11"		0-9 3/4"	0-9"	15 3/4"	1 1/8"	1 3/4"	15 3/4" OD X 11" ID	
12"	11 15/16"		0-10"	0-9 1/4"	17"	1 3/16"	1 7/8"	17" OD X 12" ID	
13"	13 1/4"		0-10 1/2"	0-9 1/2"	17 1/4"	1 3/16"	1 7/8"	17 1/4" OD X 13" ID	
14"	14"		0-10 1/4"	0-9 1/2"	18 3/8"	1 1/8"	2"	18 3/8" OD X 14" ID	

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DETAIL OF WEDGE PIECE

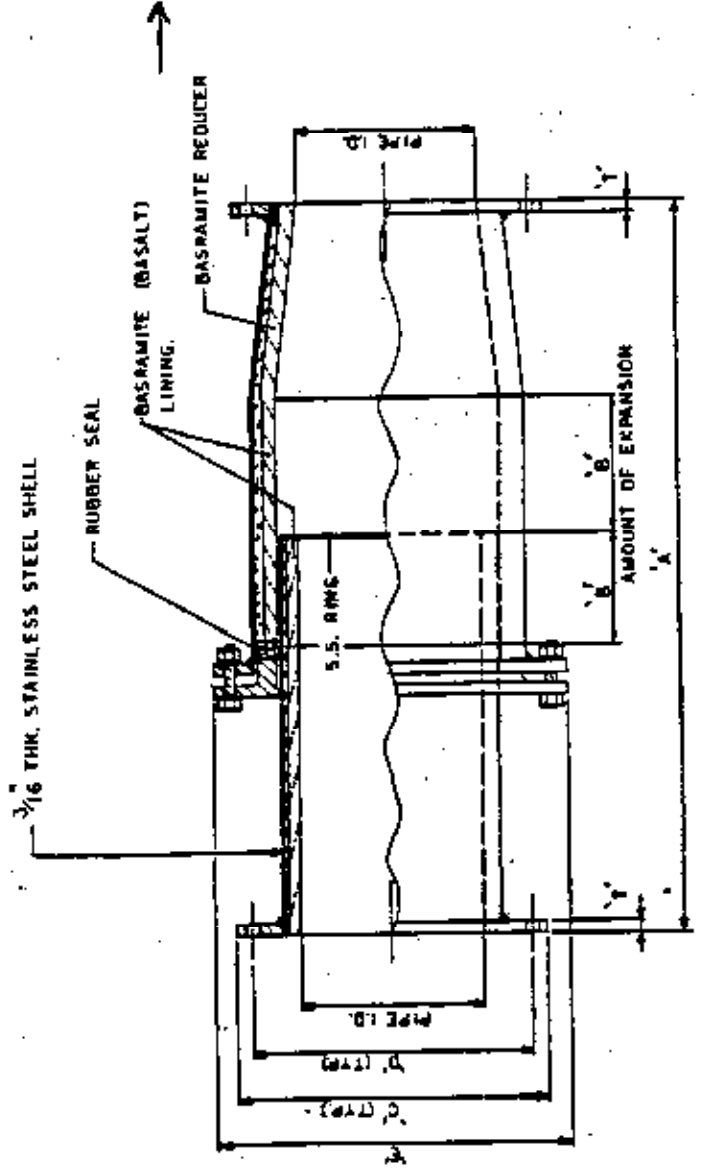
PIPE OD	PIPE ID	PIPE W.T.	PIPE W.T.	PIPE W.T.	PIPE W.T.	PIPE W.T.	PIPE W.T.	PIPE W.T.	PIPE W.T.
3"	2 15/16"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
4"	3 5/8"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
5"	4 1/8"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
6"	4 7/8"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
7"	5 3/4"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
8"	6 1/4"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
9"	6 7/8"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
10"	7 1/4"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
11"	7 7/8"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
12"	8 1/4"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
13"	8 7/8"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
14"	9 1/4"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
15"	9 7/8"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
16"	10 1/4"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
17"	10 7/8"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
18"	11 1/4"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
19"	11 7/8"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.
20"	12 1/4"	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.	1/2" D.



NOTE:
SEE STD. 35 FOR TIE ROD
AND RESTRAINING LUG
DETAILS.

COMPANY		DATE	
COP ENGINEERING CORP.		10/15/66	
TELEPHONE		PROJECT	
STANDARD EXPANSION JOINT		STD. 34	

NOM SIZE	PIPE ID	DIM A	DIM B	DIM C	DIM D	DIM E	DIM F	DIM G	DIM H	NO OF HOLES	QIM	NO OF HOLES	HOLE ST. WT DIA. LBS	STOCK REF. NO
3"	2 15/16"	10"	8 1/4"	10 1/2"	8 1/4"	10 1/2"	8 1/4"	10 1/2"	8 1/4"	8	3/4"	8	1/8"	
4"	3 5/8"	10 3/8"	9"	10 3/8"	9"	10 3/8"	9"	10 3/8"	9"	8	3/4"	8	1/8"	
5"	4 1/8"	12 3/8"	10 1/2"	12 3/8"	10 1/2"	12 3/8"	10 1/2"	12 3/8"	10 1/2"	8	3/4"	8	1/8"	
6"	4 7/8"	12 7/8"	11"	12 7/8"	11"	12 7/8"	11"	12 7/8"	11"	8	3/4"	8	1/8"	
7"	5 3/8"	14 3/8"	12 3/4"	14 3/8"	12 3/4"	14 3/8"	12 3/4"	14 3/8"	12 3/4"	8	3/4"	8	1/8"	
8"	6 1/8"	16 1/8"	13 3/4"	16 1/8"	13 3/4"	16 1/8"	13 3/4"	16 1/8"	13 3/4"	8	3/4"	8	1/8"	350
9"	6 7/8"	17"	14 1/8"	17"	14 1/8"	17"	14 1/8"	17"	14 1/8"	12	3/4"	12	1/8"	
10"	7 1/4"	18 1/4"	15 1/8"	18 1/4"	15 1/8"	18 1/4"	15 1/8"	18 1/4"	15 1/8"	12	3/4"	12	1/8"	400
11"	7 7/8"	19 1/4"	16 1/8"	19 1/4"	16 1/8"	19 1/4"	16 1/8"	19 1/4"	16 1/8"	12	3/4"	12	1/8"	
12"	8 1/4"	20 3/8"	17"	20 3/8"	17"	20 3/8"	17"	20 3/8"	17"	12	3/4"	12	1/8"	450
13"	8 7/8"	21 1/8"	18 1/2"	21 1/8"	18 1/2"	21 1/8"	18 1/2"	21 1/8"	18 1/2"	12	3/4"	12	1/8"	
14"	9 1/4"	21 1/2"	18 3/4"	21 1/2"	18 3/4"	21 1/2"	18 3/4"	21 1/2"	18 3/4"	12	3/4"	12	1/8"	
15"	9 7/8"	22 3/4"	19 1/2"	22 3/4"	19 1/2"	22 3/4"	19 1/2"	22 3/4"	19 1/2"	12	3/4"	12	1/8"	
16"	10 1/4"	24 1/4"	20 1/2"	24 1/4"	20 1/2"	24 1/4"	20 1/2"	24 1/4"	20 1/2"	12	3/4"	12	1/8"	
17"	10 7/8"	25 1/4"	21 3/4"	25 1/4"	21 3/4"	25 1/4"	21 3/4"	25 1/4"	21 3/4"	14	3/4"	14	1/8"	
18"	11 1/4"	25 3/4"	22 3/4"	25 3/4"	22 3/4"	25 3/4"	22 3/4"	25 3/4"	22 3/4"	14	3/4"	14	1/8"	
19"	11 7/8"	26 1/2"	23 1/2"	26 1/2"	23 1/2"	26 1/2"	23 1/2"	26 1/2"	23 1/2"	14	3/4"	14	1/8"	
20"	12 1/4"	27 1/2"	24 1/2"	27 1/2"	24 1/2"	27 1/2"	24 1/2"	27 1/2"	24 1/2"	14	3/4"	14	1/8"	



COP ENGINEERING CORP.		DATE	
TELESCOPING EXPANSION JOINT		10/15/66	
PROJECT		STD. 42	

Section 11
CONDENSATE PIPE

1. Contractor shall extend the HDPE condensate pipe from cell #1 to cell #2 using like materials. Extent of work is shown on the site plan.
2. Existing pipe material is Driscopipe 1000 Series by Philips Driscopipe, Inc. Pipe size is six-inch (6") with an SDR of 15.5.
3. All joints shall be fully fusion welded.
4. Pipe shall be installed in trench. Minimum cover three feet (36") shall be maintained above the top of the pipe.
5. Casing
 - 5.1. Condensate pipe shall be installed through the ductile iron pipe casing that already penetrates the geosynthetic liner of cell #2. Contractor shall provide spacers as required to properly install condensate within casing. Installation shall be done in a manner that protects the liner and the seal between liner and casing. Any damage done to the liner shall be repaired at the Contractor's expense.
 - 5.2. Contractor shall provide a casing under the ash pond access ramp for the condensate pipe. This casing shall be installed with a trenchless method to avoid damage to the ramp and to maintain access to the ash pond at all time. Casing shall be of ductile iron pipe or other pipe approved by the Owner and capable of carrying vehicular wheel loads. Contractor shall provide spacers as required to properly install condensate within casing.

END OF SECTION

Section 12
WETTING LINE PIPE

1. Contractor shall extend the wetting line pipe from cell #1 to cell #2 using like materials. Extent of work is shown on the site plan.
2. Existing pipe material is 12-inch ductile iron pipe, 350-psi pressure class, with push-on joints.
3. Pipe shall be installed in trench. Minimum cover three feet (36") shall be maintained above the top of the pipe.
4. Provide concrete thrust block at bends in pipe.
5. Wetting line pipe shall be installed under the ash pond access ramp using a trenchless method. Contractor shall provide a casing under the ash pond access ramp if necessary. Use a trenchless method to avoid damage to the ramp and to maintain access to the ash pond at all time. Casing, if used, shall be of ductile iron pipe or other pipe approved by the Owner and capable of carrying vehicular wheel loads. Contractor shall provide spacers as required to properly install condensate within casing.
6. New pipe shall connect into 12-inch ductile iron pipe already penetrating geosynthetic liner of cell #2. Installation shall be done in a manner that protects the liner and the seal between liner and pipe. Any damage done to the liner shall be repaired at the Contractor's expense.

END OF SECTION



D0000389

DMG
CS2001-1908

DYNEGY

DYNEGY MIDWEST GENERATION HAVANA POWER STATION

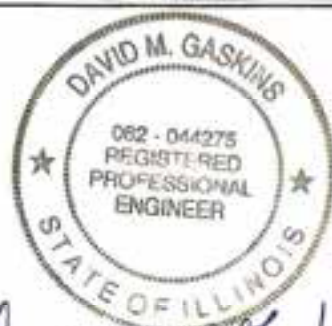
SPECIFICATIONS FOR EAST ASH POND CELL #3 HAVANA POWER STATION

JANUARY, 2002

ILLINOIS POWER

Part of the Dynegy Performance Team

DELIVERY SYSTEM OPERATION & DEVELOPMENT
CIVIL ENGINEERING SECTION
500 SOUTH 27th STREET
DECATUR, IL. 62521



David M. Gaskins
1/14/02
license expires
11/30/03

E - HAV1 - C165	FENCE PLAN (NOT INCLUDED IN CONTRACT)
E - HAV1 - C166	CELL #3 SITE PLAN
E - HAV1 - C167	TYPICAL CROSS SECTION AND DETAILS
E - HAV1 - C168-1	DETAILS (PLAN VIEWS)
E - HAV1 - C168-2	DETAILS AND SECTIONS
E - HAV1 - C169-1	OUTLET PIPE & SPILLWAY-PLANVIEW & SECTIONS
E - HAV1 - C169-2	SKIMMER SUPPORT BRACKETS DETAILS
E - HAV1 - C170	EFFLUENT PIPE MODIFICATIONS
E - HAV1 - C171 - 1	CROSS SECTIONS STA 0+00 TO STA 1+00
E - HAV1 - C171 - 2	CROSS SECTIONS STA 1+50 TO STA 2+50
E - HAV1 - C171 - 3	CROSS SECTION STA 3+00 TO STA 4+00
E - HAV1 - C171 - 4	CROSS SECTIONS STA 4+50 TO STA 4+84
E - HAV1 - C171 - 5	CROSS SECTIONS STA 4+98.5 TO STA 5+20
E - HAV1 - C171 - 6	CROSS SECTIONS STA 5+75 TO STA 6+50
E - HAV1 - C171 - 7	CROSS SECTIONS STA 7+00 TO STA 8+50
E - HAV1 - C171 - 8	CROSS SECTIONS STA 9+00 TO STA 10+50
E - HAV1 - C171 - 9	CROSS SECTIONS STA 11+00 TO STA 12+50
E - HAV1 - C171 - 10	CROSS SECTIONS STA 12+880 TO STA 14 +00
E - HAV1 - C171 - 11	CROSS SECTIONS STA 14+43 TO STA 16+00
E - HAV1 - C171 - 12	CROSS SECTIONS STA 16+50 TO ST 18+00
E - HAV1 - C171 - 13	CROSS SECTIONS STA 18+50 STA 20+00
E - HAV1 - C171 - 14	CROSS SECTIONS STA 20+50 TO STA 22+00
E - HAV1 - C171 - 15	CROSS SECTIONS STA 22+50 TO STA 23+95
E - HAV1 - C171 - 16	CROSS SECTIONS STA 24+50 TO STA 25+24
E - HAV1 - C171 - 17	CROSS SECTIONS STA 25+60 TO STA 26+30

Section 1
PROJECT DESCRIPTION

- This project consists of building an ash impoundment pond for the Dynegy Midwest Generation Havana Power Station.
 - The pond will be approximately 43 acres in size.
 - The embankment for the pond shall be constructed of on-site soil with a one-foot clay liner on the inside. Approximately 18,400 cubic yards of clay are stockpiled on site. The rest will need to be hauled in from the Bluff City borrow site. See the map at the end of this Section.
 - A polypropylene geomembrane liner shall be installed on top the clay liner.
 - The project shall also include concrete slabs, outlet works, grading, seeding, and other work as shown on the plans or specified herein.
 - The fence drawing (E-HAV1-C165) is included in the bid documents for information only. The fence will be installed by others prior to the start of this project.
- A **prebid** meeting will be held at the Havana Power Station at **10:00 AM on Thursday January 29, 2002**. All bidders should attend this meeting. Check in at the main plant office upon arriving for the meeting.
- Bid will be due at 3:00 PM on Wednesday, February 20, 2002. Dynegy Midwest Generation Purchasing Department will receive bids. Bids should be directed to:

Alona Campbell-Walker
Buyer/Contract Administrator
Dynegy Midwest Generation
2828 N. Monroe
Decatur, IL 62526
Fax (217)420-0202
- Bids may be faxed in on the due date, but a hardcopy must be delivered no later than two working days afterwards.
- It is anticipated that the Owner will notify the successful bidder of the award no later than March 1, 2002.
- Site security is a priority. New fence shall be installed by others prior to start of the project. When work requires openings in the fence, the opening shall be closed as soon as possible. The Owner reserves the right to require temporary security fencing be installed each night when fence openings cannot be permanently closed.

7. For technical questions regarding the design or bidding of this project, contact the project engineer:

David Gaskins, C-25
 Illinois Power Company
 500 South 27th St.
 Decatur, IL 62525
 Phone (217) 424-7023
 Fax (217) 362-7961

8. For arrangement of site access during the bidding period, contact:

Frank Rosenberger
 Dynegy Midwest Generation
 Havana Power Station
 15260 N. State Route 78
 Havana, IL 62644
 Phone (309) 543-2227
 Fax (309) 543-3921

9. **Tax exempt status:** As a pollution control facility, items incorporated into the construction of the pond are exempt from Illinois sales tax. Such items include the geomembrane liner, pipe, concrete, stone, etc. Item purchased for construction, but not incorporated into the finished work are not exempt. The Owner will provide the necessary documentation to the successful bidder.

288 km SW of Chicago, Illinois, United States 01 Jul 1989



**SECTION 2
GENERAL CONDITIONS
FOR ERECTED MATERIALS AND EQUIPMENT, AND LABOR CONTRACTS**

<u>ARTICLE NO.</u>	<u>TITLE</u>	<u>PAGE NO.</u>
1	DEFINITIONS	1
2	INTERPRETATION OF CONTRACT	2
3	CONTRACTOR'S PERFORMANCE AND RIGHT TO ACHIEVE COST SAVINGS	3
4	VERIFICATION OF DIMENSIONS ON DRAWINGS, AND MEASUREMENTS AT SITE	3
5	CONTRACTOR'S INSPECTION AND KNOWLEDGE OF PLANS AND THE PREMISES; COST OF PERFORMANCE	4
6	CONTRACTOR'S DRAWINGS AND DATA	4
7	SAMPLES	4
8	INSPECTION, TESTING AND EXPEDITING	4
9	MATERIALS, CORRECTION OF WORK, AND WARRANTY	5
10	PROGRESS REPORTS	6
11	DOCUMENTATION; PROPRIETARY INFORMATION	7
12	DELAYS IN COMPLETION AND EXTENSION OF TIME	7
13	SUSPENSION	8
14	OVERTIME	9
15	ROUTING OF SHIPMENTS	9
16	CLEANING UP	10
17	PERMITS AND PUBLIC REGULATIONS	10
18	COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND CODES	11
19	ERECTION	11
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21	STORAGE AND TEMPORARY BUILDINGS	14
22	MATERIAL SAFETY DATA SHEETS	14
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24	COMPANY'S RULES AND REGULATIONS	16
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26	TERMINATION	16
27	LOSS OR DAMAGE AND INSURANCE	17
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30	ADVANCE SHIPMENTS	20
31	PUBLICITY	21
32	COST BREAKDOWN	21
33	TAXES	21
34	PAYMENTS	21
35	RELEASE OF MECHANICS' LIENS	22
36	ASSIGNMENT OF CONTRACT	22
37	PATENTS	23
38	NOTICES	23
39	STATE LAW GOVERNING CONTRACT	24
40	ARBITRATION	24

41	LITIGATION	24
42	TIME OF THE ESSENCE	24
43	DATE OF CONTRACT	24
44	NON-WAIVER OF RIGHTS	25
45	HEADINGS	25
46	SEVERABILITY	25
47	SMOKING	25
48	DRUGS, ALCOHOL AND FIREARMS	26

Section 7
EARTHWORK

1. SCOPE

- 1.1. This specification covers the minimum performance requirements, materials, and references necessary to govern earthwork and related operations. Earthwork is the movement of soil, sand, or rock from one location to another, shaping the materials in accordance with the plans and specifications, and achieving the desired physical condition of the materials by various methods.
- 1.2. Earthwork associated with this project includes, but is not necessarily limited to, the following:
- 1.2.1. Stripping topsoil for later dressing out of embankments and other disturbed areas.
 - 1.2.2. Embankment construction.
 - 1.2.3. Clay liner construction including excavation at the borrow site and hauling of clay materials to the project site.
 - 1.2.4. Grading and ditch construction.
 - 1.2.5. Excavation and backfill for manhole.
 - 1.2.6. Stone surfacing.
- 1.3. Access to the clay borrow site will likely include a low water crossing of a small stream and an entrance gate. Design and permitting of the low water crossing is the responsibility of the Contractor. Furthermore, the Contractor is responsible for the construction, improvement, and maintenance of haul roads required at the borrow site. All such work required for access to the borrow site shall be paid for as a single item as indicated on the bid form.
- 1.3.1. Dynegy does not own the borrow site. It has a mineral rights lease covering the soil to be used for the clay liner. The Contractor shall perform his work at the borrow site in a way that does not unnecessarily interfere with the owner's use of his property and buildings.
 - 1.3.2. An access route to the borrow site has been established by past use. The Contractor may negotiate alternate access routes with adjacent landowners.
 - 1.3.5. The Contractor shall not use the drive to the industrial building at the borrow site. He shall confine his vehicles to the haul roads.

- 1.3.4. Contractor shall take care not to damage existing drives, fences, or other improvements at the borrow site. Any such damage shall be repaired at the Contractor's expense.
 - 1.3.5. Contractor shall be responsible for dust control around the industrial building at the borrow site.
- 1.4. The surface of the clay liner must be free of projecting rocks or other items that could damage the geomembrane liner. The following actions shall be taken to achieve this.
- 1.4.1. Use a smooth drum roller to press rocks and other hard objects down into the clay liner to leave a smooth, level surface.
 - 1.4.2. Inspect each area prior to installation of the geomembrane and hand remove projecting rocks and other items that could damage the geomembrane. Fill any voids that are left if they are determined to be large enough to be detrimental to the geomembrane liner by the on-site representative.
- 1.5. Payment for earthwork shall be as indicated on the bid form and as specified in this section.

2. DEFINITIONS

- 2.1. **Excavation:** Work done in obtaining material for embankments, liners, or fills from a source other than required excavation. Included is the excavating, transporting, placing, and compacting of materials from the borrow site near Bluff City necessary for the construction of the clay liner.
- 2.2. **Channel Excavation:** The removal and satisfactory disposal or reuse of all materials encountered in the construction of ditches, stream channels, or swales.
- 2.3. **Clay:** An aggregate of microscopic and submicroscopic flake-shaped crystalline minerals characterized by the typical colloidal properties of cohesion, plasticity, and the ability to absorb ions conforming to the gradations set forth in the Unified Classification System.
- 2.4. **Clearing:** The removal and disposal of all obstructions such as fences, walls, foundations, buildings, trees, stumps, brush, accumulations of rubbish of whatever nature, and existing structures.
- 2.5. **Construction Inspector:** The Owner's on-site representative.

- 2.6. **Contractor:** The party or parties proposing to provide all labor, equipment and materials required to perform the work specified herein or on the plans.
- 2.7. **Crushed Gravel:** Fractured particles resulting from the crushing of gravel which, prior to crushing, would have been retained on a screen with an opening 1.5 times as large as the maximum size of the resulting crushed material.
- 2.8. **Crushed Stone:** Angular fragments resulting from the mechanical crushing of granite, limestone, or dolomite from undisturbed, consolidated deposits: (Dolomite shall be a carbonate rock containing 11.0% or more magnesium oxide (MgO). Limestone shall be a carbonate rock containing less than 11.0% magnesium oxide).
- 2.9. **Engineer:** The Owner's project engineer.
- 2.10. **Embankment:** Consists of the construction of fill areas by hauling, depositing, placing and compacting the specified material above the natural surface or a specified grade line.
- 2.11. **Footing Excavation:** See Structure Excavation.
- 2.12. **Gravel:** Coarse, granular, unconsolidated material resulting from the reduction of rock by the action of the elements and having subangular to rounded surfaces conforming to the gradations set forth in the Unified Classification System.
- 2.13. **Impervious Backfill:** Fine-grained soils (Silty Clay, CL to CL-CH) placed and compacted in excavations, around structures or other items as indicated in the plans and specifications.
- 2.14. **Inorganic Silt:** Fine-grained soil possessing little or no plasticity or cohesion conforming to the gradations set forth in the Unified Classification System.
- 2.15. **Owner:** Dynegy Midwest Generation, Havana Power Station, or its designated agent.

- 2.16. **Pipe Excavation:** The excavation, removal and satisfactory disposal or reuse of all materials encountered constructing a trench for installation of the specified pipe.
- 2.17. **Porous Backfill:** Fine aggregate (clean sand) placed and compacted in excavations, around structures or other items as indicated in the plans and specifications.
- 2.18. **Rock:** Natural aggregate of mineral grains connected by strong and permanent cohesive forces.
- 2.19. **Sand:** Fine granular material resulting from the natural disintegration of rock conforming to the gradations set forth in the Unified Classification System.
- 2.20. **Soil:** Natural aggregate of mineral grains, with or without organic constituents that can be separated by gentle mechanical means such as agitation in water. Gravel and sand are coarse-grained soils, while silts and clays are fine-grained soils.
- 2.21. **Stripping:** The excavation, removal and satisfactory disposal (if required) of all materials taken between the original surface and the top of suitable material for the construction of embankments, subgrade, sub-base, shoulders, intersections, ditches, waterways, entrances, approaches and incidental work.
- 2.22. **Structure Excavation:** Removal of any and all materials encountered during installation of any designated structure and the satisfactory disposal or reuse of all materials.
- 2.23. **Unclassified Excavation:** The removal of any combination of topsoil, earth, rock, muck or obstacle carried out to the lines and grades specified or shown on the plans without regard to percentage of moisture and type of material found.

3. REFERENCES

- 3.1. The reference to specifications or organizations (such as ASTM) together with any diagrams, drawings or plans shall be considered as part of this specification. In the event of conflict between this specification and the referenced documents, the requirements of this specification shall take

precedence. The latest editions of the following specifications, standards, and codes apply:

3.2. American Society for Testing and Materials (ASTM)

ASTM D75: Practice for Sampling Aggregates

ASTM D420: Recommended Practice for Investigating and Sampling Soil and Rock for Engineering Purposes

ASTM D421: Method for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants

ASTM D422: Method for Particle-Size Analysis of Soils

ASTM D653: Terms and Symbols Relating to Soil and Rock Mechanics

ASTM D698: Test Methods for Moisture - Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb (2.49 kg) Rammer and 12-inch Drop

ASTM D854: Test Method for Specific Gravity of Soils

ASTM D1140: Test Method for Amount of Material in Soils Finer than the No. 200 (75- μ) Sieve

ASTM D1452: Practice for Soil Investigation and Sampling by Auger Borings

ASTM D1556: Test Method for Density of Soil in Place by the Sand-Cone Method

ASTM D1557: Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10-lb (4.5-kg) Rammer and 18-inch (457-mm) Drop

ASTM D1558: Test Method for Moisture Content Penetration Resistance Relationships of Fine Grained Soils

ASTM D1586: Method for Penetration Test and Split-Barrel

Sampling of Soils

ASTM D1587: Practice for Thin-Walled Tube Sampling of Soils

ASTM D2167: Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method

ASTM D2168: Methods for Calibration of Laboratory Mechanical-Rammer Soil Compactors

ASTM D2216: Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock and Soil Aggregate Mixtures

ASTM D2217: Method for Wet Preparation of Soil Samples for Particle Size Analysis and Determination of Soil Constants

ASTM D2487: Test Method for Classification of Soils for Engineering Purposes

ASTM D2922: Test Methods for Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)

ASTM D3017: Test Method for Moisture Content of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)

ASTM D3740: Practice for the Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

ASTM D4220: Practices for Preserving and Transporting Soil Samples

ASTM D4318: Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

ASTM C29: Test Method for Unit Weight and Voids in Aggregate

ASTM C127: Test Method for Specific Gravity and Absorption of

Coarse Aggregate

ASTM C128: Test Method for Specific Gravity and Absorption of Fine Aggregate

ASTM C136: Method for Sieve Analysis of Fine and Coarse Aggregates

ASTM C566: Test Method for Total Moisture Content of Aggregate by Drying

ASTM C702: Methods for Reducing Field Samples of Aggregate to Testing Size

ASTM D75: Practice for Sampling Aggregates

ASTM E11: Specification for Wire-Cloth Sieves for Testing Purposes

ASTM D3665: Practice for Random Sampling of Construction Materials

3.3. Standard Specifications for Road and Bridge Construction - Illinois Department of Transportation (IDOT)

4. MATERIALS

4.1. Acceptability -

4.1.1. The clay liner shall be made of soils classified as clay or silty clay. It is imperative that clay liner be constructed of materials that have a permeability of not more 10^{-6} cm/sec. Based on experience, it is expected that the clay and silty clay soils at the borrow site will meet this requirement at the specified compaction and moisture content.

4.1.1.1. After the exact location of the borrow excavation is determined, soil tests will be made by the Owner to confirm that the material will meet the permeability requirements. If the soil proves unsatisfactory, one or more of the following measures shall be taken.

4.1.1.1.1. The location of the borrow pit will be moved to a location with better soils.

4.1.1.1.2. The compaction and/or moisture content requirements for the clay liner will be adjusted to reduce the permeability.

4.1.1.1.3. If there are extra costs associated with any of the measures, it shall be agreed upon by the Owner and Contractor prior to their implementation.

4.1.1. Previous testing data will be considered in determining acceptability. No material will be brought to the construction site until the Owner, or the designated testing agency, has tested it, and found it suitable for the intended application. Material hauled to the site prior to the Owner's approval may be rejected, and in such cases must be removed by the Contractor at his own expense.

4.1.2. Unless otherwise approved by the Engineer, all material shall come from the same location and exhibit similar characteristics.

4.2. The type of material and gradation to be used at a particular location will be as designated in Section 1 of this section, other portions of the specifications, or on the plans for the project or specific portions thereof.

4.2.1. In most instances coarse grained material (gravels, crushed stone, sand) will be designated by an IDOT gradation. Materials with these gradations are readily available state wide during the construction season.

4.2.2. Fine grained materials (clay, silty clay) will be designated by a Unified System Classification (ASTM D2487).

4.3. Topsoil shall be relatively free from large roots, sticks, weeds, brush or stones larger than 1 inch in diameter, or other litter and waste products. Topsoil shall be a loamy mixture having the following characteristics:

- At least 90% passing the No. 10 sieve.
- Not less than 1% or more than 10% organic matter.
- Not less than 12% or more than 50% clay.
- No more than 55% sand
- A PH value between five and eight

5. CONSTRUCTION REQUIREMENTS

- 5.1. Unless noted otherwise below, compaction requirements for all phases of the work shall be 95% or greater of the maximum dry density and within $\pm 2\%$ of the optimum moisture content as determined by ASTM D698 (commonly referred to as the Standard Proctor test).
- 5.1.1. The clay liner shall be compacted to 95% or greater of the maximum dry density at a moisture content between -1% and +3% of optimum moisture content as determined by ASTM D698 (commonly referred to as the Standard Proctor test).
- 5.2. Compaction shall be obtained by mechanical means in a timely manner so as not to delay construction. Lift thickness may vary depending upon the condition of the material and equipment used, but should never exceed six inches. Each lift will be tested by the owner or an outside agency.
- 5.3. Material placed which does not meet the minimum compaction requirements shall be reworked as necessary to obtain the specified compaction at no extra cost to the Owner. No further placement of material will be allowed until the compaction requirements are met. If the material becomes unsuitable for use after placement, even if previously compacted to the specified percentage, it will be removed and replaced by suitable material that will be compacted in accordance with the specifications at no extra cost to the Owner.
- 5.4. No placement of material will be allowed on wet or frozen subgrade.
- 5.5. The Contractor will maintain his work in such a manner to prevent ponding of water in the project area. In foundation excavations where water may collect the Contractor shall establish and maintain pumping capabilities to keep the excavation free of water. This includes a layer of oversized rock ($\pm 4"$) covered by a layer of crushed stone (CA-6 or CA-10) or a mud mat to allow work to proceed in the excavation without contamination by mud or water.
- 5.6. Erosion control is the responsibility of the Contractor.
- 5.6.1. Contractor shall submit for approval prior to the start of work sediment control plans meeting the requirements of the Federal and State EPA. The plans will clearly show routing of stormwater discharge and sediment control measures such as settling basins,

- silt fences, etc. The plans shall be fully implemented and maintained throughout the project at both the pond and borrow site locations.
- 5.6.2. Contractor shall repair all erosion damage that occurs during the project at no additional cost to the Owner.
- 5.6.3. The borrow site shall be left in a condition that will minimize erosion and promote the natural revegetation of the area. Cut slopes shall not be left any steeper than 1 vertical to 4 horizontal. Seeding will not be required at the borrow site.
- 5.7. Disposal of all unsuitable material in a legal, safe, and satisfactory manner is the responsibility of the Contractor. This includes, but is not limited to, materials resulting from clearing and stripping of a site.
- 5.8. The Contractor shall be responsible for, and shall take all necessary precautions to preserve and protect, all existing tile drains, sewers, other subsurface drains, underground utilities, above ground utilities, private transmission lines, and appurtenances which may be affected by his operations and shall repair, at his own expense, any and all damages resulting from his actions or negligence.
- 5.9. The Contractor shall notify the Construction Inspector two days in advance of beginning or resuming work.
- 5.10. Trenches for pipe installation will be excavated 18 inches wider than the external diameter of the pipe, or more if necessary, to permit tamping under the haunches and around the pipe. Where a firm foundation is not encountered at the grade established all such unsuitable soil shall be removed for the width of the trench and replaced with well compacted bedding material or suitable compacted aggregate. In areas requiring impervious backfill, the trench bottom will be shaped to conform to the pipe's shape in lieu of bedding.
- 5.11. Access to the project site will be maintained at all times. If the work is being performed at an existing facility the Contractor shall make the necessary arrangements to maintain access to vital areas.
- 5.12. Various portions of the work will require testing by Owner's personnel or an outside testing agency. The Contractor will cooperate with the testing program and make his work accessible at all times.

- 5.13. Stripping and clearing of the site is incidental to the contract.
- 5.14. If the work generates sufficient dust to cause complaints to be received by the Owner, the Contractor shall alleviate the situation at no cost to the Owner.
- 5.15. All holes, ruts, soft places, and other defects shall be corrected. In no case shall the surface course, base course, or other items be placed on soft or unstable material or over areas that are not properly drained.
- 5.16. In cut sections where excessively wet soil is encountered the Contractor will be required to make the following efforts to dry the soil and to obtain compaction of the material in accordance with the requirements of 5.1:
- 5.16.1. Cut ditches to drain the area.
- 5.16.2. Air dry the top 8 inches of subgrade, including at least two eight-inch depth processings utilizing discs or tillers each day for three consecutive good drying days.
- 5.16.3. Recompact the layer processed in the above paragraphs to achieve compaction results stated in 5.1. When the above work has failed to produce satisfactory work, contact the Engineer to review the circumstances.
- 5.17. The subgrade shall be constructed so that after being compacted it will conform to the alignment, grade, and cross section shown on the plans. Equipment of such weight or use in such a way as to cause a rut in the finished subgrade of one inch or more in depth shall be removed from the work or the rutting shall otherwise be prevented. Rutted areas shall be graded and rerolled with a smooth-wheeled roller.
- 5.18. A smooth surface is desired at the termination point of each type of material used whether it is virgin subgrade, embankment material, crushed stone, or other construction materials. When a sheepfoot roller is used, the area must be leveled at the finished grade. The interface between continuing layers of embankment are not to be leveled and are expected to exhibit a normal amount of "fluff" associated with an ongoing fill operation.
- 5.19. Traffic control, including provisions for the necessary barricades, flagmen and other items, is the responsibility of the Contractor.

- 5.20. Embankment operations shall comply with the following requirements:
- 5.20.1. Before any embankment is placed, all clearing and stripping over the entire area shall be performed. The top six inches of the exposed surface shall be disced, and then compacted to meet the requirements of 5.1. When construction is resumed after any freezing weather the top eight inches of all partially completed embankments will be reworked and compacted to meet the requirements of 5.1 prior to placing more fill.
- 5.20.2. Embankment material will be as specified in Section 1 of this specification, other portions of the specifications, or on the plans for the project. If required, the material shall be disced sufficiently to break down oversize clods, mix the material, secure a uniform moisture content, and insure uniform density and compaction. Each layer of material shall extend the entire length and width of embankment, if possible, and shall be leveled when placed. Embankment around structures is not to be placed until the concrete has attained its specified strength.
- 5.21. Topsoil shall not be placed until the area to be covered has been shaped, trimmed, and finished. All irregularities in the surface shall be filled or smoothed out before the topsoil is placed. If the existing surface has become hardened or crusted it shall be disced or raked until broken up to provide a bond with the topsoil. All unsuitable debris and stones larger than three inches in diameter shall be removed from the area.
- 5.22. Road surfaces shall consist of crushed stone aggregate shown on the plans. The aggregate shall be deposited full-lane width directly on the subgrade, geotextile fabric (if specified), or previous layer of compacted base course in such a way to prevent segregation and require a minimum amount of blade work. Immediately after placement of the material it shall be compacted by a rubber tired roller or vibratory smooth steel drum machine to the requirements of 5.1. If any subgrade material is worked into the base material during the operations all granular material affected will be removed and replaced with new aggregate at no cost to the owner.
6. INSPECTION BY OWNER
- 6.1. The Owner is responsible for testing the project materials and results of the work performed at regular intervals. Materials that fail to meet the

specified requirements shall be reworked or replaced at the Contractor's expense.

- 6.2. The Contractor will cooperate with the Owner at all times to provide access to the materials and site for testing purposes.

7. MEASUREMENT

- 7.1. The Owner reserves the right to increase or decrease quantities, as required, with no increase in the unit price except as noted in the Supplemental General Conditions.
- 7.2. Items measured in units of weight may be paid for on a dry-weight basis at the discretion of the Engineer if the moisture content is found to be excessive. The bid units will not be affected unless the moisture content of coarse grained soils exceeds 12%, or 20% for fine grained soils.
- 7.3. Clearing will not be measured for payment and is incidental to the contract.
- 7.4. Pipe excavation and furnishing, placing, and compacting bedding will not be measured for payment and are to be included in the bid price for the pipe.
- 7.5. Cross section measurements and the average end area method shall be used to determine volumes of excavations of required material for embankments unless otherwise approved by the Engineer.
- 7.6. Borrow material and embankment quantities shall be in net cubic yards of material moved. The plan quantities will be used for bidding purposes. If there is a discrepancy between the successful bidder's take off quantities of more than plus or minus 5%, the Contractor shall notify the Engineer in writing prior to starting work. Arrangements will be made to cross-section the project areas before and after earthwork is done to determine the amount of material moved in accordance with these specifications.
- 7.6.1. In determining the volumes, no allowance will be made for settlement, consolidation, or similar factors. Volumes will be based on before and after topographies at the pond and borrow site.
- 7.6.2. At the pond site, it is expected that there will be excess cut beyond what is needed to construct the embankments. The surplus soil shall be stockpiled on site as directed by the On-Site

Representative. Stockpiled soil will be shaped and compacted to leave it in a stable condition. Stockpiled soil shall be considered embankment construction for the purposes computing pay quantities.

- 7.7. If the Contractor's quantities are less than 105% of the estimated contract quantities he shall be paid the contract quantities when the project is constructed to the lines and grades shown in the plans and specifications.
- 7.8. The following items will be measured in cubic yards:
- 7.8.1. Embankment
 - 7.8.2. Clay Liner
 - 7.8.3. Channel Excavation
 - 7.8.4. Structure Excavation
 - 7.8.5. Unclassified Excavation
- 7.9. The following items will be measured in tons:
- 7.9.1. Sand
 - 7.9.2. Gravel
 - 7.9.3. Crushed Gravel
 - 7.9.4. Crushed Stone Aggregate
- 7.10. Porous backfill will be measured in tons of the specified material.
- 7.11. Stripping will be incidental to the work and not paid for as a separate item.
- 7.12. Topsoil will be measured in cubic yards at the same rate as the on-site embankment fill and will include excavating, transporting, placing, and grading the material as indicated in the plans and specifications. Depth of topsoil on the outside of embankments will be 4 inches.
- 7.13. Geotextile fabric will be measured in square yards, not including laps or portions anchored in trenches.

Section 8 CONCRETE

1. SCOPE

- 1.1. This specification covers the minimum requirements for concrete foundations and slabs on grade.
- 1.2. Except as noted otherwise, the Contractor shall furnish all labor, material, tools, and equipment necessary for concrete work shown on the drawings and specified herein.
- 1.3. Exceptions to the requirements of this specification will be considered only if submitted in writing with the bid and an increase (or decrease) in cost for complying with the requirements of this specification is provided.

2. DEFINITIONS

- 2.1. Contractor - The party or parties proposing to perform the work and provide the material specified herein.
- 2.2. Company - Dynegy Midwest Generation, Havana Power Station, or its designated agent.
- 2.3. Engineer - The Company's Project Engineer.
- 2.4. On-Site Representative - The Company's On-Site Construction Representative.
- 2.5. Tester - The Company's designated testing agency (including concrete and soil testing).
- 2.6. All design terms and symbols shall be defined in ACI 318.

3. REFERENCES

- 3.1. Any specification or document referred to in this specification is to be considered as part of this specification. In the event of conflict between this specification and referenced documents, the requirements of this specification shall take precedence. The following specifications, standards, and codes apply:

- 3.1.1. American Concrete Institute (ACI)

ACI 305R - Recommended Practice for Hot-Weather Concreting.

ACI 306 - Recommended Practice for Cold-Weather Concreting.

ACI 308 - Recommended Practice of Curing Concrete.

ACI 315R - Manual of Standard Practice for Detailing Reinforced Concrete Structures.

ACI-318 - Building Code Requirements for Reinforced Concrete.

ACI 347 - Recommended Practice for Concrete Formwork.

3.1.2. American Society for Testing and Materials (ASTM)

ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.

ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

ASTM C31 - Making and Curing Concrete Test Specimens in the Field.

ASTM C33 - Concrete Aggregates.

ASTM C94 - Ready-Mixed Concrete.

ASTM C150 - Portland Cement.

ASTM C171 - Sheet Materials for Curing Concrete.

ASTM C309 - Liquid Membrane - Forming Compounds for Curing Concrete.

ASTM C494 - Chemical Admixtures for Concrete.

3.1.3. Illinois Department of Transportation (IDOT) - 1983 Specifications for Roads and Bridges.

4. GENERAL REQUIREMENTS

- 4.1. All concrete work shall conform to ACI 347 unless otherwise specified. This work shall also be performed under the personal and constant supervision of a competent Construction Superintendent or Foreman experienced in concrete work.

- 4.2. Concrete work shall be done in a manner that protects the geomembrane liner from damage. Any liner damage shall be repaired at the Contractor's expense including the cost of concrete removal and replacement that may be needed to properly repair the liner.
- 4.3. The Contractor shall provide all forms required for concrete work above and below ground.
- 4.4. The Company reserves the right to inspect all materials and make concrete tests. For most projects, a Tester will be on-site the day of the pour to test the concrete.
- 4.5. If requested, the Contractor shall provide concrete test cylinders in accordance with ASTM C31 (two from each truckload) from the concrete placed for the structure foundations. Cylinders should be dated and labeled as to the foundation and truckload number.
- 4.6. If the concrete test cylinders, whether made by the Contractor or a testing agency, fail to meet specified compressive strength, the Contractor shall replace any and all affected areas at his own cost.
- 4.7. The On-Site Representative will schedule the Tester.

5. MATERIALS

- 5.1. Cement shall be Portland Cement conforming to ASTM C150, Type I.
- 5.2. Fine aggregate shall be sand - clean, hard, durable, uncoated grains, free from deleterious substances, conforming to ASTM C33. Gradation shall conform to IDOT specifications.
- 5.3. Coarse aggregate shall be natural rock or crushed limestone - clean, hard, durable uncoated particles without flat or elongated pieces. Aggregate shall be free from deleterious materials and shall conform to ASTM C33. Gradation shall conform to IDOT specifications.
- 5.4. Water shall be clean and free from injurious amounts of oils, acids, salts, organic, or other deleterious matter.
- 5.5. Reinforcing bars shall conform to ASTM A615, Grade 60 unless otherwise noted on the foundation drawings. Reinforcing wire shall conform to ASTM A82. All reinforcing shall be free from loose rust, dirt and oil.

- 5.6. Removable forms shall be wood, metal, approved fiber tubes, or other approved materials.
- 5.7. Curing materials shall conform to ASTM C171. Curing compounds shall conform to ASTM C309.
- 5.8. Water-reducing admixtures shall conform to ASTM C494.
- 5.9. CA-6 road mix for backfill material shall conform to IDOT specifications.

6. EXCAVATION

- 6.1. All excavated materials shall be reused or properly disposed of on site by the Contractor, unless otherwise noted on the plans or in the specifications. Any affected ground area shall be returned to its former condition.
- 6.2. When soil conditions demand, casing and/or shoring will be allowed to help excavation. This casing shall be removed during placement of the concrete.
- 6.3. The actual depth of the foundation dig shall be within + 6 inches from the required foundation depth given on the drawings.
- 6.4. If over-excavation occurs, the hole should be filled at Contractor's expense with compacted CA-6 road mix or additional concrete up to the required depth.

7. FORMS

- 7.1. Support and anchorage of forms must not puncture or damage the geomembrane liner in any way.
- 7.2. Forms shall conform to the shape, line, and dimensions of the members indicated on the drawings, and shall be substantial and tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain position and shape. Lumber, once used in forms, shall have nails withdrawn, and the surfaces to be exposed to concrete shall be carefully cleaned before reuse.
- 7.3. Forms for exposed surfaces shall be coated with nonstaining mineral oil, applied before the reinforcing steel is placed. Before concrete is placed, surplus oil shall be removed from the contact face of forms. All oil shall be removed from reinforcing steel and other surfaces requiring bond with concrete.
- 7.4. Forms shall not be disturbed until the concrete has adequately hardened and has gone through the first stage of curing, a minimum of 16 hours. Care shall be

taken to avoid spalling the concrete surfaces. Wood forms and all particles of wood shall be completely removed.

8. REINFORCING

- 8.1. All bars shall be bent accurately, placed in position as shown on the drawings, securely tied with #16 gauge black, annealed wire at all intersections, and securely held in place by spacers, chairs, or other approved supports in accordance with ACI 315R. At time of placing concrete, all reinforcing shall be free of loose rust, scale, oil, paint, mud, or other coatings which will destroy or reduce the concrete bond. Unless otherwise shown on the drawings or specified, the spacing, amount of concrete coverage, splicing, and bending of reinforcing steel shall conform to the requirements of ACI 318.
- 8.2. Reinforcing shall not be welded unless approved by the Engineer.
- 8.3. Anchor bolts (when used) shall be a minimum of 6" from the bottom of the foundation. All steel shall have a minimum of 3" concrete cover.
- 8.4. Lap splices for reinforcement shall conform to requirements of ACI 318 Class B splices.
- 8.5. All anchor bolt threads shall be taped to protect them from dirt and concrete during construction.
- 8.6. Substation foundation anchor bolts shall be connected to the reinforcing cage as detailed on the plans. If no details are shown, the Contractor shall provide a minimum of 4 #4 bar cross ties, 2 at the top and 2 at the bottom of the anchor bolt cage, wired to diagonal anchor bolts, each other, and the reinforcing cage per Article 9. For foundations with only 2 anchor bolts, only 2 #4 bars will need to be wired to the reinforcement and anchor bolts, 1 at the top and 1 at the bottom.

9. TOLERANCES

- 9.1. Formwork shall be set and maintained so as to insure completed concrete work within tolerance limits.
- 9.2. Forms used for the round tops of drilled piers shall be placed concentric to the structure and to the rest of the foundation, and shall extend at least 6 inches but not more than 18 inches below ground (final grade).
- 9.3. Top elevation of the finished slab or foundation shall not vary more than + 1/4 inch from the elevation indicated on the drawings.

10. CONCRETE MIX

- 10.1. The concrete mix design(s) to be used on the project shall be supplied to the Company by the Contractor 2 weeks prior to any concrete placement at the job site or at the pre-construction meeting. All materials incorporated into the concrete mix shall be identified by brand name, gradation, and the supplier.
- 10.2. All concrete shall have a minimum compressive strength of 3500 psi at 28 days. The mix shall have a minimum of 5 1/2 sacks of cement per cubic yard and a maximum water cement ration of .50 (by weight).
- 10.3. All concrete shall have 5 to 7 per cent entrained air.
- 10.4. All concrete shall have a slump of 4 to 5 inches unless otherwise approved by the Engineer.
- 10.5. Water-reducing admixtures may be used to help meet the above concrete mixture specifications, following admixture manufacturer recommendations.

11. MIXING CONCRETE

- 11.1. Unless otherwise approved by Engineer, "Ready-Mixed" concrete shall be used for all concrete. It shall be mixed and delivered in accordance with the requirements set forth in ASTM C94.

12. PREPARATION FOR PLACING CONCRETE

- 12.1. Water shall be removed from excavations before depositing concrete unless a tremie chute is properly used to avoid mixing of fresh concrete with ground water. Any water flow shall be diverted through a proper side drain to prevent washing over freshly deposited concrete. Hardened concrete, ice, debris, and foreign materials shall be removed from form interiors and from mixing and conveying equipment.
- 12.2. The On-Site Representative shall be notified sufficiently in advance of the scheduled time for concrete placement to permit examination of forms and reinforcement. No concrete shall be poured until the On-Site Representative has approved reinforcing and forms. This inspection is a precautionary measure and in no way relieves the Contractor of responsibility for the accuracy of form and reinforcement.

13. PLACING OF CONCRETE

- 13.1. Equipment for conveying concrete shall be of such size and design as to insure a continuous flow of concrete without material separation at the delivery end.

- 13.2. Concrete shall be conveyed from the mixer as rapidly as practical without segregation or loss of ingredients. Concrete shall be placed in forms as nearly as practical in final position to avoid rehandling. Vibrators shall not be used to transport concrete within forms. The concreting shall be carried on at such a rate that the concrete is at all times plastic and flows readily into the spaces between the reinforcing bars. No concrete that has partially hardened, been contaminated by foreign materials, or retempered shall be used. Immediately after depositing, concrete shall be compacted in an approved manner by spading, rodding, forking, or vibrating to eliminate air pockets. Concrete placed in drilled piers below ten feet is not required to be compacted as previously described. All concrete shall be worked into corners around reinforcement and inserts to prevent voids, trapped water, or stone pockets.
- 13.3. Care should be exercised in use of a vibrator to prevent segregation, sand pockets, or bleeding. The vibrator shall be moved continuously in and out of concrete, remaining stationary only a few seconds in any position.
- 13.4. Once concreting has begun, it shall be carried on as a continuous operation until the placement is completed.
- 13.5. Adjacent surfaces shall be protected from concrete drippings, spillage, or splashes. Damaged surfaces shall be cleaned immediately.

14. HOT-WEATHER REQUIREMENTS

- 14.1. All hot-weather concreting shall conform to ACI 305R unless otherwise specified.
- 14.2. The maximum temperature of mixed concrete shall be 90°F. Temperature of aggregates and mixing water shall be reduced by the use of chilled water or ice.

15. COLD-WEATHER REQUIREMENTS

- 15.1. All cold-weather concreting shall conform to ACI 306 unless otherwise specified.
- 15.2. Concrete damaged by freezing shall be removed and replaced.

16. CURING AND PROTECTION

- 16.1. All curing shall conform to ACI 308 unless otherwise specified.

17. CONCRETE FINISHES ON EXPOSED SURFACES

- 17.1. Tops of all slabs shall be floated and brought to a true level with a 3/4-inch beveled or rounded edges. Top surface shall be given a rough boom finish.
- 17.2. Exposed, formed surfaces shall be left unfinished except that larger voids shall be filled in with an approved concrete patching material. The on-site representative shall determine the voids that require filling. Small "bug holes" need not be filled.
- 17.3. Concrete surfaces directly below the geomembrane liner or the 8-oz. geotextile shall be given a smooth float or light trowel finish. Projections and sharp edges that could damage the liner must be removed.

18. JOINTS

- 18.1. Construction joints shall not be allowed unless otherwise shown on the drawings or as directed and approved by the Engineer. Where a joint is to be made, it shall be formed with a keyway.
- 18.2. Immediately before the placing of new concrete, the hardened concrete surface shall be thoroughly cleaned, all laitance removed, and the surface dampened with clean water.

Section 9
SEEDING

1. SCOPE

- 1.1. This specification covers the minimum requirements for seeding construction areas.
- 1.2. Use the seed mixture herein specified. Compositions of seed mixtures are given in Part 4 of this Section. Fertilizer requirements are given in Part 5 of this Section
- 1.3. Seed all disturbed areas at the pond site not covered with stone, geomembrane, or concrete. This includes, but is not limited to, the following areas:
- 1.3.1. The outside face of the embankment.
- 1.3.2. Disturbed areas adjacent to the outside toe of the embankment.
- 1.3.3. Disturbed areas around manholes.

2. DEFINITIONS

- 2.1. The term "Contractor", as used in this specification, shall refer to the party or parties proposing to perform the work and provide the material herein specified.
- 2.2. The term "Owner", as used in this specification, shall refer to Dynegy Midwest Generation - Havana Power Station or its designated agent.

3. GENERAL REQUIREMENTS

- 3.1. All work shall be performed under the supervision of a competent Construction Superintendent or Foreman.
- 3.2. The Owner reserves the right to inspect all materials and perform all tests necessary to determine compliance with the specifications. If the materials or finished product fail to meet the controlling criteria for these tests, the Contractor shall replace all affected areas at the Contractor's expense.
- 3.3. Each lot of seed furnished shall be tested by a State Agriculture Department (including states other than Illinois)
- 3.4. Each bag shall be tagged or labeled as required by the Illinois Seed Law.

4. SEEDS

Seed	lbs./Acre
Brome	30
Alfalfa	10
Oats	40

- 4.1. Seed mixtures shall be proportioned by weight.
- 4.2. No seeds shall be sown until they have been tested for purity and until such tests indicate that the seeds do not contain any seeds of the noxious weeds classed as "Primary Noxious Weed Seed" in the existing Illinois Seed Law, and not more than the maximum number per ounce sample, specified in Table 1 of this specification, "Secondary Noxious Weed Seed."
- 4.3. In determining the viable germination percent of legumes, the percent hard seed is to be added to the percent test germination; however, the percent hard seed added shall not exceed the maximum specified in Table 1 of this specification when planted in the fall season.
- 4.4. Seed having a purity that is below the purity specified in Table 1 of this specification will be rejected. Seeds that fail to meet the requirements of Table 1, "Maximum Weed Seed Percent" and "Remarks" will be rejected.
- 4.5. Pure, live seed shall be defined as the sproutable seed of a specified variety and calculated as the product of the viable germination times the purity. The seed weights per acre listed are designed to yield specific amounts of pure, live seed per acre based on the pure, live seed percent values listed in Table 1 of this specification. Seed which has actual pure, live seed yield according to tests less than the intended yield will be rejected.

5. FERTILIZER

- 5.1. Fertilizer shall be applied at the rates given below. Fertilizer will be measured by weight (in pounds) of actual nutrients supplied. Weight of each nutrient shall be determined by the following formula:

$$(total\ wt.\ of\ fertilizer) \times (percent\ of\ nutrient\ in\ fertilizer) = (wt.\ of\ nutrient\ provided)$$
- 5.2. Fertilizer shall be supplied in either liquid or granular form. It shall be properly incorporated into the soil during application or immediately afterwards.

5.3. Fertilizer shall contain the following nutrients: Nitrogen (N), Phosphorus (P_2O_5), and Potassium (K_2O).

5.3.1. From 30 to 40% of the total nitrogen provided shall be in a slow-release form.

5.4. Provide 60 pounds of nitrogen (N) per acre, 0 pounds of phosphorus (P_2O_5) per acre, and 120 pounds of potassium (K_2O) per acre for all areas to be seeded.

5.5. No lime is required.

6. MULCH

6.1. Straw shall be stalks of air-dried wheat, rye, oats, or other approved straw.

6.2. Hay shall be air-dried. Hay shall be obtained from field of timothy, redbud, or mature brome grass.

7. OPERATIONS

7.1. Seed Bed Preparation

7.1.1. Immediately prior to the seedbed preparation, fertilizer nutrients shall be uniformly spread at the designated rate over the areas indicated on the plans.

7.1.2. Stones, boulders, debris and similar material larger than two inches in diameter shall be removed from the seed bed area. The seed bed will be worked to a minimum depth of three inches, reducing all soil particles to a size smaller than two inches as the largest dimension. The prepared surface shall be relatively free from weeds, clods, stones, roots, sticks, rivulets, gullies, crusting, and caking.

7.2. Seeding

7.2.1. No seed will be sown during unfavorable climatic conditions or when the ground is not in a proper condition for seeding.

7.2.2. All seeded areas, including slopes up to 3 to 1 or flatter, shall be rolled at right angles within 12 hours of seeding to compact the seed bed and place the seed in contact with the soil. Slopes steeper than 3 to 1 do not need to be rolled.

7.2.3. Seeding shall be done in a way that incorporates the seed at the optimum depth of 1/4 inch.

7.2.4. All legumes shall be inoculated per the manufacturer's recommendations immediately before sowing.

7.2.5. Seeding shall be done between April 1 and December 1.

7.2.6. Within 24 hours from the time the seeding has been performed, the seedbed shall be given a covering of mulch. On slopes steeper than 3:1, mulch shall be applied on the same working day.

7.3. **Mulch shall be used on all seeded area not specified otherwise.**

7.3.1. Hay or straw mulch shall be hand or machine applied loose enough to permit air to circulate, but compact enough to prevent erosion. If baled material is used, care shall be taken that the material is in a loosened condition.

7.3.2. The mulch shall be stabilized by working the area with dull blades or disks.

TABLE 1

Variety of Seeds	Hard Seed	Purity	Pure, Live	Weed	Secondary	Remarks
	Percent Maximum	Percent Minimum	Seed Percent Minimum	Percent Maximum	Noxious Weeds Number per Ounce Maximum Permitted*	
Alfalfa	20	92	89	0.50	6	Note 1
Brome Grass	--	75	68	2.00	5	--
Dawson Red Fescue	0	97	85	0.10	3	--
Fescue, Alta or KY. 31	--	92	88	1.00	6	--
Fescue, Creeping Red	--	75	82	1.00	6	--
Fults Salt Grass	0	98	85	0.10	2	--
Kentucky Bluegrass	--	75	72	0.50	7	Note 5
Lespedeza, Korean	20	92	84	0.50	6	Note 3
Oats	--	92	88	0.50	2	Note 4
Orchard Grass	--	75	70	1.50	5	Note 4
Redtop	--	75	78	1.80	5	Note 4
Reed Canary Grass	--	92	63	1.00	5	--
Ryegrass, Perennial, Annual	--	92	88	0.50	5	Note 4
Rye, Grain, Winter	--	92	83	0.50	2	Note 4
Scaldis Hard Fescue	0	97	85	0.10	3	--
Timothy	--	92	84	0.50	5	Note 4
Wheat, Hard Red Winter	--	92	89	0.50	2	Note 4

Note 1. Shall be grown in Kansas or farther north; shall be free from any mixture with southern or foreign seeds, blends or adulterations with screenings, frosted or damaged seeds; and shall not contain more than 0.2 percent bur or sweet clover mixture.

Note 2. Shall be free from blends or adulterations with screenings, blasted, shriveled or immature seeds.

Note 3. Shall be hulled and free from blends or adulterations with blasted, shriveled or immature seeds.

Note 4. Shall be re-cleaned.

Note 5. Shall not contain more than 5 percent adulteration with Canada Blue Grass, Merion Blue Grass or other hybrids or varieties of blue grass.

* No primary Noxious Weeds are permitted.

Section 10
GEOMEMBRANE

I. General

1.1. Scope of Work

1.1.1. The work covered by these specifications consists of installing a 45-mil thick fabric reinforced Polypropylene (PP) geomembrane, in the areas shown on the project drawings. All work shall be done in strict accordance with the project drawings, these specifications and the Fabricator's approved shop drawings.

1.1.2. Sufficient material shall be furnished to cover all areas as shown on the drawings including seam areas, anchor trenches and appurtenances as required. The Fabricator/Installer of the liner shall allow for any anticipated or planned shrinkage or wrinkles in the field panels, installing the membrane free of stress or tension.

1.1.3. Payment shall be made on the basis of net area covered in acres. No allowance will be made for anchor trenches, seams, penetrations, or repairs when computing the area for purposes of payment. Area will be measured on the slope (actual surface) as opposed to plan area.

1.2. Manufacturer/Fabricator/Installer Information

1.2.1. The following shall be the minimum information submitted at the time of the bid, relating to the PP Manufacturer, proposed fabricator and installer: name, address, phone, fax. A summary of relevant experience of the fabricator and installer will be provided if requested by the Owner.

1.3. Products

1.3.1. The geomembrane material shall be 45-mil thick, scrim-reinforced Polypropylene as manufactured by Cooley Engineered Membranes, JP Steven, or an approved equal. The geomembrane shall be manufactured by the extrusion/calendering process, consisting of first quality ingredients, suitably compounded of which PP is the principal resin. The finished compound shall be uniform in color, thickness, size, and surface texture.

1.3.2. The finished membrane shall consist of two (2) plies of Polypropylene (PP) laminated over one (1) ply of reinforcing scrim. The reinforcing scrim shall be a 9 x 9 – 1000 denier polyester fabric or approved equal to create an open-type weave that permits strike-through of the PP.

- 1.3.3. The PP shall fully encapsulate the scrim and shall extend a minimum of 1/8" beyond the reinforcing scrim roll edges. The finished membrane shall meet or exceed the "physical properties" values on the following table:

**45-Mil Polypropylene Geomembrane
Physical Properties**

Property	Test Method	Values
Gauge, nominal (mils)	ASTM-D751	45+ 10%
Plies reinforcing	--	1
Fabric breaking strength (min.)	ASTM-D751, Method A	225 lbs.
Tear strength (Min.)	ASTM-D751, tongue tear	55 lbs.
Low temperature	ASTM-D2136, 1/8" mandrel, 4 hours	-40° F
Dimensional stability (% change, Max.)	ASTM-D 1204, 180° F/1 hour	1%
Hydrostatic resistance (Min.)	ASTM-D751, Method A	350 psi
Ply adhesion (Min.)	ASTM-D413	20 lbs./in
Puncture resistance	FTM-101B, Method 2031	350 lbs.
Water absorption (Max. % weight change)	ASTM-D471	<1%
UV resistance	ASTM-G-26, xenon arc @ 80° C	Pass @ 4,000 hours+
Resistance to soil burial (% tensile retention)	ASTM-D3083 (Part 9.5)	90% Min.
Bonded seam strength (Min.) (lb/width)	ASTM-D751 as modified in Annex A, ANSI/NSF 54	200
Peel Adhesion, (Min.) lb/in)	ASTM-D413 as modified in Annex A, ANSI/NSF 54	20 or FTB

- 1.3.4. Submittals shall include samples, the manufacturer's data sheet on the liner material and panel layout drawings showing location and sizes of all panels.
- 1.3.5. The PP roll goods shall be factory fabricated into large panels. The Fabricator shall furnish a proposed geomembrane panel layout to be approved in writing by the Engineer prior to material shipment. The drawings shall show: the direction of factory seams, the size of panels and the location of field seams, consistent with the requirements of the project drawings. These details shall include the recommended termination and penetration details of the geomembrane. Except for special requirements due to configuration and/or terminating the geomembrane, maximum use of large size panels shall be made to reduce field seaming to minimum.

- 1.3.6. If membrane can be supplied in various colors at no additional cost, supply samples of each color available for use of Owner in selecting color. If only one color is available at bid price, state color on submittal.

1.4. Factory Fabrication

- 1.4.1. The Fabricator shall give two week's notice to the Engineer prior to the start of work. The Owner at his discretion may choose to have any or all of the factory fabrication observed by his representative. Such observation will be at the Owner's expense.
- 1.4.2. The Fabricator should be an experienced firm customarily engaged in factory-fabricating individual widths of scrim-reinforced geomembranes roll stock into large panels. The fabricator shall have experience in fabricating a minimum of 50,000,000 square feet of geomembranes by thermal fusion methods.
- 1.4.3. Prior to factory seaming, all goods shall be inspected. All factory seams shall be made by thermal fusion methods. All factory seams shall have a minimum scrim-to-scrim overlap on one and one-fourth inches (1 1/4") when fabricated. All seams shall be made by thermal fusion methods. All factory seams shall be made so that no loose edges are preset on the top side of the panel.

1.5. Inspection and Testing of Factory Seams

- 1.5.1. All sheets and seams shall be 100% visually inspected during fabrication. No defective seams or exposed scrim will be allowed. All exposed scrim edges shall be sealed with an approved PP edge caulk or with a strip of PP. All indicated repairs shall be made by the geomembrane Fabricator before the panels are packaged for shipment.
- 1.5.2. In addition to visual inspection, a 48 inch (1.2M) sample shall be taken from each factory seam welding unit used in this work at the beginning of every work shift and every four hours of production thereafter. Samples shall be non-destructive, not requiring patching of fabricated panels. Test specimens shall be cut at quarter points from each 48 inch seam sample (a total of three places) and tested for seam strength and peel adhesion.
- 1.5.3. A log shall be maintained showing the date, time, panel number and test results. Failure of the material and/or seams to meet all requirements of these specifications may be cause for rejection of the PP material and/or seams as appropriate. The Fabricator shall provide the test results to the Engineer.

1.5.4. Prior to installation of the PP panels, the Fabricator/Installer shall provide the Engineer with the following certification and test reports:

1.5.4.1. Written certification that the material meets all of the requirements of this specification.

1.5.4.2. Written certification that the factory seams were inspected and tested in accordance with this specification.

1.6. PP Panel Packaging and Storage

1.6.1. Each factory fabricated panel shall be rolled and/or accordion- folded and placed onto a sturdy wooden pallet designed to be moved by a forklift or similar equipment. Each panel shall be given prominent and unique identifying markings indicating the proper direction of unrolling and/or unfolding to facilitate layout and position in the field. The panels shall be suitably packaged, enclosed and protected to prevent damage during shipment and each package shall be prominently marked in the same fashion as the panels within. Until needed, packaged factory fabricated panels shall be stored in their original unopened containers in a dry area, and protected from the direct heat of the sun, where possible. Pallets shall not be stacked.

2. Polypropylene (PP) Installation and Seaming

2.1. Subgrade preparation

2.1.1. The surfaces on which the lining is to be placed shall be maintained in a firm, clean, dry and smooth condition during the lining installation. All surfaces shall be compacted and smooth graded with anchor trenches provided as required and detailed. All surfaces to be lined shall be free of rocks, roots, gravel, grade stakes or debris that may puncture the geomembrane. The subgrade shall be compacted to a minimum of 95 % of the dry density as determined by ASTM D689 – Standard Proctor Method. Geotextiles may be used as a cushioning agent. All vegetation, if present, shall be removed.

2.1.2. Immediately prior to the installation of the PP geomembrane, a complete and detailed inspection of the area shall be performed by the Engineer, On-Site Representative, Contractor and the Geomembrane Installer to determine acceptance of the finished subgrade and elevations. Any erosion or other damage to the base material which has occurred since placement shall be corrected by the Earthwork Contractor.

2.2. PP Geomembrane Installation

2.2.1. The surface shall be prepared in accordance with the requirements as specified in the drawings or specification documents. The surface must be acceptable to the installation contractor and the recommendations of the liner manufacturer.

2.2.2. The geomembrane shall be placed over the prepared surfaces in such a manner as to insure minimum handling and in accordance with the approved shop drawings. The lining shall be sealed to all concrete structures and other openings in accordance with details shown on the plans and shop drawings. The geomembrane lining shall be closely fitted and sealed around all inlets, outlets and other projections through the lining, using prefabricated fittings where possible as shown in the construction details. Liner sheets, damaged from any cause, shall be repaired or covered with additional sheeting. Only those sheets of lining material which can be anchored and seamed together the same day shall be unpacked and placed into position. In areas where high winds are prevalent, the lining installation should begin on the upwind side of the project and proceed downwind. The leading edge of the liner shall be secured at all times with sandbags sufficient to hold it down during high winds. The leading edges of the liner material left exposed after the day's work shall be anchored to prevent damage or displacement due to wind.

2.2.3. Materials, equipment or other items shall not be dragged across the surface of the PP liner or be allowed to slide down slopes on the lining. All parties walking or working on the PP lining material shall wear soft-sole shoes.

2.2.4. Air vents shall be installed along the top edge of the liner as indicated on the plans. Air vents shall consist of a round hole from ½ to 1-inch in diameter covered with a patch of PP liner. The patch shall be fully welded to the liner on the top and two sides, but left unbonded on the bottom. The intent being to allow air trapped under the liner to escape without letting water seep under the liner through the air vent holes.

2.2.5. Provide a double thickness of PP liner under all concrete placed on top the liner. The additional layer shall be on top the primary liner. Attach the extra layer of PP liner along the full length of its top and at four-foot intervals along the sides. The bottom need not be attached. Provide additional attachment at no extra cost if needed to hold the extra layer in place during concrete work.

2.3. Field Seams

2.3.1. Lap joints shall be used to seal factory fabricated sheets together in the field. The lap joint shall be formed by lapping the edges of the sheets four (4) inches. The contact surfaces of the sheets shall be wiped clean of all dirt, dust, moisture and other foreign matter per the manufacturer's requirements.

A minimum one and one half inch (1 1/2") bond shall apply to all field seams.

2.3.1.1. If a clean cloth does not adequately clean the liner, use clean water or xylene to clean the seam area. Do not use detergents or soaps to clean the seam area without approval of the Engineer. Seam areas shall be clean and dry per the manufacturer's requirements before seaming begins.

2.3.2. Extreme care should be taken throughout the work to avoid fishmouths, wrinkles, folds or pleats in the seam area. Where fishmouths do occur, they should be slit out far enough from the seam to dissipate them, lapped, seamed together in the lapped area and patched. Any necessary repairs to the PP geomembrane shall be done using an additional piece of the specified PP sheeting applied as stated in Article 2.4.3 of this Section.

2.3.3. Cleanup within the liner area shall be an ongoing responsibility of the Lining Contractor. Particular care should be taken to ensure that no stones, scrap material, trash, tools or other unwanted items are trapped beneath the geomembrane liner.

2.3.4. All field seams shall be made utilizing hot air or hot wedge welding techniques as outlined in section 7 and 8 of the EPA Technical Guidance Document: "Inspection Techniques for the Fabrication of Geomembrane Field Seams".

2.4. Inspection, Testing, and Repair of PP Field Seams

2.4.1. Upon completion of the liner installation, all seams shall be visually inspected for compliance with these specifications. In addition to visual inspection, all field seams shall be checked using an air lance nozzle directed on the upper edge and surface to detect any loose edges or ripples indicating unbonded areas within the seam (per ASTM D4437).

2.4.2. All field seams, on completion of the work shall be tightly bonded. Any geomembrane surface showing injury due to scuffing, penetration by foreign object, or distress from other causes shall be replaced or repaired. All exposed scrim edges shall be sealed with an approved Polypropylene edge sealant or capped with a strip of polypropylene.

2.4.3. Any repairs made to the liner shall be made with PP lining material. Patches shall be cut with rounded corners and extend a minimum of four (4) inches in each direction from the damaged area. The entire surface of the patch shall be bonded to the PP lining material. If reinforced patches are used, the cut edges of the patch should be coated with an approved Polypropylene edge sealant.

2.4.4. Destructive test seams are to be made by each seaming crew, at the beginning of the seaming process and every four (4) hours thereafter, and every time equipment is changed. These seams are to be made of like materials provided for the purpose of testing and not cut from the seamed panels. Each seaming crew and the materials they are using must be traceable and identifiable to their test seams. The samples shall be numbered, dated and identified as to the personnel making the seam, and location made by appropriate notes on a print of the panel layout for the project. The completed field seam sample shall measure not less than 24 inches in length.

2.4.5. The field test seams are to be tested for seam strength and peel adhesion. See the table in Article 1.3.3 of this Section for required strengths.

2.4.6. If a test seam fails to meet the field seam design specification, then additional test seam samples will have to be made by the same seaming crew, using the same tools, equipment and seaming materials and retested.

2.4.7. The membrane installer shall be responsible for arranging for testing of the field seam samples. The cost of testing shall be included in the unit price for the membrane. All testing procedures and equipment shall be approved by the Engineer or On-Site Representative. All test results shall be documented and sent to the Engineer.

2.5. Warranty

2.5.1. The Geomembrane Manufacturer shall confirm in writing, that the material to be furnished will be free of defects in materials and workmanship at the time of sale, and against deterioration due to the effects of ozone, ultraviolet or other normal weathering on a pro-rata basis for up to 20 years from the date of completed installation. The PP Geomembrane Manufacturer shall furnish a sample warranty for review and approval prior to shipment.

Section 11
GEOTEXTILES

1. Geotextiles shall be used where indicated on the plans. Nominal weight of the geotextiles shall be as follows.
 - 1.1 Under crushed stone and gravel – a single layer of 4-oz/sq.yd. fabric.
 - 1.2 Under the geomembrane on the side of the embankment a single layer of 8-oz/sq.yd. fabric.
2. Geotextiles shall be manufactured from either polyester or polypropylene fiber.
3. Geotextiles shall be from an approved manufacturer. All products shall be for geotechnical applications. Submittals for geotextiles shall include material data sheets and samples.
4. Geotextiles shall be of the needlepunched, nonwoven type. The minimum physical properties for each weight of geotextile shall be as indicated in the table below.
5. Geotextiles shall be paid for on the basis of net area covered without allowance for seams, laps, folds, anchorage trenches, etc. Areas shall be measured on the slope (actual surface) as opposed to plan area.
6. All seams in geotextiles shall either be sewn per manufacturer recommendations or lapped a minimum of 20 inches.

Minimum Geotextile Properties
(average roll values in weakest principal direction)

Property	Test Procedure	4-oz. Fabric	8-oz. Fabric
Nominal Weight (oz/yd ²)	---	4	8
Tensile Strength (lbs.)	ASTM D-4632	100	200
Elongation (%)	ASTM D-4632	50	50
Puncture Strength (lbs.)	ASTM D-4833	65	100
Mullen Burst Strength (lbs.)	ASTM D-3786	210	350
Trapezoidal Tear (lbs.)	ASTM D-4533	40	75

Section 12
LEVEL GAGE

1. The Contractor shall furnish and install at the location shown on the plans a FRP level gage manufactured by Plast-Fab, Inc., PO Box 100, Tualatin, OR 97062, phone number (503)692-5460.
2. Level gages manufactured by others will be considered provided sufficient data and samples are provided to determine that the alternate product is of the same or better quality as the specified Plasti-Fab product.
3. The level gage shall be mounted on the 8" ductile iron pipe post shown on the drawings. Contractor shall provide all mounting accessories required at no additional charge. These accessories may include bolts, screws, cross arms, bracing and the like as required to firmly attach and support the level gage.
 - 3.1. Mount the level gage in compliance with the manufacture's recommendations.
4. Contractor shall provide all surveying required to set the level gage accurately at the proper elevation.
5. The FRP level gage shall be 14" wide by at least 8 feet tall by 0.25" thick. It shall be constructed in one piece. The material shall be fiberglass reinforced polyester laminate. The gage shall be made using UV stabilized gel coat for numerals and background both applied prior to the laminating process. Numerals and other markings shall be black with a white background, both having a minimal thickness of 10 to 20 mils and of a gel coat formulated to withstand normal impact.
6. Numbers shall be 6" high and have a 0.75" minimum width. There shall be five lines per foot with each line one tenth; of a foot high. Lines to have progressive lengths of 1", 2", 3", 4", and 5" with points on the 3" and 5" long lines. Each top and bottom edge of the lines is to indicate one tenth of a foot.
7. The highest line on the gage is to be indicated as elevation "96". The lowest line on the gage shall be indicated as elevation "88". The gage shall extend beyond the top and bottom lines as needed for the numerals. Elevations are to be measured in decimal feet as indicated above. The gage shall be attached to the post so that the "96" elevation on the gage corresponds to site elevation 496.00.

Section 13
MISCELLANEOUS STEEL

1. SCOPE

- 1.1. This specification covers the minimum requirements for the design, material, fabrication, inspection, protective coating, drawings, and delivery of miscellaneous steel. Ductile iron pipe is not included in the scope of this section.
- 1.2. In the event of discrepancies between the Vendor's proposal and this specification, the terms of this specification shall govern unless written exception is provided by the Vendor and approved by the Engineer.

2. DEFINITIONS

- 2.1. The term "Vendor", as used in this specification, shall refer to the party or parties proposing to perform the work and provide the material herein specified.
- 2.2. The term "Owner", as used in this specification, shall refer to Dynegy Midwest Generation, Havana Power Station, or its designated agent.
- 2.3. The term "Engineer", as used in this specification shall refer to the Owner's Project Engineer.
- 2.4. All design terms and symbols shall be as defined in the AISC - Steel Construction Manual.

3. REFERENCES

- 3.1. The reference to specifications of organizations (such as ASTM), together with any diagrams, drawings, and loading schedules, shall be considered part of this specification. In the event of conflict between this specification and referenced documents, the requirements of this specification shall take precedence. The following specifications, standards, and codes apply:

3.1.1. American Society for Testing and Materials (ASTM)

ASTM A6 - General Requirements

ASTM A143 - Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

ASTM A194 - Carbon and Alloy Steel Nuts for Bolts for High Pressure and High-Temperature Service.

ASTM A-325 - High Strength Bolts for Structural Steel Joints.

ASTM A384 - Safeguarding Against Warpage and Distortion - During Hot-Dip Galvanizing of Steel Assemblies.

3.1.2. American Institute of Steel Construction (AISC)

AISC - Steel Construction Manual, 8th Edition

3.1.3. Steel Structures Painting Council Surface Preparation Specification (SSPC-SP)

SSPC-SP6 - No. 6 Commercial Blast Cleaning Rev. 1-1-71

3.1.4. American National Standards Institute (ANSI)

National Electrical Safety Code (NESC) Part 2

ANSI C135.1 - American National Standard for Galvanized Steel Bolts and Nuts for Overhead Line Construction

4. GENERAL CONSIDERATIONS

- 4.1. All steel is to be hot dipped galvanized after fabrication. See "PROTECTIVE COATINGS" below for items to be painted after galvanizing.
- 4.2. All steel shall be either ASTM A36 or A992 material.
- 4.3. Welds shall be with E70 electrodes. Bolts shall be hot dipped galvanized A325 bolts.
- 4.4. Concrete anchors and other accessories and manufactured components shall be as shown on the plans.

5. DRAWINGS

- 5.1. After acceptance of a proposal, the Contractor shall submit to the Engineer three prints of each detail drawing. One set of these drawings will be returned to the Contractor marked as "approved" or "approved as noted"

or "not approved". Fabrication shall not begin until the appropriate detail drawings have been approved.

5.2. Engineer's approval of the Vendor's drawings is approval of intent of design and detail only, and in no way relieves the Vendor of responsibility for adequacy or the correctness of dimensions and details.

5.3. Each detail drawing shall include, as a minimum, the following information:
 Dimensions.
 Description and strength of material.
 Weld locations and sizes.
 Size, description, quantity, and location of all holes and hardware.
 Any other special information.

6. MATERIAL

6.1. All structural plate material shall be selected with sufficient ductility to avoid brittle fracture.

6.2. The Vendor shall use suitable quality control procedures to insure that the correct steel strength is used in the fabrication of the hardware.

6.3. Materials the Vendor proposes to substitute for those stated herein shall be identified with the applicable ASTM or ANSI designation and shall be subject to the approval of the Engineer.

6.4. Fasteners

6.4.1. All bolts shall conform to ASTM A325 or ANSI C135.1. Nuts shall conform to ASTM A194 grade 2, and shall be tapped .020 in. oversize for pitch and major diameter. All nuts, bolts, and washers shall be hot dipped galvanized.

6.4.1.1. For galvanized hardware, nuts and bolts shall be galvanized in accordance with ASTM standards, but hot-dip galvanizing will not be allowed for any material with a yield strength greater than 100 ksi.

6.4.2. All bolts of any one diameter and similar length shall be of the same type and strength.

6.4.3. All bolt locations shall permit easy wrench access to both the bolt head and the nut.

7. FABRICATION AND QUALITY CONTROL

7.1. Fabrication tolerances will be in accordance with ASTM A6.

7.2. Fabrication shall be in strict accordance with shop detail drawings prepared by the Vendor and approved by the Engineer.

7.3. Straightening Material - Before being laid out or worked in any manner, structural material shall conform to ASTM A6 for permissible variations in straightness. If straightening is necessary, it shall be done by methods that will not injure the metal. Members which are bent or warped or otherwise improperly fabricated will be rejected by the Owner.

7.4. Bending - All forming or bending during fabrication shall be done by methods that will prevent embrittlement or loss of strength in the material being worked.

7.5. Holes for connection bolts shall be 1/16 inch larger than the nominal diameter of the bolts. The details of all connections and splices shall be subject to the approval of the Engineer. Connections shall be detailed in accordance with AISC 1.1.5.2 to avoid rust expansion (pack-out).

7.6. All holes shall be cylindrical, perpendicular to the member, clean-cut, and chamfered (when specified). Where necessary to avoid hole distortion, holes close to the points of bends shall be made after bending. The use of a burning torch for cutting holes will not be permitted without approval from the Engineer.

8. PROTECTIVE COATINGS

8.1. Surface preparation

8.1.1. For galvanized structures, all fabricated steel components shall be blast cleaned in accordance with SSPC-SP6, or cleaned with an acid-pickling procedure with approval from the Owner.

8.2. Galvanizing

8.2.1. Hardware shall be galvanized in accordance with the applicable ASTM standard and shall remain corrosion-free for 10 years.

8.2.2. Precautions shall be taken against embrittlement, warpage, and distortion in accordance with ASTM A143 and in accordance with ASTM A384.

8.3. Handrails and boom anchor posts shall be painted safety yellow. Use a surface preparation and primer recommended by the paint manufacturer for use on galvanized finishes. Topcoat shall be industrial alkyd enamel recommended for exterior use.

8.3.1. Provide a second layer of topcoat paint if needed to provide a uniform finish or if recommended by the manufacturer.

8.3.2. Provide Engineer with name of coatings to be used and the manufacture. Primer and topcoat shall be by the same manufacture.

9. SHIPPING

9.1. Steel shall be suitably protected to prevent damage to the surface finish during shipment.

9.2. Each shipment shall be accompanied by a check list of all parts on that particular shipment. Bolts, nuts, and other hardware shall be either boxed or bundled.

10. INSPECTION BY OWNER

10.1. Materials and workmanship shall, at all times, be open to inspection and acceptance or rejection by the Owner either at the Vendor's plant or at the point of delivery. Any omission or failure on the part of the Owner to disapprove or reject any work or materials at the time of inspection shall not be construed as an acceptance of any defective work or materials.

10.2. The Owner shall have free entry to all parts of the Vendor's plant at all times while work is being carried on. The Vendor shall afford the Owner reasonable facilities, without charge, to satisfy Owner that the materials are being furnished strictly in accordance with this specification. The Owner will comply with the Vendor's safety rules.

10.3. The Owner reserves the right to make additional tests and/or inspections deemed necessary to verify compliance with this specification. Generally, the cost of these tests and inspections shall be borne by the Owner. However, the direct cost of all tests directly related to, and indicating noncompliance with this specification shall be borne by the Vendor.

Section 14 MANHOLES

1. All manholes and manhole extensions shall be constructed of precast concrete. The design, fabrication, modifications, and installation of manholes shall comply with Section 602 of the Illinois Dept. of Transportation "Standard Specifications for Road and Bridge Construction," adopted January 1, 2002.
2. Overall dimensions of manhole rings and flat slab tops shall be as shown on the plan. Minimum thickness and reinforcement shall be as shown in the Illinois Dept. of Transportation "Highway Standards." In addition to these minimums, the fabricator of precast concrete manholes and tops shall design and construct the products to support the anticipated loads and meet industry standards.
3. Precast manholes and extension rings shall have cast iron manhole steps spaced at 12 inches. Steps shall be as manufactured by Neenah Foundry or an approved equal.
4. Replace the existing manhole lid in Manhole #1 with a grate lid. Grate lid shall be Neenah Type G either medium or light-duty, or an approved equal. Grate shall be of gray iron or ductile iron.
5. The flat slab top for Manhole #1A shall have a round Neenah medium or light-duty frame (or approved equal) cast into it. The frame shall be equipped with a Neenah Type G grate (or an approved equal). Minimum clear opening of frame shall be 20 inches.
6. Submittals for manholes shall include all precast concrete products, frames, and grates.



Appendix D: Havana Power Station East Ash Pond System Class 1 Dam Operations and Maintenance Plan

**Havana Power Station
East Ash Pond System
Class 1 Dam Operations and Maintenance Plan**

1.0 General

The following operation and maintenance procedures are provided to maintain the structural integrity of the east ash pond system (cells 1, 2, 3, and the final polishing pond - cell 4). Cells 1 and 2, and the final polishing pond of this system are classified as Small Class 1 dams by the Illinois Department of Natural Resources, Office of Water Resources (IDNR_OWR). Cell 3 is classified as an Intermediate Class 1 dam. Cells 1, 2, and 3 are the primary ash deposition cells of the system. The fourth cell is the final effluent polishing pond. Cells 1, 2, and 3 are not hydraulically connected. Water elevations in cell 4 will be slightly lower than in cells 1, 2, or 3. The normal pool elevation of primary cells 1 and 2 of this system is 486 feet above msl. Cell 1 is now used only for the deposition of bottom ash and there is no free standing water in the pond. Cell 2 will be taken out of service after cell 3 is constructed and placed into service probably during the summer of 1993. Cell 2 will be dewatered shortly thereafter. The normal pool elevation of cell no. 3 will be 492 feet above msl. The emergency spillway crest in cell 3 is at approximate elevation 494 feet above msl. This emergency spillway consists of a concrete overflow channel which would discharge to the final effluent polishing pond.

2.0 Operation

2.1 Normal Operation and Surveillance

Ash disposal facility operation will be controlled by limiting discharges from the station to cells 1, 2, or 3 and by varying water surface elevations at the final effluent polishing pond (cell 4) discharge structure.

(a) Ash Pond Monitoring

An Ash Pond Log shall be used to establish and maintain pond history. All inspections and maintenance activities shall be recorded. Responsibility for maintaining this log shall be designated by the Station Manager.

(b) Daily Surveillance

The water surface elevation of each cell of the ash pond system shall be observed and recorded daily in the Ash Pond Log. A staff gauge is installed in each cell of the system and these gauges shall be maintained such that they accurately indicate water level elevations in each cell.

(c) Weekly Surveillance and Inspection

Weekly inspections of the perimeter berms around cells 1, 2, 3, and 4 shall be made to look for seepage and slumping, and unusual seepage at and/or blockage of the outfall structures in each cell. All findings shall be entered into the Ash Pond Log and maintenance activities shall be initiated.

2.2 Emergency Action Plan

During and immediately following unusual storm and flood events, inspection of the cells and their appurtenances shall be carried out and recorded at least once each day.

If the staff gauge in either cell 1 or cell 2 indicates a pool elevation of 487 feet or 493 feet in cell 3, inspection of the cells and their appurtenances shall be carried out and recorded at least once every 12 hours.

If the staff gauge in either cell 1 or cell 2 indicates a pool elevation of 488 feet or 494 feet in cell 3, a downstream flood watch will be disseminated and discharges from the station to the ash pond system will be suspended. Inspection of the cells and their appurtenances shall be carried out and recorded at least once every four hours.

When the staff gauge in either cell 1 or cell 2 indicates a pool elevation of 489 feet or 495 feet in cell 3, a flood warning will be disseminated and downstream residents that could experience first floor flooding shall be evacuated. Inspection of the ponds and their appurtenances shall be carried out and recorded at least once every two hours.

When the staff gauge in either cell 1 or cell 2 indicates a pool elevation of 489.25 feet or 495.25 feet in cell 3, all residents within the breach wave area shall be evacuated. Inspection of the ponds and their appurtenances shall be performed and recorded continuously. Residents will not be permitted to return to the breach wave area until the event concludes, the water surface in the cells fall to normal pool levels, and complete inspection of the cells and their appurtenances indicate pond operation to be safe.

Any unusual condition discovered during major storm events or routine inspection which may constitute an emergency shall be communicated as follows:

- Notice of any type of emergency involving the berms or outfall shall be made to the Shift Leader on duty.

- The shift leader on duty shall then notify the Station Manager (A.K. Millis; pager and home tel. nos. 217-467-6123; 618-277-1566; kmillis@imcingular) or in his absence the Production Director (R.L.Short; pager and home tel. nos. 309-862-6227; 309-828-0412; rshort@imcingular.com). One of these shall then notify the following city, county, state, and federal regulatory authorities:

- Illinois ESDA, 24-hour service 1-800-782-7860
- IDNR_OWR, Dam Safety Section 217-782-3863
- IDOT, District 6 217-782-7301
- Mason County Sheriff 309-543-2231
- Havana Police Department 309-543-3321
- IP E&TS, Chief Civil Engineer 217-424-6762
217-424-7023
- DMT ER, Water Group 217-876-3934
217-872-3615
217-872-2183
- DMT ER Emergency Pager..... 1-800-862-0399; PIN # 17136226
- DMT ER 24-Hour Cell Phone 217-855-9680

2.3 Dewatering

The Station Manager or the Production Supervisor shall be responsible for determining how repairs shall be accomplished and whether dewatering of the ash pond cells is necessary. Dewatering shall be accomplished by (a) manually removing the concrete stop logs from cell 4 of the ash pond system and (b) pumping of water from cell 1, or cell 2, or cell 3 to cell 4. If water from cell 1, cell 2, or cell 3 must be rapidly drained to cell 4, the internal berms between cell 1 and cell 4, or between cell 2 and cell 4, or between cell 3 and cell 4 would be breached.

3.0 Maintenance

3.1. Semiannual Inspections

Semiannual inspections shall be conducted during optimal conditions at approximately six-month intervals to determine the general condition of the berms and discharge structure. Degradation of riprap, berm erosion, tree growth, animal burrows, and berm seepage shall be monitored during these inspections.

3.2 Vegetation

Berms shall be maintained to protect the structural integrity of the ash ponds. Damaged and barren areas shall be repaired as soon as appropriate with topsoil, limed, fertilized, and seeded with appropriate vegetation. Trees and shrubs observed during semiannual inspections shall be cut and removed from the berms. This shall be done as frequently as is necessary to insure that no tree reaches a size where the root structure would require removal and filling. Woody vegetation, shrubs, and trees shall be removed during the early stages of growth before reaching a 3-inch diameter. Low-growing vegetation that will not interfere with inspections shall be planted and maintained.

3.3. Intermediate Standpipe Structures, Final Discharge Structure, and Effluent Piping

Intermediate standpipe structures (which allow water to flow from cell to cell) shall be inspected semiannually for significant corrosion, scaling, etc. Structures significantly corroded shall be promptly repaired or replaced. Substantial deposits of scale shall be removed.

The final discharge structure shall be inspected semiannually for significant corrosion and for spawling and cracking of the concrete beams present in the structure. Any defects discovered shall be promptly repaired.

Effluent piping shall be inspected semiannually for excessive corrosion or scaling. Pipe which is significantly corroded shall be promptly replaced. Substantial scale deposits shall be removed. Effluent piping channels shall be inspected semiannual for seepage (infiltration) and corrosion. Excessive infiltration and corrosion shall be repaired.

Erosion of berms around the discharge structure or intermediate standpipe structures be promptly corrected by revetment with riprap or another erosion control method.

3.4. Animal Damage and Repairs

Animal burrows discovered during inspections shall be promptly repaired by filling with grout.

3.5 Restriction of Unauthorized Vehicles and Personnel

Berm approaches shall be posted with signs and the entire site enclosed by security fencing to prevent unauthorized travel on the roadways and slopes.

3.6. Annual Inspection

An annual inspection shall be made by a licensed Professional Engineer. This inspection shall follow IDNR's "Guidelines and Forms for Inspection of Illinois Dams", and shall be followed by verbal and written reports by the consulting engineer. Based on the findings of the inspection, the Station Manager shall implement corrective action as required to promote dam safety. Procedures and methods for corrective action shall be performed in accordance with the recommendations of the consulting engineer and as outlined above. Copies of the engineer's report along with the corrective action taken shall be reported to the IDNR_OWR. An annual statement on forms furnished by the IDNR certifying compliance with the above maintenance plan shall be submitted to the IDNR.