



JC Weadock History of Construction Bottom Ash Pond

Initial Compiled History Certification by Owner or Operator

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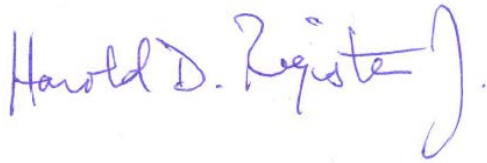
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CERTIFICATION

Certification Statement by Owner or Operator

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this demonstration and all attached documents, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Consumers Energy Company

A handwritten signature in blue ink that reads "Harold D. Register, Jr." with a stylized flourish at the end.

Signature

October 17, 2016

Date of Report Certification

Harold D. Register, Jr.

Name

1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA) promulgated the Resource Conservation and Recovery Act (RCRA) Coal Combustion Residuals (CCR) Rule (“CCR RCRA Rule”) on April 17, 2015. The CCR RCRA Rule requires that owners or operators of existing CCR surface impoundments with a height of five feet or more and a storage volume of 20 acre-feet or more compile a history of construction, which shall contain, to the extent feasible, the information specified in 40 CFR 257.73 (c)(1)(i) through (xii). The history of construction, and any revisions of it, as required by 40 CFR 257.73(c) shall be placed in the operating record and shall be maintained until the CCR unit completes closure of the unit in accordance with 40 CFR 257.102 [40 CFR 257.105(f)(9)].

2.0 40 CFR 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.

Consumers Energy Company
Contact: Caleb Batts
2742 North Weadock Highway
Essexville, MI 48732

Name of CCR Unit: JC Weadock Bottom Ash Pond
State Assigned Identification Number: None

3.0 40 CFR 257.73 (C)(1)(II)

The location of the CCR unit identified on the most recent U.S. Geological Survey (USGS) 7½ minute or 15 minute topographic quadrangle map, or a topographic map of equivalent scale if a USGS map is not available.

Figure 1 – Site Location Map presents the 7 ½ minute USGS quadrangle map of Bay City NE, Michigan dated 2014. The location of the CCR unit is denoted on the map with the callout box – Site Location.

4.0 40 CFR 257.73 (C)(1)(III)

A statement of the purpose for which the CCR unit is being used.

According to the “Potential Failure Mode Analysis (PFMA) Report” prepared by AECOM (2009), JC Weadock consisted of six coal-fired electric generating units that began generating power in 1940, and were retired in 1980. Two additional units were added in 1958 and 1959. The facility is bound by the D.E. Karn generation facility to the north, the Saginaw River to the west and the Saginaw Bay to the east. Agricultural land borders the facility to the south.

JC Weadock ceased electrical generation on April 15, 2016. Prior to stopping electrical generation, bottom ash was sluiced from JC Weadock to the Bottom Ash Pond, Areas 1 and 2. Stored bottom ash

was mechanically removed from the pond as needed to maintain storage capacity. The Bottom Ash Pond discharged water via two steel outflow pipes. The pipes discharge to a channel network and then to the permitted National Pollutant Discharge Elimination System (NPDES) outfall. Currently, JC Weadock is being decommissioned. The Bottom Ash Pond is no longer receiving coal combustion residuals (CCR) from active power generation. During decommissioning of the facility, the Bottom Ash Pond is anticipated to receive negligible amounts of CCR contact wash water and other non-CCR waste streams.

5.0 40 CFR 257.73 (C)(1)(IV)

The name and size in acres of the watershed within which the CCR unit is located.

The CCR RCRA Rule requires the name and size (in acres) of the watershed within which the CCR surface impoundment is located. According to the EPA MyWATERS Mapper website (USEPA 2016), the CCR surface impoundment is located within the Walther Drain-Frontal Lake Huron Subwatershed, which encompasses approximately 15,250 acres.

6.0 40 CFR 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.

As part of the subsurface investigation and sampling program conducted by Golder in May 2016, soil samples were collected from beneath the Bottom Ash Pond. Sampling locations are visually depicted on **Figure 2 – Existing Conditions Site Map**. Physical properties of the soil samples are demonstrated by data included in **Appendix A – Soil Sample Data**.

Engineering properties for the foundation and abutment materials were selected from Cone Penetrometer Test (CPT) correlations, field testing, and laboratory testing that supplemented the structural stability and factor of safety assessments for the Bottom Ash Pond. A portion of the engineering properties of the foundation and abutment materials are presented in the “Structural Stability and Safety Factor Assessment Report” (Golder 2016c). Additional engineering properties of the foundation and abutment materials are presented in the ““Summary of Monitoring Well Design, Installation, and Development – Impoundment Unit, J.C. Weadock Electric Generation Facility” (ARCADIS 2016).

7.0 40 CFR 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.

7.1 Physical and Engineering Properties

Golder sampled and tested the materials that exist in the exterior berm of the Bottom Ash Pond to gather subsurface information and develop certifications for the structural stability and factor of safety assessment. The physical properties are provided in **Appendix A – Soil Sample Data**. A portion of the engineering properties of the foundation and abutment materials are presented in the “Structural Stability and Safety Factor Assessment Report” (Golder 2016c). Additional engineering properties of the foundation and abutment materials are presented in the “Summary of Monitoring Well Design, Installation, and Development, J.C. Weadock Electric Generation Facility” (ARCADIS 2016).

7.2 Site Preparation and Construction

Site drawings and historical aerial photographs from 1957, 1959 and 1963 included in the PFMA Report (AECOM 2009) were reviewed, and the following sequence of construction was developed:

- The JC Weadock facility began generating in 1940, and sometime during the construction of the plant, the original dike structures that comprise the ash disposal facility were constructed (AECOM 2009).
- The ash disposal area was developed by reclaiming low-lands through the construction of perimeter dikes, as seen on the 1959 aerial photograph, and the subsequent filling of the area with fly ash (AECOM 2009).
- The ash disposal area was expanded in 1971 and the perimeter dikes were also raised at this time. Limited construction details of the expansion are provided in Figures 4 and 5 in the PFMA Report (AECOM 2009).

The site drawings depicted no details regarding the site construction methods for the Bottom Ash Pond and perimeter dike, however, an internal CEC memo from 1975 (Consumers Energy, 1975) contains limited details regarding the general construction methods of the ash pond dikes at JC Weadock.

8.0 40 CFR 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.

Golder developed the following figures, which are attached hereto, for the Bottom Ash Pond at JC Weadock:

- Figure 2 – Existing Conditions Site Map

■ Figure 3 – Bottom Ash Pond Characterization Cross Section A-A'

A cross section were developed based on an EES Survey (May 2016) and subsurface data collected and interpreted by Golder in 2015 and 2016. These cross sections are not intended to illustrate a comprehensive conceptual site model representing all data that may be available for the Bottom Ash Pond.

9.0 40 CFR 257.73 (C)(1)(VIII)

A description of the type, purpose, and location of existing instrumentation.

The CCR RCRA Rule requires that a description of the type, purpose, and location of existing instrumentation be provided. Golder included the locations of the known instruments on **Figure 2 – Existing Conditions Site Map**.

CEC retained ARCADIS to install RCRA monitoring wells to characterize groundwater quality conditions in the vicinity of the Bottom Ash Pond. The description and location of this existing instrumentation can be found in the "Summary of Monitoring Well Design, Installation, and Development – Impoundment Unit Report" (ARCADIS 2016).

10.0 40 CFR 257.73 (C)(1)(IX)

Area-capacity curves for the CCR unit.

Area capacity curves for the Bottom Ash Pond were calculated by Golder using survey data collected by EES in May 2016. The area capacity curves are included in the "Inflow Design Flood Control System Plan" completed by Golder for the Bottom Ash Pond (Golder 2016b).

11.0 40 CFR 257.73 (C)(1)(X)

A description of each spillway and diversion design features and capacities and calculations used in their determination.

11.1 Spillway and Diversion Description

Based on the "Annual RCRA CCR Surface Impoundment Inspection Report" completed by Golder for the Bottom Ash Pond (Golder 2016), an elevated trestle and pipe system formerly conveyed sluiced bottom ash to the north into Area 1 of the Bottom Ash Pond and to the south into Area 2 of the Bottom Ash Pond. According to the "Inflow Design Flood Control System Plan" (Golder 2016b), one 24-inch diameter steel culvert is located within the perimeter berm of Area 1 and one 24-inch diameter culvert is located within the perimeter berm of Area 2 of the Bottom Ash Pond. These culverts discharge water from the Bottom Ash Pond into a series of ditches that convey the flow to the NPDES outfall location.

Diversion is provided by the perimeter berm, minimum elevation of 598.96 for Area 1 and 596.68 for Area 2 (NAVD88) (Golder 2016b), which surrounds the Bottom Ash Pond.

11.2 Capacities and Calculations

Capacities and calculations regarding the spillway and diversion features can be found in Golder's "Inflow Design Flood Control System Plan" for the Bottom Ash Pond (2016b).

12.0 40 CFR 257.73 (C)(1)(XI)

The construction specifications and provisions for surveillance, maintenance, and repair of the CCR unit.

12.1 Construction Specifications

An internal CEC memo from 1975 (Consumers Energy, 1975) contains limited details regarding the construction methods of the ash pond dikes at JC Weadock. The memo describes raising the elevation of the ash pond dikes using conventional methods. However, the memo does not identify specific ash pond dikes or describe the methods in detail.

12.2 Surveillance, Maintenance, and Repair

The December 2010 "Coal Ash Landfill Surveillance and Monitoring Program" (SMP) (CEC 2010) outlines CEC's surveillance, maintenance, and repair program specific to each CCR surface impoundment at JC Weadock. Beginning in October 2015, the Bottom Ash Pond was inspected by a qualified individual at least weekly and by a qualified professional engineer (QPE) annually in accordance with the CCR RCRA Rule.

13.0 40 CFR 257.73 (C)(1)(XII)

Any record or knowledge of structural instability of the CCR unit.

Weekly inspections of the facility are performed by qualified individuals to detect potentially hazardous conditions or structural weakness per the CCR RCRA Rule and documented internally on CCR Weekly Inspection Observations Forms. Annual inspections at the facility have been performed by AECOM (2009a, 2012), Barr Engineering (2014), and Golder (2016, 2016a).

14.0 ATTACHMENTS

Figure 1 – Site Location Map

Figure 2 – Existing Conditions Site Map

Figure 3 – Ash Pond Characterization Cross Section A-A'

Appendix A – Soil Sample Data

15.0 REFERENCES

- AECOM (2009). "Potential Failure Mode Analysis (PFMA) Report, J.C. Weadock Generating Facility Ash Dike Assessment."
- AECOM (2009a). "Inspection Report J.C. Weadock Generating Facility Ash Dike Risk Assessment, Essexville, Michigan."
- AECOM (2012). "J.C. Weadock Ash Disposal Area 2012 Ash Dike Risk Assessment Inspection Report."
- ARCADIS (2016). "Summary of Monitoring Well Design, Installation, and Development – Impoundment Unit, J.C. Weadock Electric Generation Facility."
- Barr Engineering (2014). "J.C. Weadock Generating Facility Triennial Ash Dike Risk Assessment Report – Spring 2014."
- Consumers Energy (1975). "J.C. Weadock Plant Ash Disposal Area License, File TS 195-06."
- Consumers Energy (2010). "Coal Ash Landfill Surveillance and Monitoring Program."
- Golder Associates (2016). "J.C. Weadock Bottom Ash Pond, Annual RCRA CCR Surface Impoundment Inspection Report – January 2016."
- Golder Associates (2016a). "J.C. Weadock Bottom Ash Pond Annual Inspection Report."
- Golder Associates (2016b). "J.C. Weadock Generating Facility Bottom Ash Pond Inflow Design Flood Control System Plan."
- Golder Associates (2016c). "J.C. Weadock Generating Facility Bottom Ash Pond Structural Stability and Safety Factor Assessment Report."
- USEPA 40 CFR Parts 257 and 261; Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, (2015). Environmental Protection Agency, Washington D.C. epa.gov.
- USEPA MyWATERS Mapper (2016). <https://watersgeo.epa.gov/mwm>.

FIGURES



Channel Island

Windy Point

Gull Island

SITE LOCATION



SITE LOCATION

MICHIGAN COUNTIES
NOT TO SCALE

REFERENCE(S)

BASE MAP TAKEN FROM USGS 7.5 MINUTE QUADRANGLE
BAY CITY NE, MICHIGAN
DATED 2014



CLIENT
CONSUMERS ENERGY COMPANY
2742 NORTH WEADOCK HIGHWAY
ESSEXVILLE, MI. 48732

PROJECT
J.C. WEADOCK HISTORY OF CONSTRUCTION

CONSULTANT	YYYY-MM-DD	2016-09-12
	DESIGNED	MAL
	PREPARED	MAL
	REVIEWED	JTT
	APPROVED	JRP

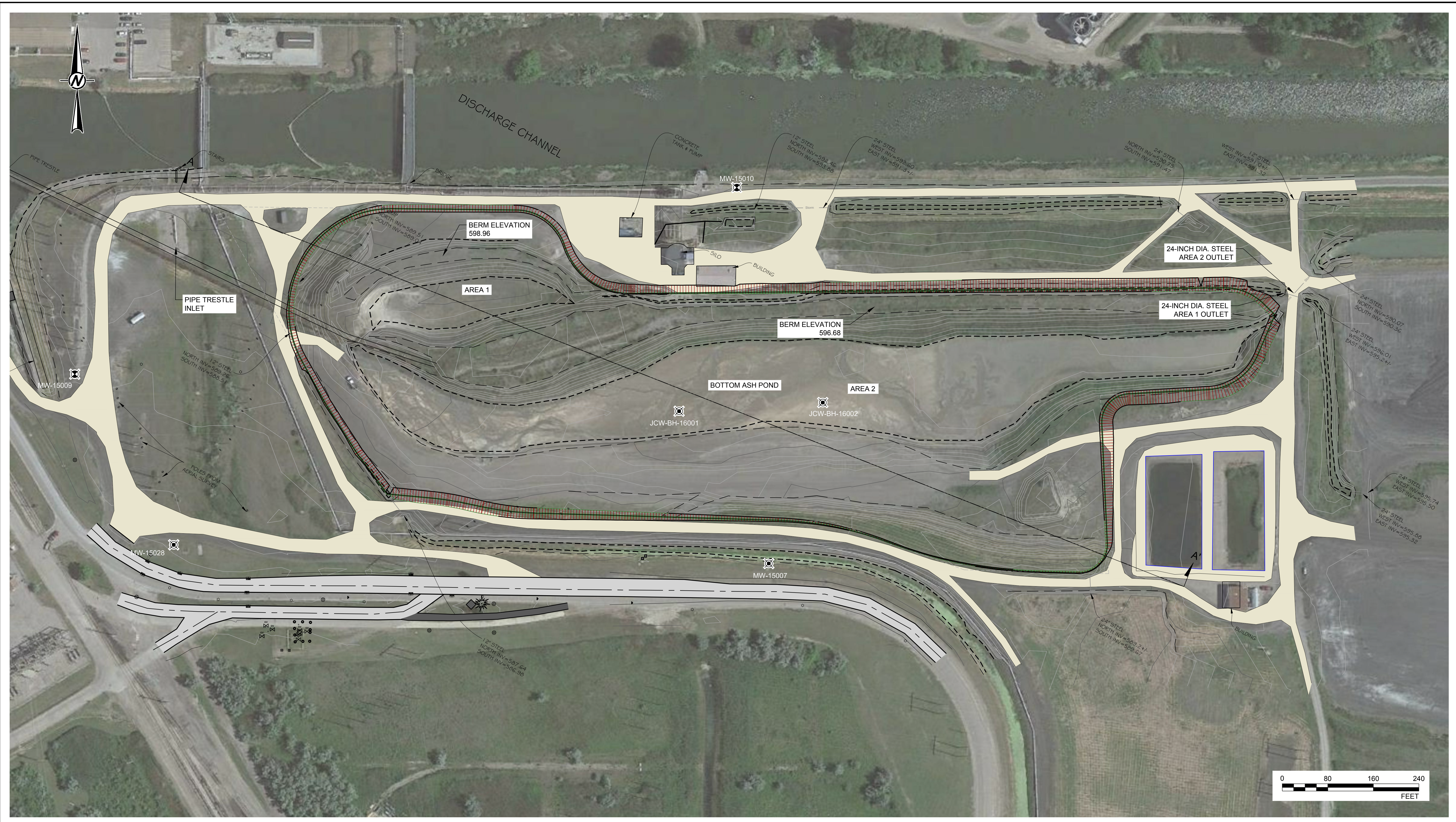


TITLE
SITE LOCATION MAP

PROJECT NO.
1655164

REV.

FIGURE
1



Path: \\saramerino\cas\Sheets_Work for Other Offices\1655164_JC Weadock Bottom Ash Pond\CIVIL_3D_1 File Name: 1655164_2016-08-06 Survey - History Construction.dwg

LEGEND			

CLIENT
CONSUMERS ENERGY COMPANY
 2742 NORTH WEADOCK HIGHWAY
 ESSEXVILLE, MI 48732

CONSULTANT	YYYY-MM-DD	2016-09-09
	DESIGNED	MJ
	PREPARED	CMN
	REVIEWED	JRP
	APPROVED	MAB

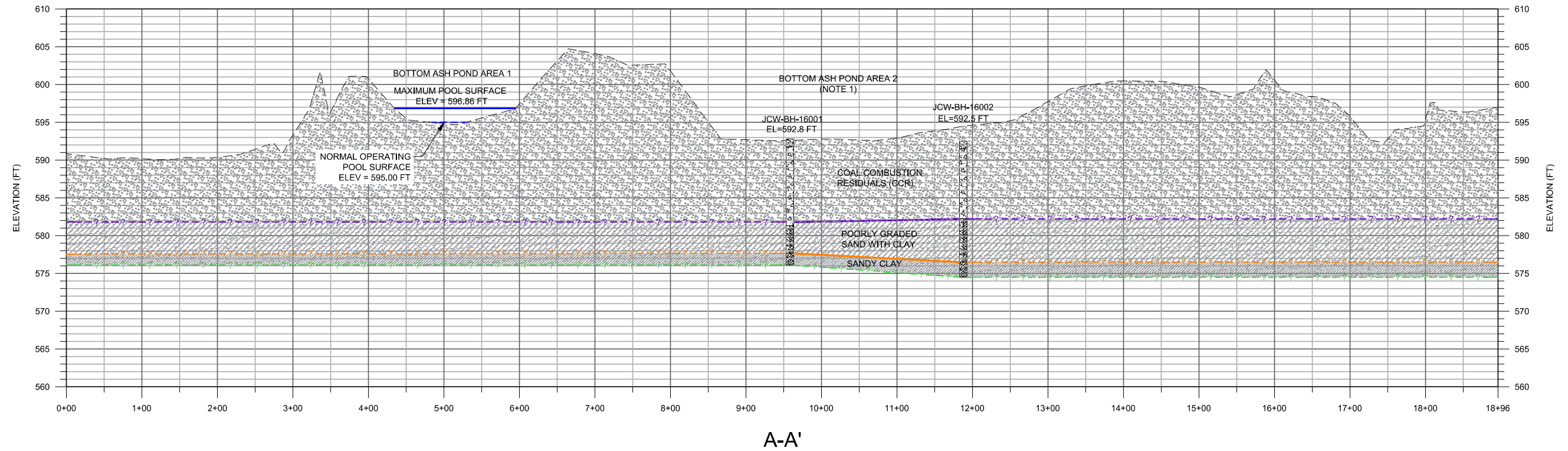


PROJECT
J.C. WEADOCK HISTORY OF CONSTRUCTION

TITLE
EXISTING CONDITIONS MAP

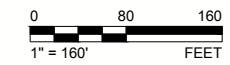
PROJECT NO.	REV.	FIGURE
1655164	--	2

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A3S D



NOTE(S)

1. THE MAXIMUM POOL SURFACE ELEVATION FOR AREA 2 DOES NOT DISPLAY IN THE BOTTOM ASH POND CHARACTERIZATION CROSS SECTION A-A' DUE TO THE POND SLOPING TO THE EAST. WATER ACCUMULATION OCCURS IN THE EAST SIDE OF THE POND AREA. MAXIMUM POOL SURFACE ELEVATION = 592.23 FT (NAVD 88). NORMAL OPERATING POOL SURFACE ELEVATION = 590.36 (NAVD 88).



LEGEND

- WATER
- COAL COMBUSTION RESIDUALS (CCR)
- POORLY GRADED SAND WITH CLAY
- SANDY CLAY
- BASE OF CCR
- BASE OF POORLY GRADED SAND WITH CLAY
- BASE OF SANDY CLAY
- MAXIMUM POOL SURFACE ELEVATION
- NORMAL OPERATING POOL SURFACE ELEVATION

CLIENT
 CONSUMERS ENERGY COMPANY
 2742 NORTH WEADOCK HIGHWAY
 ESSEXVILLE, MI 48732

CONSULTANT



YYYY-MM-DD	2016-09-13
DESIGNED	MJ
PREPARED	CMN
REVIEWED	JRP
APPROVED	MAB

PROJECT
 J.C. WEADOCK HISTORY OF CONSTRUCTION

TITLE
**BOTTOM ASH POND CHARACTERIZATION CROSS SECTION
 A-A'**

PROJECT NO.
 1655164

REV.

FIGURE

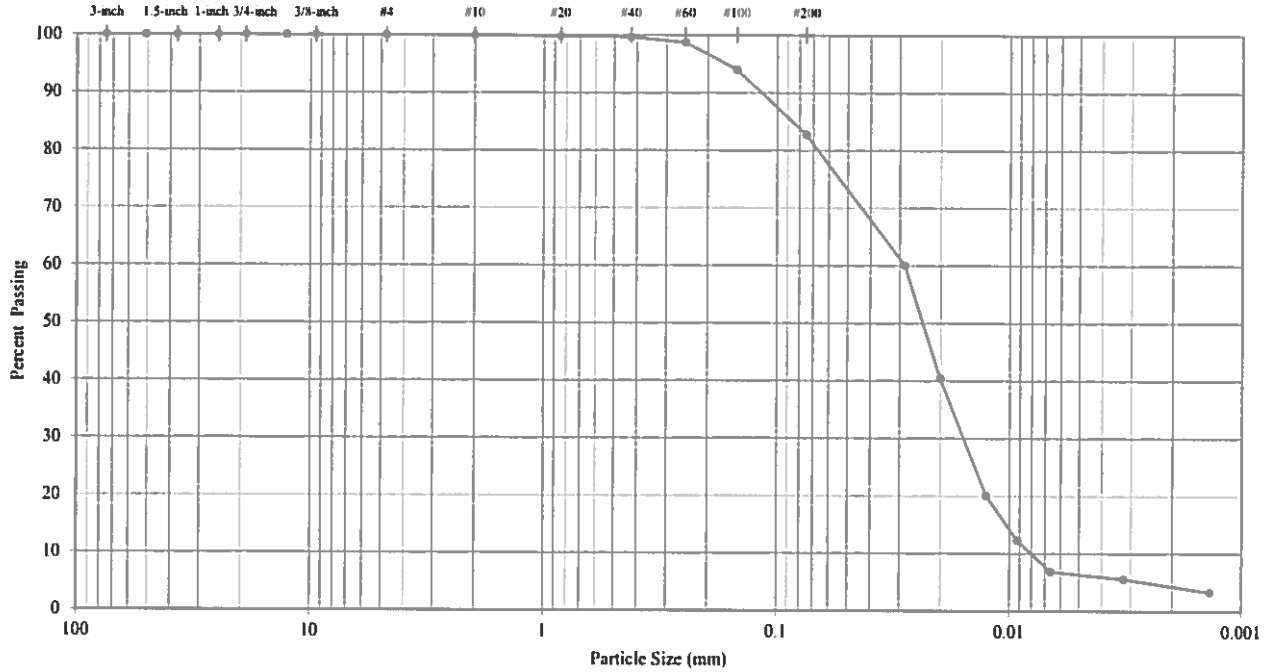
3

**APPENDIX A
SOIL SAMPLE DATA**

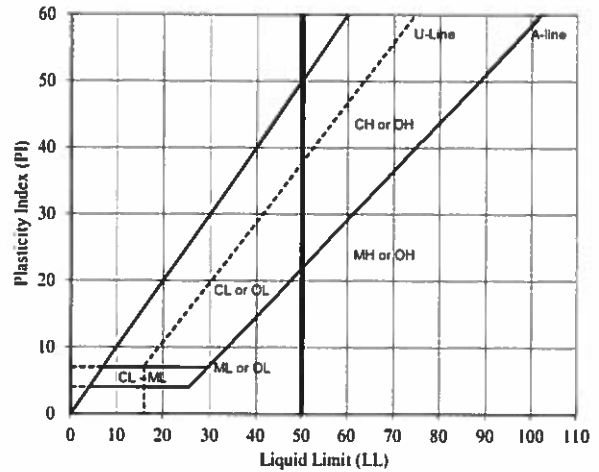
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS ASTM D421, D422, D4318

PROJECT NAME: **J.C. Weadock Ash Pond Characterization**
 SAMPLE ID: **JCW-BII-16001 S-2**
 TYPE: **Jar**

DEPTH (ft): **9.0**



		Particle Size				
		Sieve	(mm)	% Passing	Description	Percentage
Sieve Analysis (Initial Separation on No. 4 Sieve)		3-inch	75.0	100.0	Cobbles	0.00
		2-inch	50.8	100.0	Coarse Gravel	0.00
		1.5-inch	37.5	100.0		
		1-inch	25.0	100.0		
		3/4-inch	19.0	100.0	Fine Gravel	0.00
		1/2-inch	12.7	100.0		
		3/8-inch	9.5	100.0		
	#4	4.75	100.0	Coarse Sand	0.06	
	#10	2.0	99.9			
	#20	0.85	99.8			
	#40	0.425	99.7	Medium Sand	0.27	
	#60	0.25	98.8			
	#100	0.15	94.0	Fine Sand	16.93	
	#200	0.075	82.7			
Hydrometer Analysis			0.029	60.0	Silt or Clay Fines	82.74
			0.020	40.4		
			0.013	20.0		
			0.009	12.3		
			0.007	6.8		
			0.003	5.5		
			0.001	3.3		



Visual Description:
 Very dark gray, CCR

LL	PL	PI	LI
-	-	-	-

As-Received Moisture Content (%)
98.4

USCS Group Symbol
-

- Notes: (1) Particle size analysis sample Mechanically dispersed using Stirring Apparatus A for about 1 Minute.
 (2) Sample prepared for Atterberg Limits testing by the dry method. Material retained on No. 40 sieve removed from Atterberg Limits sample by dry sieving. Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using manual device.

TECH **DW**
 DATE **5/24/2016**
 CHECK **[Signature]**
 REVIEW **[Signature]**

ASTM GRAIN SIZE ANALYSIS
ASTM D 421, D 2217, D 1140, C 117, D 422, C 136, C 142

PROJECT TITLE	J.C. Weadock Ash Ponbd Characterization	SAMPLE ID	JCW-BH-16002 S-3
PROJECT NO.	165-5164	SAMPLE TYPE	Jar
REMARKS		SAMPLE DEPTH (ft)	14.0

WATER CONTENT (Delivered Moisture)		Hygroscopic Moisture For Sieve Sample	
Wt Wet Soil & Tare (gm)	(w1) 33.23	Wet Soil & Tare (gm)	1.00
Wt Dry Soil & Tare (gm)	(w2) 30.11	Dry Soil & Tare (gm)	1.00
Weight of Tare (gm)	(w3) 13.97	Tare Weight (gm)	0.00
Weight of Water (gm)	(w4=w1-w2) 3.12	Moisture Content (%)	0.00%
Weight of Dry Soil (gm)	(w5=w2-w3) 16.14	Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture	
Moisture Content (%)	(w4/w5)*100 19.33	Weight Of Sample (gm)	732.46
		Tare Weight (gm)	370.91
		(W6) Total Dry Weight (gm)	361.55

SIEVE ANALYSIS	Wt Ret	Cum. Ret.	Cumulative	% PASS	SIEVE
Tare Weight	+Tare	(Wt-Tare)	(%Retained)	(100-%ret)	
370.91		(dry)	{(wt ret/w6)*100}		
3.0"	370.91	0.00	0.00	100.00	3.0" coarse gravel
2.5"	370.91	0.00	0.00	100.00	2.5" coarse gravel
2.0"	370.91	0.00	0.00	100.00	2.0" coarse gravel
1.5"	370.91	0.00	0.00	100.00	1.5" coarse gravel
1.0"	370.91	0.00	0.00	100.00	1.0" coarse gravel
0.75"	370.91	0.00	0.00	100.00	0.75" fine gravel
0.50"	370.91	0.00	0.00	100.00	0.50" fine gravel
0.375"	370.91	0.00	0.00	100.00	0.375" fine gravel
#4	371.05	0.14	0.04	99.96	#4 coarse sand
#10	372.10	1.19	0.33	99.67	#10 medium sand
#20	373.95	3.04	0.84	99.16	#20 medium sand
#40	395.15	24.24	6.70	93.30	#40 fine sand
#60	544.48	173.57	48.01	51.99	#60 fine sand
#100	668.04	297.13	82.18	17.82	#100 fine sand
#200	706.70	335.79	92.88	7.12	#200 fines


% C GRAVEL	0.00	Descriptive Terms	> 10% mostly coarse (c)	LL	-
% F GRAVEL	0.04	trace	0 to 5%	PL	-
% C SAND	0.29	little	5 to 12%	PI	-
% M SAND	6.38	some	12 to 30%	Gs	-
% F SAND	86.17	and	30 to 50%		
% FINES	7.12		< 10% coarse (c-m)		
% TOTAL	100.00		< 10% coarse (m-f)		
			< 10% coarse and fine (m)		
			< 10% coarse and fine (m)		
			< 10% coarse and medium (f)		
			> 10% equal amounts each (c-f)		

VISUAL DESCRIPTION Light gray, POORLY GRADED SAND WITH CLAY, trace gravel

USCS SP-SC

TECH DF

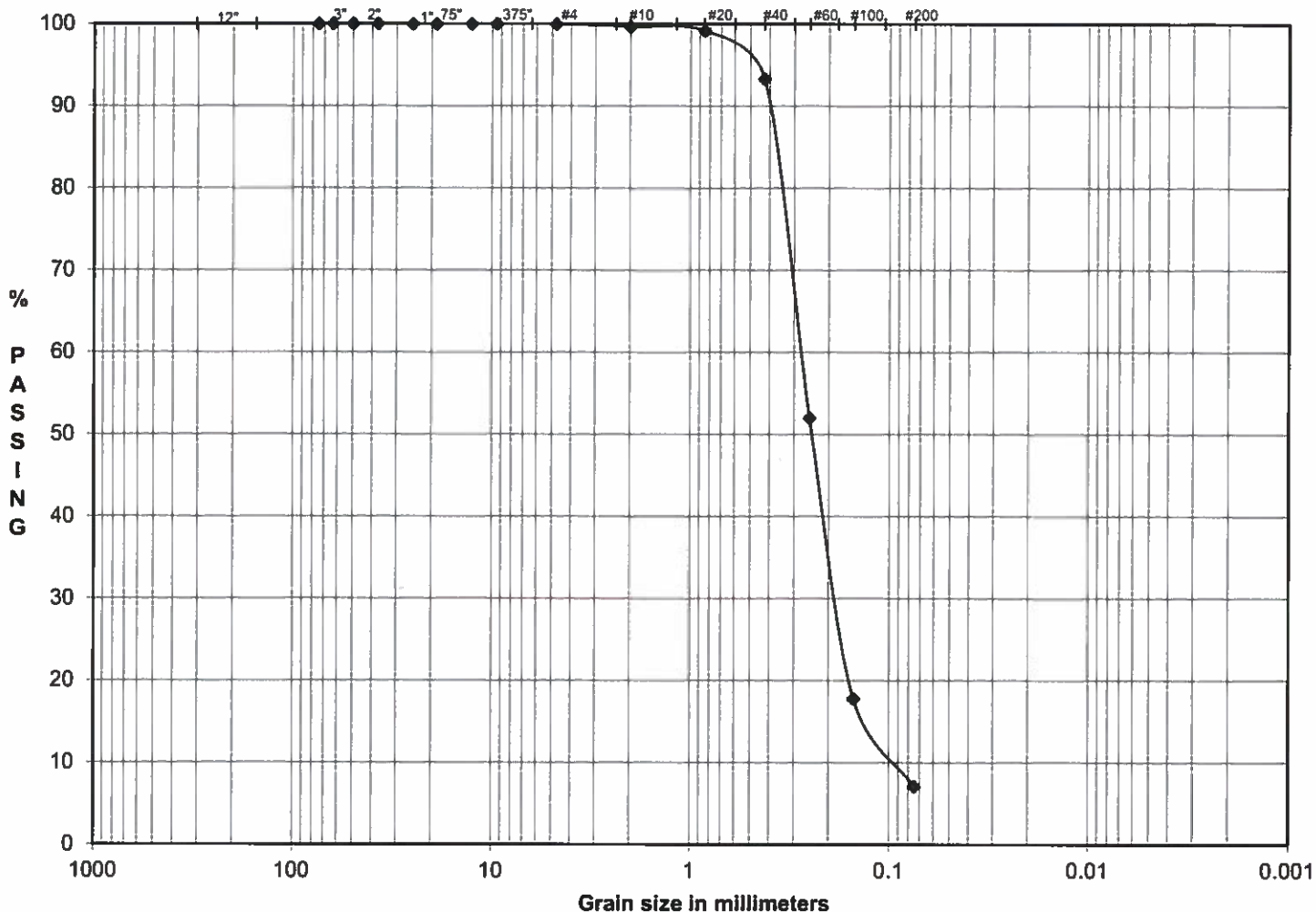
DATE 5/25/2016

CHECK 

REVIEW

* material finer than #4 sieve corrected for hygroscopic moisture.

**PARTICLE SIZE DISTRIBUTION ASTM D 421 AND D 422
US STANDARD SIEVE OPENING SIZES**



Boulders	Cobbles	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
		GRAVEL		SAND			FINES
	0.00	0.00	0.04	0.29	6.38	86.17	7.12
		0.04		92.84			

SAMPLE ID	JCW-BH-16002 S-3
SAMPLE TYPE	Jar
SAMPLE DEPTH (ft)	14

LL	-
PL	-
PI	-

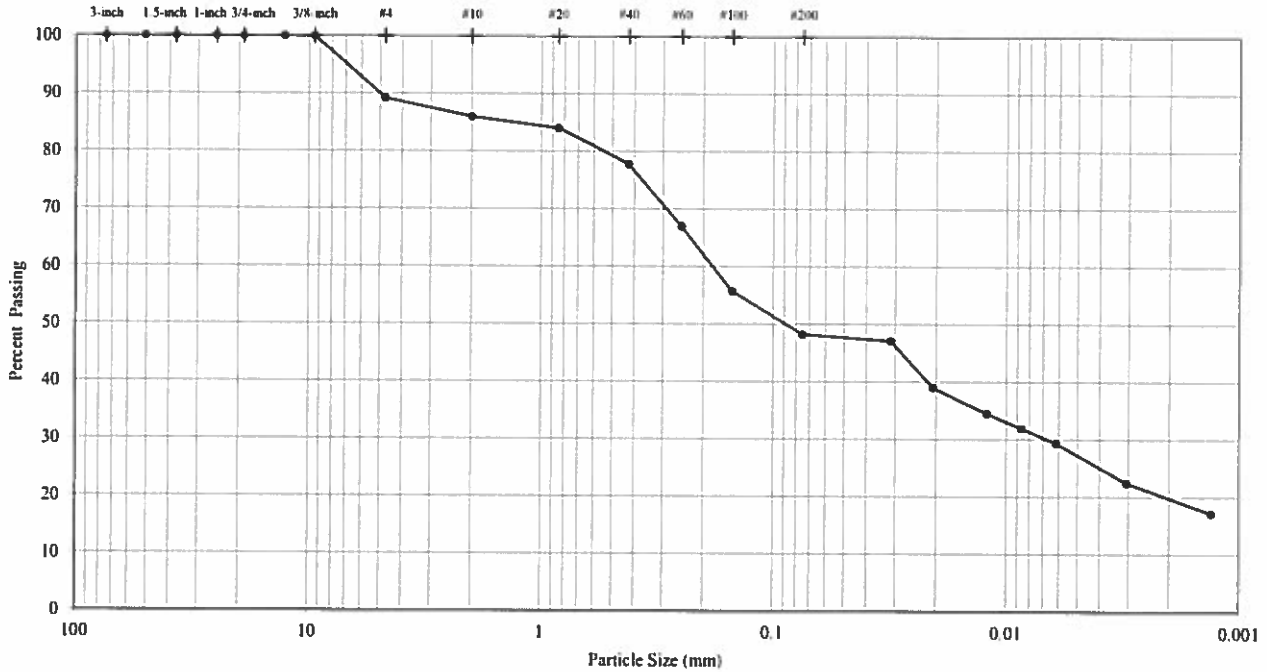
VISUL DESCRIPTION: Light gray, POORLY GRADED SAND WITH CLAY, trace gravel

USCS: SP-SC

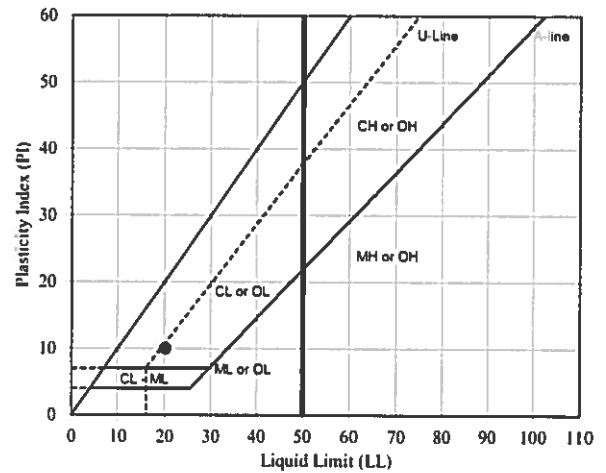
TECH	DF
DATE	5/25/2016
CHECK	<i>[Signature]</i>
REVIEW	<i>[Signature]</i>

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS ASTM D421, D422, D4318

PROJECT NAME: J.C. Weadock Ash Pond Characterization
 SAMPLE ID: JCW-BII-16002 S-5
 TYPE: Jar
 DEPTH (R): 18.0



	Sieve	Particle Size (mm)	% Passing	Description	Percentage	
Sieve Analysis (Initial Separation on No. 4 Sieve)	3-inch	75.0	100.0	Cobbles	0.00	
	2-inch	50.8	100.0	Coarse Gravel	0.00	
	1.5-inch	37.5	100.0			
	1-inch	25.0	100.0			
	3/4-inch	19.0	100.0			
		1/2-inch	12.7	100.0	Fine Gravel	10.86
		3/8-inch	9.5	100.0		
		#4	4.75	89.1	Coarse Sand	3.17
		#10	2.0	86.0		
		#20	0.85	84.0		
	#40	0.425	77.8	Medium Sand	8.21	
	#60	0.25	67.0			
	#100	0.15	55.7	Fine Sand	29.56	
	#200	0.075	48.2			
		0.032	47.1			Silt or Clay Fines
Hydrometer Analysis		0.021	39.0			
		0.012	34.5			
		0.009	32.0			
		0.006	29.3			
		0.003	22.5			
		0.001	17.2			



USCS Description (ASTM D 2487):
Very pale brown, CLAYEY SAND, little gravel

LL	PL	PI	LI
20	10	10	-0.15

As-Received Moisture Content (%) USCS Group Symbol
8.5 SC

Notes: (1) Particle size analysis sample Mechanically dispersed using Stirring Apparatus A for about 1 Minute.
 (2) Sample prepared for Atterberg Limits testing by the dry method. Material retained on No. 40 sieve removed from Atterberg Limits sample by dry sieving. Plastic Limit test performed by hand rolling. Method A Liquid Limit test performed using manual device.

TECH: DW
 DATE: 5/24/2016
 CHECK:
 REVIEW: