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15 January 2016
File No. 41938-008

Westar Energy, Inc.
818 South Kansas Avenue
Topeka, Kansas 66612

Attention: Mr. Jared Morrison

Subject: Annual CCR Surface Impoundment PE Inspection
Area 1 Pond
Tecumseh Energy Center
Tecumseh, Kansas

Mr. Jared Morrison:

Enclosed please find our Initial Annual Coal Combustion Residuals (CCR) Surface Impoundment Inspection Report for the Westar Energy, Inc. (Westar) Area 1 Pond located at the Tecumseh Energy Center (TEC) in Tecumseh, Kansas.

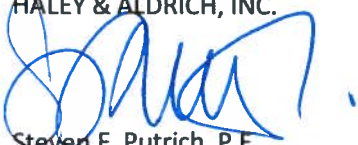
We completed our site visit for the inspection of the surface impoundment on 7 October 2015. This work was performed by Haley & Aldrich, Inc. (H&A) on behalf of Westar in accordance with the US Environmental Protection Agency's (EPA's) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 40 CFR Part 257, in particular §§257.83(b).

The scope of our work was to complete: 1) a review of available information on the surface impoundment, 2) a visual inspection of the surface impoundment, and 3) prepare the enclosed report. Recommendations for remedial action are provided in Section 4 of the report.

Westar Energy, Inc.
15 January 2016
Page 2

Thank you for inviting us to complete this inspection and please feel free to contact us if you wish to discuss the contents of the report.

Sincerely yours,
HALEY & ALDRICH, INC.



Steven F. Putrich, P.E.
Vice President

Enclosures

\\cle\common\Projects\41938_Westar-CCR Compliance\008-TEC Stability Assessments\Deliverables\Annual Impoundment Inspection-FINAL\2016-0115-HAI-
Westar-Area 1 Pond-CCR Impoundment Annual PE Inspection rpt-F.docx

**REPORT ON
INITIAL ANNUAL CCR SURFACE IMPOUNDMENT PE
INSPECTION
AREA 1 POND
TECUMSEH ENERGY CENTER
TECUMSEH, KANSAS**

by Haley & Aldrich, Inc.
Cleveland, OH

for Westar Energy, Inc.
Tecumseh, Kansas

File No. 41938-008
January 2016



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1. Description of Project

1.1 GENERAL

1.1.1 Authority

Haley & Aldrich, Inc. (H&A) has been contracted by Westar Energy, Inc. (Westar, Owner) to perform an Initial Annual CCR Surface Impoundment Inspection for the Area I Pond located at the Tecumseh Energy Center (TEC) near Tecumseh, Kansas. This work was completed in accordance with the US Environmental Protection Agency's (EPA's) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 40 CFR Part 257, specifically 257.83(b).

1.1.2 Purpose of Work

The purpose of this inspection was to visually observe and evaluate the present condition of the CCR surface impoundment to evaluate the design, construction, operation, and maintenance of the Area 1 Pond for consistency with recognized and generally accepted good engineering standards. The visual inspection is intended to identify signs of distress or malfunction of the surface impoundment, should they exist. This report addresses summarizes those findings and notes conditions observed that are disrupting or have the potential to disrupt the operation and safety of the surface impoundment.

The inspection is divided into three parts: 1) obtain and review readily available reports, investigations, and data pertaining to the surface impoundment; 2) perform a visual inspection of the site; 3) prepare this report presenting our observations and recommendations for any repairs or remedial actions.

1.2 DESCRIPTION OF PROJECT

1.2.1 Location

The Area 1 Pond is located at the TEC in Tecumseh, Kansas. TEC is located on the northern side of SE 2nd Street at North latitude 39° 3.1' and West longitude 95° 34.3', as shown on Figure 1, Project Locus. The surface impoundment is accessed from the plant site along a gravel access road. Access to the plant and surface impoundment is restricted by full time security and barriers/fences at the plant.

1.2.2 Owner/Operator

The Area 1 Pond is owned, operated and maintained by Westar Energy.

	Surface Impoundment Owner	Surface Impoundment Operator (at Time of Inspection)
Name	Westar Energy	Westar Energy
Mailing Address	Tecumseh Energy Center 5330 SE 2 nd St.	Tecumseh Energy Center 5330 SE 2 nd St.
Town	Tecumseh Kansas 67357	Tecumseh Kansas 67357

1.2.3 Purpose of the Area 1 Pond

The TEC was originally commissioned in 1925. At the time of our inspection, the plant included two steam electric generating units and one auxiliary boiler. Following our inspection, one of the steam generating units was retired from operation.

The Area 1 Pond was constructed in 1968. In 1980, the pond was deepened and an internal berm constructed which separates the Area 1 Pond into approximately equal size north and south ponds. Currently, Westar cycles the two ponds between actively sluicing water and bottom ash while drying out the idled pond for excavation.

1.2.4 Description of the Surface Impoundment

The Area 1 Pond is located west of Tecumseh power plant along the western boundary of the facility as shown in Figure 2, Site Plan.

The Area 1 Pond has a total surface area of approximately 2 acres, comprised of the north and south ponds each of which has a surface area of approximately 1 acre. The design total capacity of the impoundment is approximately 20 acre-ft as estimated from the most recent topographic survey.

Bottom ash from the power plant is sluiced to the Area 1 Pond where it directed to either the north pond or the south pond. When bottom ash has reached a pre-determined level in one of the ponds, flow is directed to the other pond and the first pond dewatered and the ash removed and sold or landfilled on-site in dry form.

During the original construction, the east end of the Area 1 Pond was incised into the sloping topography while above-grade berms were constructed around the north, south and west sides of the pond. Currently, the berm crest is at El. 885, resulting in a total berm height of 39 ft for the north berm, 25 to 35 ft for the west berm, and 10 to 20 ft for the south berm. The embankments are constructed from on-site silty clay. The crest of the impoundment is generally 18 to 25 ft in width. The crest perimeter is approximately 1,300 ft in length.

Based on observations during our 7 October 2015 site visit and our review of available site plans, the Area 1 Pond receives water from the following sources: 1) discharge of water/bottom ash slurry from the TEC plant, 2) limited runoff entering the impoundment during rain events and snow melt, and 3) direct precipitation falling into the impoundment.

1.3 REVIEW OF AVAILABLE INFORMATION

1.3.1 Design and Construction Records

The Area 1 Pond was constructed in 1968 to create a sedimentation basin and temporary staging for bottom ash. In 1980, the Area 1 Pond was deepened and an internal berm constructed to provide separate north and south ponds. It is our understanding the Area 1 Pond was an engineered structure however, Westar does not have engineering drawings or construction records of the impoundment.

1.3.2 Operating Records

Written operational records were not historically maintained for the surface impoundment.

1.3.3 Description of Changes Since Previous Annual Inspection

This was the first annual impoundment inspection conducted as a requirement of §257.83, thus there are no geometrical changes to report. Subsequent annual impoundment inspections will note any changes in design of the impounding structure.

2. Inspection

2.1 VISUAL INSPECTION

On 7 October 2015, Haley & Aldrich completed a visual inspection of the surface impoundment. The following subsections describe the conditions observed during the inspection. In addition, refer to the photographs and checklist forms included in Appendices A and B, respectively for additional information.

2.1.1 Description of Inspection

During the visual inspection, the impoundment perimeter was walked and the berms, downstream area, and outlet were examined for deficiencies (e.g. cracking, ruts, woody and overgrown grassy vegetation, etc.) and for the presence of local instrumentation. Throughout the inspection, pictures were taken to document various physical conditions of the impoundment.

2.1.2 General Findings

2.1.2.1 *Impoundment Berms*

At the time of the inspection, the north pond had been drained and the full height of the internal slope was visible. The south pond was filled with water with approximately 3 ft of the slope visible above the water surface (pond level at approximately El. 882). See Photos 1 through 4.

The upstream slopes are steep, ranging from nearly vertical to about 1H:1V. No slope protection is provided and there is little to no vegetation on the slopes. Despite having no protection, the slope appeared to be reasonably stable but exhibited some erosion from runoff (Photos 8 and 9).

The berm crests are generally 18 to 25 ft in width and are gravel surfaced, providing access to service vehicles around the ponds. The surface is hard and capable of supporting vehicle traffic without significant rutting (Photos 5 and 6).

The crest alignment appeared generally level; however, a low spot exists at the southwest corner of the south pond. At this location, the crest was also sloped toward the upstream slope, resulting in some erosion of the slope caused by runoff (Photos 7 and 8).

Several rodent burrows were observed along the downstream edge of the crest, primarily along the north berm at the fence line located on the downstream edge of the crest. The burrows were typically on the order of 2 inches in diameter. A somewhat larger burrow hole, approximately 3 inches in diameter, was observed at the downstream edge of the west berm crest (Photo 19). Two dead moles were observed on the crest of the west berm.

The crest exhibited no signs of surface cracking, significant rutting, sinkholes, or depressions other than noted above.

The north and west downstream slopes are well protected against surface erosion by the heavy erosion control blankets placed during 2010 and 2012 construction activities, and by the vegetation that has

become established since construction (Photos 10 and 11). On the north downstream slope, a continuous cover of grass exists that was generally well maintained. On the west downstream slope, vegetation was less established resulting in some areas where the grass was dead. In addition, there were patches where the grass was up to 18 inches in height (Photo 12).

Erosion on the north and west downstream slopes was noted in a few limited areas. At the toe of the west berm, a tracked vehicle had traversed the area at some time in the past, causing some rutting of the soft ground and tearing of the erosion control blanket along the edge of the ruts (Photo 13). Runoff from the west slope has caused some erosion in the ruts within a relatively limited area. Some relatively minor surface erosion was also noted on the downstream slope at the junction between the west and south berms.

Over the years, Tecumseh Creek has eroded a deep channel along the downstream toe of the north berm (Photo 27). Although the channel has steep sides in some areas, the channel banks appear to be stable due to the apparent stiffness of the soil and remaining root mass from trees previously cut immediately adjacent to the creek.

The north and west downstream slopes appeared to be stable. During the inspection, no signs of seepage, slides, sloughs or unusual movements were observed.

The south berm downstream slope is generally vegetated with grass but there were a number of patches where the grass was dead (Photos 14 and 15). The dead patches were up to approximately 30 ft x 30 ft in size. Much of the slope was covered with pieces of woody vegetation that had recently been mowed. With the exception of one area as discussed below, the slope appeared to be stable with no significant erosion or signs of slope instability. A notable exception is a slough that exists on the slope approximately 50 ft west of the chain link gate on SE 2nd Street. Runoff from SE 2nd Street flows to an unlined drainage ditch at the toe of the south berm. Flow in the ditch has deepened the channel to the point that it caused a localized slump, approximately 5 ft x 5 ft in size on the slope (Photos 16 and 17).

Small rodent burrows, generally about 2 inches in diameter, were noted on all downstream slopes but appeared to be most prevalent on the north slope, particularly at the top of the slope near the downstream edge of the crest (Photo 18). This may be due to the rodents being trapped under the heavy erosion control blanket on the slope, and exiting at the upper edge of the blanket at the top of the slope.

2.1.2.2 Hydraulic Structures

Area 1 Pond discharges through a concrete box intake structure located at the west end of the separator berm (Photos 20 to 22). Decant water from the pond discharges into the concrete box structure through a window near the top of the structure. Flow from the box structure enters a steel outflow pipe that penetrates the berm near the northwest corner of the impoundment and discharges to the Area 2 Pond (Photo 23).

The concrete box intake structure has minor, isolated, concrete chips and weathering but was otherwise in good condition. Minor, surficial rusting was observed on the exposed metal hardware which was otherwise in good condition. After exiting the Area 1 Pond berm, the outflow pipe, which was lined with a plastic pipe insert in 2012, is above ground and appeared to be in stable condition.

2.1.2.3 *Downstream Toe Area*

Downstream of the west berm toe of slope, mature trees exist between Tecumseh Creek and the toe of slope. Due to the heavy vegetative cover, it was not possible to observe the condition of the ground downstream of the west toe of slope.

On the south side of the impoundment, SE 2nd Street exists downstream of the toe of slope. No signs of seepage or instability were observed in this area.

Downstream of the north berm, the topography immediately begins sloping upward to the Area 2 pond. The area appeared stable.

2.2 OPERATIONS AND MAINTENANCE

The Area 1 Pond is operated and maintained by TEC personnel. Operation of the impoundment includes directing flow to the north or south pond, regulating water levels in the ponds, dewatering the ponds and removing settled ash for reuse.

Maintenance of the berms includes regular cutting of vegetation on the downstream and upstream slopes.

2.3 STRUCTURAL STABILITY

In 2009, Golder Associates drilled three test borings in the Area 1 Pond berms and performed slope stability analyses on the configuration of the Area 1 berms at that time. Based on the results of their 2009 analysis, Golder recommended flattening the north downstream slope to 1.7H:1V. In 2010, Golder installed two piezometers in the Area 1 north berm. Using groundwater levels recorded in the two piezometers and assuming a 1.7H:1V downstream slope, Golder performed additional slope stability analyses on the north berm. Results of the analyses indicated acceptable factors of safety for the recommended 1.7H:1V slope configuration based on industry standards. Results of the stability analysis are discussed in Reference 2.

The impoundment berms were observed to be stable with little or no ruts, sloughing, low areas except at specific locations noted. The crest exhibited no signs of surface cracking, significant rutting, sinkholes, or depressions other than noted above.

Westar will be performing a Safety Factor Assessment in accordance EPA's Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 40 CFR Parts 257 and 261.

3. Impoundment Geometry, Instrumentation Readings, and Capacity

3.1 CHANGES IN STRUCTURE GEOMETRY

As this is the first annual inspection, no changes in structure geometry have occurred.

3.2 INSTRUMENTATION READINGS

A piezometer was located along the crest of the west berm of the Area 1 Pond. The piezometer was installed for the purposes of monitoring groundwater quality. No readings were taken in the piezometer and historical documentation was not provided. This was the first annual impoundment inspection, thus a maximum piezometer reading since the previous annual inspection is not applicable.

3.3 IMPOUNDED WATER AND CCR DEPTH AND ELEVATION

This was the first annual impoundment inspection, thus a maximum and minimum water and CCR reading since the previous annual inspection is not applicable. No water level readings were taken and historical documentation was not provided.

3.4 STORAGE CAPACITY

At the time of the inspection, the storage capacity of the Area 1 Pond is estimated to be approximately 20 acre-ft. As described in Figure 4, the remaining storage capacity was approximated by determining the volume of the impoundment (as of the most recent survey Western Air Maps and PEC) below El. 885, which is the elevation of the berm crest on the inspection date. Because no bathymetric data was available, the bottom of the pond was approximated to be at El. 877.

3.5 VOLUMES

The impounded water volume was approximated to be 5 acre-ft. As described in Figure 4, the volume of impounded water was approximated by determining the volume of the impoundment (as of the most recent survey by Western Air Maps and PEC) below El. 882. Because no bathymetric data was available, the bottom of the pond was approximated to be at El. 877.

The impounded CCR volume could not be accurately determined due to temporary nature of CCR storage in the Area 1 Pond and the periodic cycling between the north and south ponds.

4. Assessments and Recommendations

4.1 ASSESSMENTS

The following deficiencies were observed at the Area 1 Pond:

- A low spot exists in the berm crest at the southwest corner of the south pond. At this location, the crest is also sloped toward the upstream slope, resulting in some erosion of the upstream slope caused by runoff.
- A number of relatively small animal burrows (about 2 inches in diameter) exist on the downstream slopes of the north, west and south berms, and along the downstream edge of the north and west crests. A larger burrow hole, approximately 3 inches in diameter, exists at the downstream edge of the west berm.
- On the west downstream slope, grass was up to 18 inches in height and patches exist where the grass is dead. On the south berm downstream slope, there are a number of patches (up to 30 ft x 30 ft in size) where the grass is dead.
- At the toe of the west berm, some rutting, erosion and tearing of the erosion control blanket exist where a tracked vehicle had traversed the area at some time in the past.
- Some relatively minor surface erosion exists on the downstream slope at the junction between the west and south berms.
- Localized sloughing in a 5-ft x 5-ft area of the south downstream slope caused by erosion in the bottom of the unlined drainage ditch on the north side of SE 2nd Street.

4.2 RECOMMENDATIONS

Haley & Aldrich recommends the following remedial measures be undertaken:

- Place and compact fill as needed to raise the grade in the low spot on the crest at the southwest corner of the south pond.
- Backfill animal burrows with a compacted sand and gravel mix.
- Regularly cut vegetation on slopes to maintain a maximum height of 6 in.
- Seed and re-establish vegetation in the dead patches on the south and west downstream slopes.
- Fill ruts and erosion channels on the west and south downstream slopes.
- Evaluate need for armoring the bottom of drainage ditch between SE 2nd Street and the south downstream toe of slope in the vicinity of the slough to prevent continued deepening of the channel and resulting sloughing of the downstream slope.

- Regularly monitor banks of Tecumseh Creek at toe of north downstream slope for signs of instability.
- Monitor the area of mature trees downstream of the west berm for uprooting, signs of decay, or other conditions that could potentially impact the Area 1 Pond.

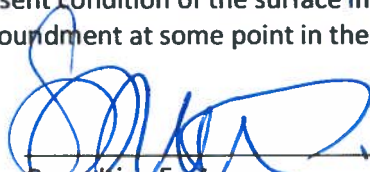
5. Certification

The assessment of the general condition of the surface impoundment is based upon available data and visual observation. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations are beyond the scope of this report.

In reviewing this report, it should be realized that the described condition of the surface impoundment is based on observations of field conditions at the time of inspection, along with other data available to the inspection team.

It is important to note that the condition of a surface impoundment depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the surface impoundment will continue to represent the condition of the surface impoundment at some point in the future.

Signed:



Consulting Engineer

Print Name: Steven F. Putrich

Kansas License No.: 24363

Title: Vice President

Company: Haley & Aldrich, Inc.

Professional Engineer's Seal and date:





MAPSOURCE: USGS
GRANTVILLE, KANSAS
2012



**HALEY
ALDRICH**

ANNUAL CCR SURFACE IMPOUNDMENT PE INSPECTION
AREA 1 POND
TECUMSEH ENERGY CENTER
TECUMSEH, KS

PROJECT LOCUS

APPROXIMATE SCALE: 1" = 5000'
JANUARY 2016

FIGURE 1

LUCAS, ANDY
G:\1938 WESTAR-CCR COMPLIANCE\CAD-TEC\FIGURES\ANNUAL INSPECTION\1938-008 FIG-2 SITE PLAN.DWG
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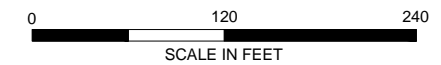


LEGEND

--- APPROXIMATE LIMITS OF AREA 1 POND

NOTES

1. AERIAL IMAGERY PROVIDED BY GOOGLE EARTH PRO. PHOTO TAKEN 11 MAY 2015.
2. APPROXIMATE LIMITS OF AREA 1 POND AND WATER SURFACE BOUNDARY PROVIDED BY WESTAR. DRAWING PRODUCED BY PEC TITLED "WESTAR ENERGY TECUMSEH ENERGY CENTER INDUSTRIAL LANDFILL PLAT OF SURVEY" DATED 7 OCTOBER 2015.



**HALEY
ALDRICH**

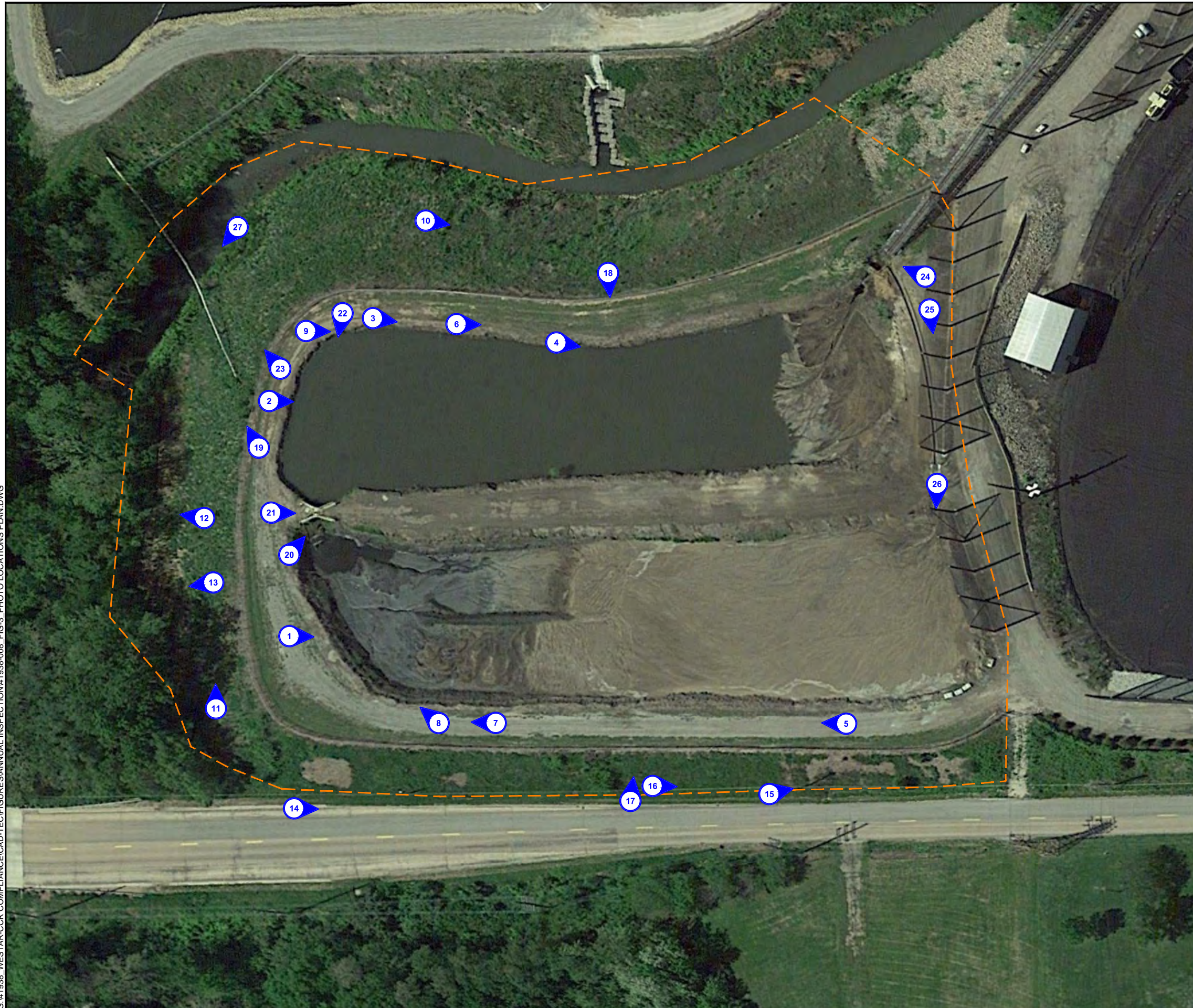
ANNUAL CCR SURFACE IMPOUNDMENT PE INSPECTION
AREA 1 POND
TECUMSEH ENERGY CENTER
TECUMSEH, KS

SITE PLAN

SCALE: AS SHOWN
JANUARY 2016

FIGURE 2

LUCAS, ANDY
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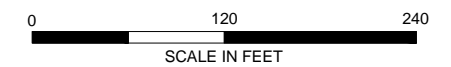


LEGEND

- APPROXIMATE LIMITS OF BOTTOM AREA 1 POND
- 1 PHOTO LOCATION/DIRECTION

NOTES

1. AERIAL IMAGERY PROVIDED BY GOOGLE EARTH PRO. PHOTO TAKEN 11 MAY 2015.



**HALEY
ALDRICH**

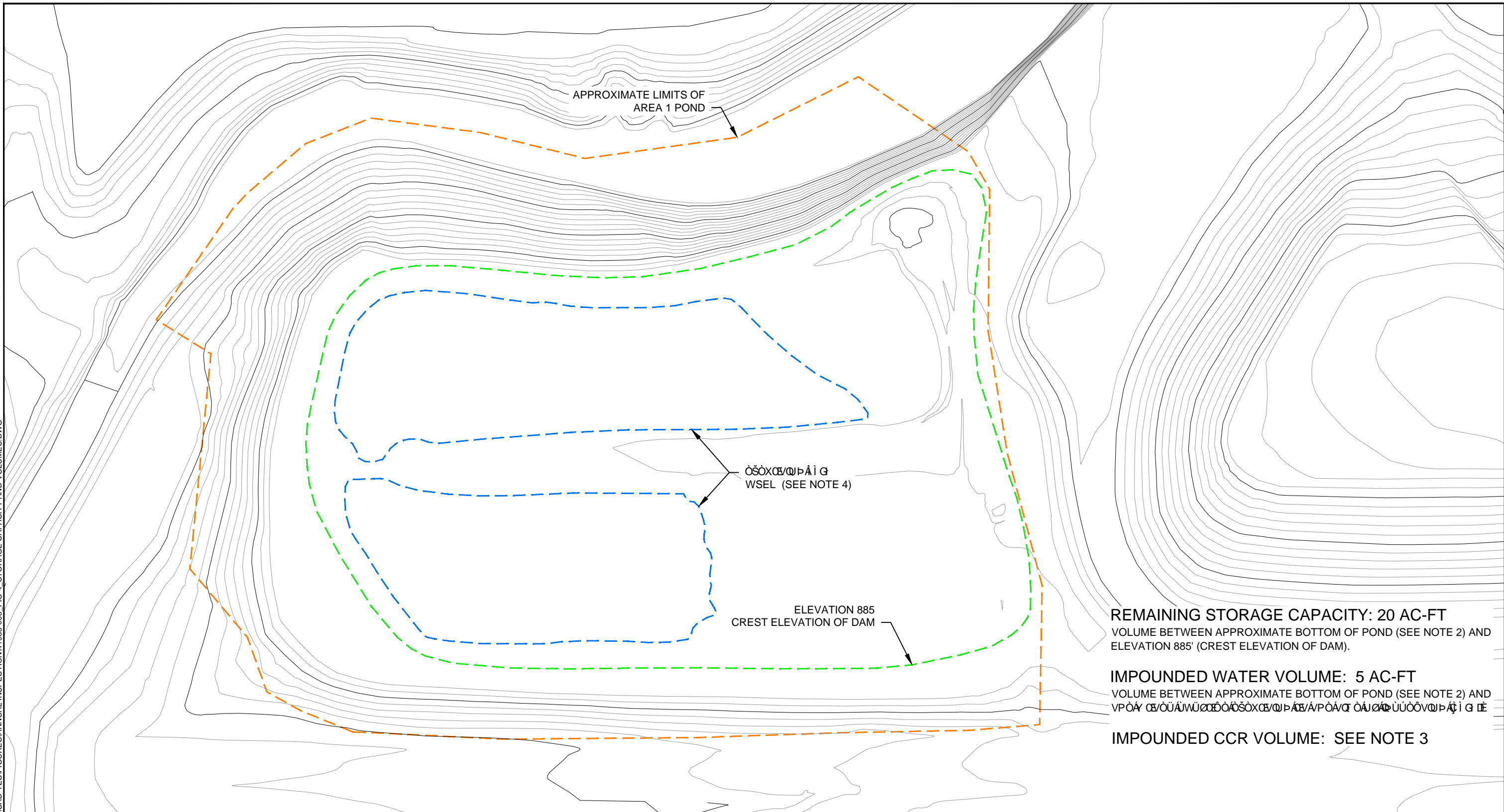
ANNUAL CCR SURFACE IMPOUNDMENT PE INSPECTION
AREA 1 POND
TECUMSEH ENERGY CENTER
TECUMSEH, KS

PHOTO LOCATION PLAN

SCALE: AS SHOWN
JANUARY 2016

FIGURE 3

Lucas_Andy
 G:\1938_WESTAR-CCR_COMPLIANCE\CAD-TECFIGURES\ANNUAL INSPECTION\1938-008 FIG-4 STORAGE CAPACITY AND VOLUMES.DWG
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APPROXIMATE LIMITS OF
AREA 1 POND

WSEL (SEE NOTE 4)

ELEVATION 885
CREST ELEVATION OF DAM

REMAINING STORAGE CAPACITY: 20 AC-FT
 VOLUME BETWEEN APPROXIMATE BOTTOM OF POND (SEE NOTE 2) AND
 ELEVATION 885' (CREST ELEVATION OF DAM).

IMPOUNDED WATER VOLUME: 5 AC-FT
 VOLUME BETWEEN APPROXIMATE BOTTOM OF POND (SEE NOTE 2) AND
 WSEL (SEE NOTE 4)

IMPOUNDED CCR VOLUME: SEE NOTE 3

LEGEND

- WSEL
- ELEVATION 885'
CREST ELEVATION OF DAM
- APPROXIMATE LIMITS OF
AREA 1 POND

NOTES

1. EXISTING TOPOGRAPHY, PROVIDED BY WESTAR, IS A COMBINATION OF CONTOURS FROM WESTERN AIR MAPS AND VARIOUS PEC TOPOGRAPHIC SURVEYS.
2. CURRENT BATHYMETRIC DATA AND APPROXIMATE TOPOGRAPHY PRIOR TO TIME OF DAM CONSTRUCTION WAS UNAVAILABLE. BOTTOM OF POND APPROXIMATED AS ELEVATION 877.
3. STORAGE IN AREA 1 POND IS TEMPORARY AND VARIES DEPENDING ON CYCLING BETWEEN PONDS AND REMOVAL OF CCR.
4. APPROXIMATE LIMITS OF AREA 1 POND AND WATER SURFACE BOUNDARY PROVIDED BY WESTAR. DRAWING PRODUCED BY PEC TITLED "WESTAR ENERGY TECUMSEH ENERGY CENTER INDUSTRIAL LANDFILL PLAT OF SURVEY" DATED 7 OCTOBER 2015.



ANNUAL CCR SURFACE IMPOUNDMENT PE INSPECTION
 AREA 1 POND
 TECUMSEH ENERGY CENTER
 TECUMSEH, KS

**STORAGE CAPACITY AND
IMPOUNDED CCR AND WATER
VOLUMES**

SCALE: AS SHOWN
 JANUARY 2016

FIGURE 4

APPENDIX A

Photographs



Photo No. 1
South Pond



Photo No. 2
North Pond



Photo No. 3
North Pond - Drained



Photo No. 4
North Pond – Area of Ash Removal



Photo No. 5
South Berm Crest



Photo No. 6
North Berm Crest



Photo No. 7
Low Area on South Crest



Photo No. 8
Erosion on South Berm Upstream Slope



Photo No. 9
North Berm Upstream Slope



Photograph No. 10
North Berm Downstream Slope



Photo No. 11
West Berm Downstream Slope



Photo No. 12
Tall Grass and Dead Vegetation on West Downstream Slope



Photo No. 13
Rutted/Eroded Area on West Downstream Slope



Photo No. 14
South Downstream Slope



Photo No. 15
Dead Spots on South Downstream Slope



Photo No. 16
Slough and Eroded Drainage Ditch on South Downstream Slope



Photo No. 17
Slough on South Downstream Slope



Photo No. 18
Burrows at Top of North Downstream Slope

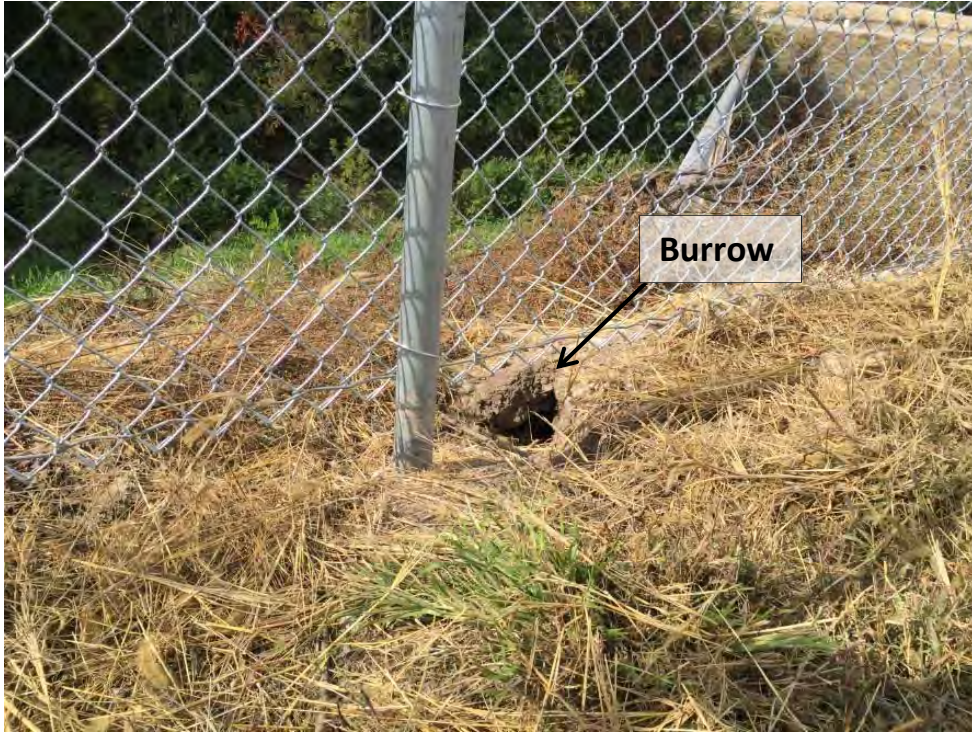


Photo No. 19
Burrow at Downstream Edge of West Crest



Photo No. 20
Intake Structure



Photo No. 21
Intake Structure



Photo No. 22
Intake Structure



Photo No. 23
Outflow Pipe



Photo No. 24
Inlet Pipe



Photo No. 25
Inlet Channel to South Pond



Photo No. 26
Discharge from Inlet Channel into South Pond



Photo No. 27
Tecumseh Creek at Downstream Toe of Slope - Northwest Corner of Area 1 Pond

\\cle\common\Projects\41938_Westar-CCR Compliance\008-TEC Stability Assessments\Dam Assessment\20151007\2015-1206-Appendix A-Photos-TEC-d1.docx

APPENDIX B

Inspection Forms

DAM SAFETY INSPECTION CHECKLIST

NAME OF DAM: <u>Area 1 Pond</u>	STATE ID #: <u>N/A</u>
REGISTERED: (YES/NO) <u>No</u>	NID ID #: <u>N/A</u>
STATE SIZE CLASSIFICATION: <u>Small</u>	STATE HAZARD CLASSIFICATION: <u>TBD</u>
	CHANGE IN HAZARD CLASSIFICATION REQUESTED?: (YES/NO) _____

DAM LOCATION INFORMATION

CITY/TOWN: <u>Tecumseh</u>	COUNTY/STATE: <u>Shawnee/Kansas</u>
DAM LOCATION: <u>5330 SE 2nd St. Tecumseh, Kansas</u> (street address if known)	ALTERNATE DAM NAME: <u>N/A</u>
USGS QUAD.: <u>Grantville, Kansas</u>	LAT.: <u>39°3.1' N</u> LONG.: <u>95°34.3' W</u>
DRAINAGE BASIN: <u>N/A</u>	RIVER: <u>Kansas River</u>
IMPOUNDMENT NAME(S): <u>Area 1 Pond</u>	

GENERAL DAM INFORMATION

TYPE OF DAM: <u>Earthen Incised and Bermed</u>	OVERALL LENGTH (FT): <u>1300</u>
PURPOSE OF DAM: <u>Sedimentation and Storage Basin</u>	NORMAL POOL STORAGE (ACRE-FT): <u>20</u>
YEAR BUILT: <u>1968</u>	MAXIMUM POOL STORAGE (ACRE-FT): <u>20</u>
STRUCTURAL HEIGHT (FT) <u>39</u>	EL. NORMAL POOL (FT): <u>882±</u>
HYDRAULIC HEIGHT (FT): <u>2.75</u>	EL. MAXIMUM POOL (FT): <u>885.0</u>
RESERVOIR SURFACE AREA (ACRES): <u>2</u>	WINTER DRAWDOWN (FT BELOW NORMAL POOL) <u>0.0</u>
PUBLIC ROAD ON CREST: <u>No</u>	DRAWDOWN VOL. (AC-FT) <u>0.0</u>
PUBLIC BRIDGE OVER SPILLWAY: <u>No</u>	

NAME OF DAM: Area 1 Pond Dam STATE ID #: N/A

INSPECTION DATE: October 7, 2015 NID ID #: N/A

INSPECTION SUMMARY

DATE OF INSPECTION: October 7, 2015 DATE OF PREVIOUS INSPECTION: October 26, 2010

TEMPERATURE/WEATHER: Sunny, 74 ARMY CORPS PHASE I: No
(YES/NO) If YES, date _____

CONSULTANT: Haley & Aldrich, Inc. PREVIOUS ALT. PHASE I: No
(YES/NO) If YES, date _____

BENCHMARK/DATUM: NGVD29

OVERALL PHYSICAL CONDITION OF DAM: _____ DATE OF LAST REHABILITATION: N/A

SPILLWAY CAPACITY: _____

EL. POOL DURING INSP.: 882.25 EL. TAILWATER DURING INSP.: _____

PERSONS PRESENT AT INSPECTION

<u>NAME</u>	<u>TITLE/POSITION</u>	<u>REPRESENTING</u>
<u>Mark Brownstein</u>	<u>Senior Engineer</u>	<u>Haley & Aldrich, Inc</u>
<u>Andy Lucas</u>	<u>Staff Engineer</u>	<u>Haley & Aldrich, Inc</u>
<u>Brandon Griffin</u>	_____	<u>Westar Energy</u>
<u>Jared Morrison (part-time)</u>	_____	<u>Westar Energy</u>
<u>Kelley Kelsey (part-time)</u>	_____	<u>Westar Energy</u>
<u>Sam Sunderraj (part-time)</u>	_____	<u>KDHE</u>

NAME OF DAM: <u>Area 1 Pond Dam</u>		STATE ID #: <u>N/A</u>	
INSPECTION DATE: <u>October 7, 2015</u>		NID ID #: <u>N/A</u>	
OWNER: ORGANIZATION	<u>Westar Energy - Jeffrey Energy C</u>	CARETAKER: ORGANIZATION	<u>Westar Energy - Jeffrey Energy Center</u>
NAME/TITLE	<u>Mr. Jared Morrison</u>	NAME/TITLE	<u>Mr. Jared Morrison</u>
STREET	<u>5330 SE 2nd St.</u>	STREET	<u>5330 SE 2nd St.</u>
TOWN, STATE, ZIP	<u>Tecumseh, Kansas 67357</u>	TOWN, STATE, ZIP	<u>Tecumseh, Kansas 67357</u>
PHONE	<u>785-575-8273</u>	PHONE	<u>785-575-8273</u>
EMERGENCY PH. #	<u>785-231-9577</u>	EMERGENCY PH. #	<u>785-231-9577</u>
FAX		FAX	
EMAIL	<u>Jared.Morrison@westarenergy</u>	EMAIL	<u>Jared.Morrison@westarenergy.com</u>
OWNER TYPE	<u>Private</u>		
PRIMARY SPILLWAY TYPE <u>Decant structure</u>			
SPILLWAY LENGTH (FT) <u>N/A</u>		SPILLWAY CAPACITY (CFS) <u>N/A</u>	
AUXILIARY SPILLWAY TYPE <u>N/A</u>		AUX. SPILLWAY CAPACITY (CFS) <u>N/A</u>	
NUMBER OF OUTLETS <u>One</u>		OUTLET(S) CAPACITY (CFS) <u>Unknown</u>	
TYPE OF OUTLETS <u>24" dia. Steel pipe</u>		TOTAL DISCHARGE CAPACITY (CFS) <u>Unknown</u>	
DRAINAGE AREA (SQ MI) _____		SPILLWAY DESIGN FLOOD (PERIOD/CFS) <u>Unkown</u>	
HAS DAM BEEN BREACHED OR OVERTOPPED? (YES/NO): <u>No</u>		IF YES, PROVIDE DATE(S) _____	
FISH LADDER (LIST TYPE IF PRESENT) <u>Unkown</u>			
DOES CREST SUPPORT PUBLIC ROAD? (YES/NO) <u>No</u>		IF YES, ROAD NAME: _____	
PUBLIC BRIDGE WITHIN 50' OF DAM? (YES/NO): <u>No</u>		IF YES, ROAD/BRIDGE NAME: _____ MHD BRIDGE NO. (IF APPLICABLE) _____	

NAME OF DAM: Area 1 Pond

STATE ID #: N/A

INSPECTION DATE: October 7, 2015

NID ID #: N/A

EMBANKMENT (U/S SLOPE)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
U/S SLOPE	1. SLIDE, SLOUGH, SCARP	None	X		
	2. SLOPE PROTECTION TYPE AND COND.	No slope protection	X		
	3. SINKHOLE/ANIMAL BURROWS	None	X		
	4. EMB.-ABUTMENT CONTACT	N/A	X		
	5. EROSION	Some minor erosion on upstream slope		X	
	6. UNUSUAL MOVEMENT	None	X		
	7. VEGETATION (PRESENCE/CONDITION)	Generally unvegetated. Some limited areas where vegetation is taller than 6 in.			

ADDITIONAL COMMENTS: _____

NAME OF DAM: Area 1 Pond

STATE ID #: N/A

INSPECTION DATE: October 7, 2015

NID ID #: N/A

EMBANKMENT (CREST)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
CREST	1. SURFACE TYPE	Gravel/Sand	X		
	2. SURFACE CRACKING	None	X		
	3. SINKHOLES, ANIMAL BURROWS	Multiple 2-in. dia. burrows and one 3-in. borrow on D/S edge of N and W crests			X
	4. VERTICAL ALIGNMENT (DEPRESSIONS)	Low spot at SW corner of south pond			X
	5. HORIZONTAL ALIGNMENT	OK	X		
	6. RUTS AND/OR PUDDLES	Very minor	X		
	7. VEGETATION (PRESENCE/CONDITION)	Nothing of note (generally less than 6 inches in height)	X		
	8. ABUTMENT CONTACT	N/A			

ADDITIONAL COMMENTS: Two dead moles on crest

NAME OF DAM: Area 1 Pond

STATE ID #: N/A

INSPECTION DATE: October 7, 2015

NID ID #: N/A

EMBANKMENT (D/S SLOPE)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
D/S SLOPE	1. WET AREAS (NO FLOW)	None	X		
	2. SEEPAGE	None	X		
	3. SLIDE, SLOUGH, SCARP	5' x 5' slough on S D/S slope caused erosion in bottom of unlined drainage ditch			X
	4. EMB.-ABUTMENT CONTACT	N/A	X		
	5. SINKHOLE/ANIMAL BURROWS	Multiple small (2-in. dia.) burrows on north, west and south downstream slopes.			X
	6. EROSION	Rutting on SE corner & along creek. Erosion in tracks at bottom of W embankment		X	
	7. UNUSUAL MOVEMENT	None	X		
	8. VEGETATION (PRESENCE/CONDITION)	Dead patches on S and W D/S slopes. Some patches of grass up to 18 inches high.			X
					X

ADDITIONAL COMMENTS: Black wire exposed at ground surface adjacent to drainage ditch at slough on south downstream slope

NAME OF DAM: Area 1 Pond

STATE ID #: N/A

INSPECTION DATE: October 7, 2015

NID ID #: N/A

PRIMARY SPILLWAY

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
SPILLWAY	SPILLWAY TYPE	Decant structure	X		
	WEIR TYPE	Concrete stoplogs	X		
	SPILLWAY CONDITION	Fair	X		
	TRAINING WALLS	None present	X		
	SPILLWAY CONTROLS AND CONDITION	None present	X		
	UNUSUAL MOVEMENT	None present	X		
	APPROACH AREA	Fair	X		
	DISCHARGE AREA	Fair	X		
	DEBRIS	None present	X		
	WATER LEVEL AT TIME OF INSPECTION	882.25	X		

ADDITIONAL COMMENTS: _____

NAME OF DAM: Area 1 Pond

STATE ID #: N/A

INSPECTION DATE: October 7, 2015

NID ID #: N/A

OUTLET WORKS

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
OUTLET WORKS	TYPE	Concrete Box Intake Structure with Steel Outflow Pipe			
	INTAKE STRUCTURE	Concrete Box Intake Structure	X		
	TRASHRACK	None	X		
	PRIMARY CLOSURE	Gate	X		
	SECONDARY CLOSURE	None	X		
	CONDUIT	Steel pipe lined with pushed-in plastic pipe liner	X		
	OUTLET STRUCTURE/HEADWALL	Discharges directly into Area 2 Pond	X		
	EROSION ALONG TOE OF DAM	None	X		
	SEEPAGE/LEAKAGE	None	X		
	DEBRIS/BLOCKAGE	None	X		
	UNUSUAL MOVEMENT	None	X		
	DOWNSTREAM AREA	Discharges directly into Area 2 Pond	X		
MISCELLANEOUS					

ADDITIONAL COMMENTS: _____

NAME OF DAM: Area 1 Pond

STATE ID #: N/A

INSPECTION DATE: October 7, 2015

NID ID #: N/A

DOWNSTREAM AREA

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
D/S AREA	1. ABUTMENT LEAKAGE	N/A	X		
	2. FOUNDATION SEEPAGE	None observed. See comments below.		X	
	3. SLIDE, SLOUGH, SCARP	None observed. See comments below.		X	
	4. WEIRS	N/A	X		
	5. DRAINAGE SYSTEM	N/A	X		
	6. INSTRUMENTATION	N/A	X		
	7. VEGETATION	See comments below.		X	
	8. ACCESSIBILITY	See comments below.	X		
9. DOWNSTREAM HAZARD DESCRIPTION	Downstream hazard is low. No occupied structures, only Bottom Ash Pond and Lake.				
10. DATE OF LAST EAP UPDATE					

ADDITIONAL COMMENTS: Downstream area - North berm - Area immediately transitions to slope up to Area 2 Pond
Downstream area - West berm - Area heavily vegetated with trees between toe of slope and Tecumseh Creek. Ground surface not visible.
Downstream area - South berm - Area consists of SE 2nd Street

NAME OF DAM: Area 1 Pond

STATE ID #: N/A

INSPECTION DATE: October 7, 2015

NID ID #: N/A

INSTRUMENTATION

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
INSTR.	1. PIEZOMETERS	Piezometers observed along dam crest and downstream	X		
	2. OBSERVATION WELLS	None present	X		
	3. STAFF GAGE AND RECORDER	None present	X		
	4. WEIRS	None present	X		
	5. INCLINOMETERS	None present	X		
	6. SURVEY MONUMENTS	None present	X		
	7. DRAINS	None present	X		
	8. FREQUENCY OF READINGS	No measurements are taken	X		
	9. LOCATION OF READINGS	N/A	X		

ADDITIONAL COMMENTS: _____

NAME OF DAM: Area 1 Pond

STATE ID #: N/A

INSPECTION DATE: October 7, 2015

NID ID #: N/A

UNDERLYING HYDRAULIC STRUCTURES/PIPES

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
UNDERLYING HYDRAULIC STRUCTURES /PIPES	TYPE	24" dia. Steel pipe	X		
	INLET				
	CONDUIT				
	OUTLET STRUCTURE/HEADWALL	Fair	X		
	EROSION ALONG STRUCTURE	None present	X		
	SEEPAGE/LEAKAGE	None present	X		
	DEBRIS/BLOCKAGE	None present	X		
	UNUSUAL MOVEMENT				
	DOWNSTREAM AREA				
	MISCELLANEOUS				

ADDITIONAL COMMENTS: _____

Note: Use additional sheets for additional outlets.

APPENDIX C

References

References

1. Golder Associates, "Evaluation of Ash Pond Berm Stability, Westar Energy, Tecumseh Energy Center," dated December 23, 2009.
2. AMEC, "Report on Dam Safety Assessment of Coal Combustion Surface Impoundments, Westar Energy, Tecumseh Energy Center, Tecumseh, KS," dated May 2011.
3. Burns & McDonnell Engineering Company, Inc., "Figure 2 – Site Plan, Tecumseh Energy Center, Tecumseh, Kansas," dated 2011.