SCS ENGINEERS

January 27, 2017 File No. 25211357.33

Mr. Jeff Harter Plant Leader-Environmental Indianapolis Power & Light Petersburg Generating Station 6925 N. State Road 57 Petersburg, IN 47567

Subject:

Dike Inspection - Petersburg Generating Station Ash Pond Facilities

2016-1, August 23, 2016

Dear Mr. Harter:

SCS Engineers (SCS) is pleased to submit this dike and basin inspection report for the Indianapolis Power & Light (IPL) Petersburg Generating Station Ash Pond Facilities. Mr. David M. Hendron, PE, has prepared this report. The report presents a Summary of Visual Observations, and Conclusions and Recommendations. Mr. Hendron performed the inspection on August 23, 2016. Mr. Hendron made a presentation summarizing the findings and recommendations contained in this report to Mr. Erwin Leidolf at the conclusion of the inspection.

Following the inspection, Mr. Hendron completed the IPL Dike Field Review Checklist. The completed form is given in **Attachment A** to this report. During the inspection, Mr. Hendron documented conditions observed by the photographs shown in **Attachment B** to this report.

The general layout of the ash ponds at the Petersburg Generating Station is shown on **Figure 1**. At the time of the inspection, IPL was using Pond A and Pond A Discharge for processing bottom ash materials from plant operations. IPL went to dry ash processing in the recent past and will use Pond A and Pond C for bottom ash processing only in the future.

SUMMARY OF VISUAL OBSERVATIONS

There was seepage noted in the northeast corner of Pond C during the inspection. The nature and extent of the seepage was visibly decreased from previous inspections as a result of the cessation of dredging activities and the significant reduction of water levels in Pond C prior to this inspection. There were no observations of discoloration of seepage fluid and loss of fine materials as a result of seepage during this inspection in the northeast corner of Pond C. Close observation of the nature and extent of seepage and any indications of movement is continued to be recommended for this area. If changes are observed in either condition, it is recommended that IPL notify Mr. Hendron immediately.

Mr. Jeff Harter January 27, 2017 Page 2

Mr. Erwin Leidolf, Environmental Coordinator, was a facility contact for the inspection. Mr. Leidolf accompanied Mr. Hendron during the inspection. Weather conditions during the inspection were clear and warm.

One item was observed during this (16-1) inspection that requires continued attention on the part of IPL. It is as follows:

1. There were continuing visual signs of seepage occurring in the northeast corner of Pond C. The amount of seepage appeared to be somewhat less than amounts observed during previous uses of Pond C. We recommend close observation of the toe of the upper lift of Pond C be continued and that any changes to the nature and extent of seepage or movement of materials be identified to Mr. Hendron immediately.

SUMMARY OF OBSERVATIONS OF THE ASH PONDS

1. General - Operational Status of the Ash Ponds

- a. The only sluicing being done is going to Pond A. Material sluiced to Pond A is being excavated along a perimeter ditch and is being used to construct the cover for Pond B.
- b. The south portion of Pond A has been redesignated as Pond D and is being used for construction of the new waste water treatment plant. This area is not included in the scope of this inspection.
- c. Future use of Pond C will be to process wet bottom ash, excavated flyash, and FGD slurry materials from Pond A. This will extend until at least September 2018. At that time, Pond C will be closed in the same general manner that Pond B was closed.

2. Pond A

- a. No significant problems observed during the inspection.
- b. Pond A had limited capacity at the time of this inspection.
- c. There was sluicing of bottom ash, fly ash, and scrubber sludge going on into Pond A at the time of the inspection. This sluicing is scheduled to continue until the fall of 2018 at the present time.
- d. There has been an emergency spillway constructed in the intermediate dike between Pond A and Pond A'. The spillway was recommended and designed by CH2MHill. The spillway was constructed and operational at the time of this inspection. SCS requested copies of the design drawings for this facility.

3. Pond A (Discharge)

- a. No significant problems observed during the inspection.
- b. Discharge pipe from Pond A Discharge to Lick Creek was visible at the time of this inspection. Rip-rap on the downstream slope of Pond A Discharge dike appeared stable. The exposed end of the discharge pipe looked in good condition.

c. CH2MHill also recommended and designed an emergency spillway on top of the downstream dike for Pond A'. The spillway was constructed and operational at the time of this inspection. SCS requested the design drawings for this spillway.

4. Pond C

- a. Pond C will still be used for processing ash slurry materials generated from the excavation activities in Pond A.
- b. The fluid level in Pond C was about 8 feet below the top of the upper dike at the time of the inspection. This is expected to continue because there will be no further slurrying activity into Pond C from Pond A.
- c. There was seepage noted along the toe of the upper dike of Pond C especially in the west and northeast corner areas of the pond.
- d. Mr. Hendron did not observe the movement of fine materials from any seepage occurring in the west and the northeast portions of the top dike of Pond C.
- e. Recent mowing activity has done significant damage to the exterior slope on the upper dike for Pond C along the west and northeast dike areas. This damage should be repaired to avoid erosion during future heavy rainfalls and from residual seepage of fluids from Pond C.

5. General Observations

- a. Overall, the slopes of the ash ponds inspected look to be in satisfactory condition.
- b. IPL has constructed two emergency spillways as identified earlier in these notes. SCS has requested the design drawings for these spillways. SCS has not reviewed the underlying documents for these facilities but understands that they have been designed and sealed by a registered Indiana professional engineer from CH2MHill.

CONCLUSIONS AND RECOMMENDATIONS

Based on the visual inspection, the dikes that form Ponds A and C appeared to be in satisfactory condition.

Pond A

1. We have no recommendations for Pond A.

Pond C

1. We recommend that daily inspections of the perimeter dike of Pond C be accomplished until the water accumulation from the last dredging of Pond A is eliminated and the visual signs of seepage and loss of any fine material are also eliminated. If any visual changes in the seepage or movement of materials are detected, we recommend that IPL call Mr. Hendron immediately to discuss in detail.

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SCS appreciates the opportunity to perform this inspection and looks forward to assisting IPL in future inspection of their ash disposal facilities. If you have any questions with regard to this report, please do not hesitate to contact me at (312) 286-9397.

Sincerely yours,

David M. Hendron, PE Indiana PE 10000050 SCS ENGINEERS

DH/lmh

Enclosures: Figure 1 – Site Location Showing Basin Configuration

Attachment A - IPL Dike Field Review Checklist Form

Attachment B - Photographs

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FIGURE 1

Site Location Showing Basin Configuration

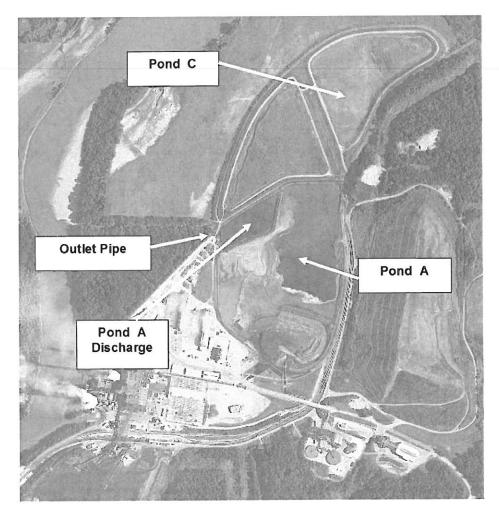


Figure 1. Site Location Showing Basin Configuration

ATTACHMENT A

IPL Dike Field Review Checklist Form

<u>Attachment A - IPL Dike Field Review Checklist – 16-1 Inspection Report</u> <u>Petersburg Station</u>

1)	Complete all Portions of this Section (Pre-review) Date of Review: August 23, 2016
	Name of Dike: Ash Ponds A, C, and Pond A Discharge Project Number #25211357.3
2)	Review Inventory – Highlight missing information (Pre-review)
	Owner(s) Name(s): Indianapolis Power & Light Company (IPL)
	Address: 6925 N. State Rd 57
	City: Petersburg State: Indiana Zip (+4) 47467
	Telephone (Home): Telephone (Work): 812-354-7224
	Contact Person: Erwin Leidolf
	Designed By: IPL
	Constructed By:
	Year Completed: Various Plans Available (Yes, No) (Location): Partial
	Purpose of Dike: Ash slurry processing
	I UIDOSE OI DING. ASII SIUITY PIOOCOONING

3) General Information

Age of Dike: Various

Mowing (times per year): Once or Twice during dry times

Prior problems (wet areas, erosion, slides): See prior inspection reports. Pond A and Pond A discharge were the ponds being used for ash processing at the time of the inspection. Dredging of materials to Pond C had been completed and water levels in Pond C significantly below max levels.

Repair or modification (what & when):

Failure/Incident/Breach (max. pool): None

Downstream hazard status (recent changes): None

Dike Embankment Material: <u>Upper lift of Basin C – pozotec material.</u> <u>Lower lift of Ponds A and C – compacted natural soil materials – based on results of borings completed in 2011.</u>

Slope Erosion Control: No problems observed during this inspection.

4) Field Information (while at site)

Pool Elevation (during review): Pond A and Pond A Discharge were essentially full at the time of the inspection, and there was discharge into Lick Creek.

Site Conditions (temp., weather, ground moisture): Cool and clear.

Review Party: David M. Hendron and Erwin Leidolf

{General Information, Inside Slope, Crest, Outside Slope, Outlet/Inlet Structures, Pond Drain}

	Required Action
5) INSIDE SLOPE Gradient: Horizontal: 3.0 Vertical: 1.0 (est. m	None Monitor Maintenance Engineer
x VEGETATION [no problem] Trees: Quantity: (<5, sparse, dense) Diameter: (<6", 6-12", >12") Location: Notes:	
□ Brush: Quantity: (spare, dense) Location: Notes:	
Ground Cover: Type: (grass, crown vetch) Other:Quantity: (bare, sparse, adequate, dense)Appearance: (too tall, too short, good)Notes:	
x□ SLOPE PROTECTION [no problem] □ None □ Riprap: Average Diameter:	no)
□ Wave Berm:	
□ Other: Notes: x□ EROSION [no problem, could not inspect thoroughly] □ Wave Erosion (beaching): Scarp: Length: Height: Location: Notes:	
Runoff Erosion (Gullies): Quantity: Depth: Width: Length: Location: Notes/Causes:	
x□ INSTABILITIES [no problem, could not inspect thoroughly] □ Slides: Transverse Length: Longitudinal Length: Scarp: Width: Length: Location: Crack: Width: Depth: Notes/Causes	
□ Cracks: □ Transverse □ Longitudinal □ Other Quantity: Length: Width: Depth: Location:_ Notes/Causes:	
{Inside Slope, Crest, Outside Slope, Outlet/Inlet Structures, Pond Dr	None Monitor Maintenance Engineer

		Required Action
	☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other Quantity: Length: Width: Depth:	None Monitor Maintenance Engineer
	Location:Notes/Causes:	
	□ Bulges □ Depressions □ Hummocky Size: Height: Depth: Location: Notes/Causes:	0000
	□ Bulges □ Depressions □ Hummocky Size: Height: Depth: Location: Notes/Causes:	
	□ OTHER [no problem could not inspect thoroughly] x□ Rodent Burrows: (few, numerous) None observed Location: Notes/Causes:	
6)	x□ Other: None observed CREST Length: Width: (est. meas.)	
	x VEGETATION [no problem] Trees: Quantity: (<5, sparse, dense) Diameter: (<6", 6-12", >12") Location: Notes: Brush: Quantity: (spare, dense) Location: Notes:	
	Ground Cover: Type: (grass, crown vetch) Other:Quantity: (bare, sparse, adequate, dense)Appearance: (too tall, too short, good)Notes:	
	x EROSION [no problem] Runoff Erosion (Gullies): Quantity: Depth: Width: Length: Location: Notes:	
	{Inside Slope, Crest, Outside Slope, Outlet/Inlet Structures, Pond Drain}	

None
Monitor
Maintenance
Engineer

		Required Action පු
	x□ WIDTH [no problem]	None Monitor Maintenance Engineer
	□ Too Narrow Location: Notes/Causes:	
	x INSTABILITIES [no problem] Cracks: Transverse Longitudinal Other Quantity: Length: Width: Depth: Location: Notes/Causes:	
	□ Cracks: □ Transverse □ Longitudinal □ Other Quantity: Length: Width: Depth: Location: Notes/Causes:	
	Bulges: Depressions Hummocky Size: Height: Depth: Location: Notes/Causes: x OTHER [no problem] Rodent Burrows: (few, numerous) Location: Notes:	0000
7)	Other:Notes:	0000
.,	x VEGETATION [no problem] □ Trees: Quantity: (<5, sparse, dense) Diameter: (<6", 6-12", >12")	
	□ Brush: Quantity: (spare, dense) Location: Notes: x□ Ground Cover: Type: (grass, crown vetch) Mowing of slopes was completed just prior to the inspection. No damage to the slopes from the mowing operations. Quantity: (bare, sparse, adequate, dense) Appearance: (too tall, too short, good Notes:	X
	{Inside Slope, Crest, Outside Slope, Outlet/Inlet Structures, Pond Drain}	- X
4		None Nonitor Wedintenance Designeer

	Required Action ဦ
x□ EROSION [no problem]	None Monitor Maintenance Engineer
□ Runoff Erosion (Gullies): Quantity: Depth: Width: Length:	
x INSTABILITIES [no problem] Slides: Transverse Length:Longitudinal Length: Scarp: Width: Length: Location: Crack: Width: Length: Notes/Causes:	
□ Cracks: □ Transverse □ Longitudinal □ Other Quantity: Length: Width: Depth: Location: Notes/Causes:	
□ Cracks: □ Transverse □ Longitudinal □ Other Quantity: Length: Width: Depth: Location: Notes/Causes:	
□ Bulges: □ Depressions □ Hummocky Size: □ Height: □ Depth: □ Location: Seepage noted on the northeast corner of Pond C. No discoloration noted in the seepage. Notes/Causes: Water levels in Pond C were significantly reduced below maximum levels. Monitoring of the nature and extent of the seepage and movements	
in the area of seepage are recommended. If changes occur, it is recommended that IPL notify Mr. Hendron immediately. x□ OTHER [no problem x□ Rodent Burrows: (few, numerous) None observed Location:	- X
Notes: Other: Notes: Plant personnel should continue to specifically monitor the seepage activity at the toes of Pond C during the periodic inspections.	x -
Recommendations for response to the use of Pond C and to observations are given in previous sections of this report. x SEEPAGE [no problem] Wet Area Flow Boil Sinkhole Flow Rate Significant seepage noted on toe of upper lift of Pond C as described earlier in this report.	
x Aquatic Vegetation – Significant cattail growth continues on the eastern downstream slope of Pond C. Rust Colored Deposits None Sediment in Flow None Other: Notes/Causes:	X
{Inside Slope, Crest, Outside Slope, Outlet/Inlet Structures, Pond Drain}	ance

None
None
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Description

				ction	1
		None	Monitor	Maintenance	Engineer
	□ Wet Area □ Flow □ Boil □ Sinkhole Flow Rate □ Size: □ Location: □ None □ Aquatic Vegetation □ None □ Rust Colored Deposits □ None □ Sediment in Flow □ None □ Other: □ Notes/Causes: □				
8) OUTL	ET/INLET STRUCTURES				
x□ GE	□ Inlet Pipe Dimensions: (adequate, too small) Type: (steel, concrete, aluminum, stainless steel, corrugated metal wood, other): Location: Deterioration: (missing sections, rusted, collapsed)				
	In Use: (Yes, No) Pond Erosion at Inlet: (Describe)				
	□ Other				
x□ OU	JTLET STRUCTURES [no problem] □ Number of Outlet Structures: One				
Discharge.	□ Description/Location of Outlet Structures: In the northwest portion of Pond A -				
Recommen	x□ Outlet Structure 1: Type: (steel, concrete, aluminum, stainless steel, corrugated metal wood, other): ided repairs in previous report completed and continue to operate satisfactorily. Deterioration:(missing section, collapsed, rusted Erosion at Outlet Structure: (soil piping, seep collar, etc.) Debris: (leaves, trash, logs, ice, etc.)				
	Notes:				

{Inside Slope, Crest, Outside Slope, Outlet/Inlet Structures, Pond Drain}

Monitor Maintenance Engineer

Maintenance □ Outlet Structure 2 Type: (steel, concrete, aluminum, stainless steel, corrugated metal wood, other):_____ Deterioration:(missing section, collapsed, rusted): Erosion at Outlet Structure: (soil piping, seep collar, etc.) Debris: (leaves, trash, logs, ice, etc.) Notes: □ Outlet Structure 3 Dimensions: Type: (steel, concrete, aluminum, stainless steel, corrugated metal wood, other):_____ Deterioration:(missing section, collapsed, rusted):_____ Erosion at Outlet Structure: (soil piping, seep collar, etc.) Debris: (leaves, trash, logs, ice, etc.) Notes: **POND DRAIN** 9) **X** GENERAL □ None Found □ Does not have one □ Type of Pond Drain (isolated control/intake tower, valve vault w/outlet conduit, valve in riser/drop inlet, siphon) Notes: x□ Operated During Inspection (yes, no) x□ ACCESS TO VALVE/SLUICE GATE [no problem] □ Type (not accessible, from shore, boat, walkway, other)_____ Notes: □ Walkway/Platform:___ □ Concrete Deterioration □ Cracks (platform, piers, end supports, railing) Notes: {Inside Slope, Crest, Outside Slope, Outlet/Inlet Structures, Pond Drain}

None
None
Monitor
Maintenance
Description

Required Required Action

			tion	1
	None	Monitor	Maintenance	Engineer
□ Wood Deterioration Notes:	_			
□ Metal Deterioration (minor, moderate, extensive, other) Notes:	_ _ _			
POND DRAIN COMPONENTS [no problem] Concrete Structure Locations: Description: (deterioration, misalignment, cracks):				
Notes/Causes:	_			
 □ Valve Control (Operating Device) □ No Operating Device □ No Stem □ Bent/Broken Stem □ Other Notes/Operability: 	_			
□ Metal Deterioration: (surface rust, minor, moderate, extensive, other) Location: Flow Rate: Notes/Causes:				
□ Mis-alignment Notes/Causes:				
□ Leakage – Flow Rate: Notes/Causes:	_ _			
□ Outlet Conduit □ Metal: (loss of coating/paint, surface rust, corrosion (pitting, scaling), rusted out) Location: Notes/Causes:				
□ Concrete (bug holes, hairline crack, efflorescence) (spalling, popouts, honeycombing, scaling, craze/map cracks) (isolated crack, exposed rebar, disintegration, other) Dimensions/Location: Notes/Causes:				
□ Plastic: (deterioration, cracking) Location: Notes/Causes:] [
		a	D	

None
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Pengineer

		quire ction	n
	None Monitor	Maintenance	Engineer
□ Conduit Deformation □ Mis-Alignment: Location:			
Notes/Causes:	-		
□ Separated Joint □ Loss of Joint Material Location/Description: Notes/Causes:	- -		
□ Undermining Location/Description: Notes/Causes:			
□ Vegetation (trees, brush) Notes:	-		
□ Other Notes:	- -		
Discharge Outlet Type (pipe outlet, concrete channel, rock-lined channel, none) Notes:	-		
□ Riprap: Average Diameter: (adequate, sparse, displaced, weathered, vegetation) bedding/fabric noted – yes, no)) Notes:	- 		
□ Concrete (bug holes, hairline crack, efflorescence) (spalling, popouts, honeycombing, scaling, craze/map cracks) (isolated crack, exposed rebar, disintegration, other) Dimensions/Location: Notes/Causes:	- - -		
□ Mis-alignment Location/Description: Notes/Causes:			
□ Separated Joint □ Loss of Joint Material Location/Description: Notes/Causes:	- -		
□ Undermining Location/Description: Notes/Causes:			
□ Other Notes:	None Manifor	Maintenance	Engineer
{Inside Slope, Crest, Outside Slope, Outlet/Inlet Structures, Pond Drain }	R	equir Actio	red

ATTACHMENT B

Photographs



Photo 1: Pond A Discharge, looking southeast from northwest corner.



Photo 2: Same as Photo 1, looking south.



Photo 3: West Perimeter Dike of Pond A Discharge.



Photo 4: Downstream slope of Pond A Discharge, looking south.



Photo 5: West Upper Perimeter Dike of Pond C, looking north from center of Pond C. Note seepage on roadway. No signs of fine material present.



Photo 6: Typical condition of downstream slope of Upper Perimeter Dike of Pond C at the time of the inspection.

Looking south. Recently mowed.



Photo 7: Same as Photo 6, looking south.



Photo 8: Same as Photo 7 taken in the northeast corner of Pond C, looking southwest. Note seepage along the toe of the slope. No fine materials observed. Water levels in Pond C had been significantly reduced below maximum levels.



Photo 9: Typical conditions along the eastern perimeter slope of Pond C. No significant seepage noted.



Photo 10: Same as Photo 9 further south along the perimeter dike.



Photo 11: Roadway along the northern boundary of Pond A adjacent to the upper dike of Pond B.

No seepage noted. Looking west from the northeast corner of Pond A.



Photo 12: Same as Photo 11, looking east from center of Pond A.



Photo 13: Same as Photo 12, looking west from center of Pond A.



Photo 14: Pond A, looking east from center of the north perimeter of Pond A.



Photo 15: Same as Photo 14, looking southeast.



Photo 16: Water treatment facilities along the north perimeter road of Pond A.

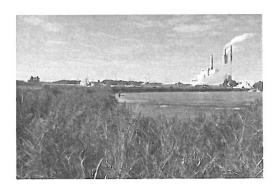


Photo 17: Pond A Discharge, looking south from the northeast corner of Pond A Discharge.



Photo 18: Same as Photo 17, looking southwest.

Annual Inspection - Elevation	Inspection - IPL Petersburg Surface Impoundment Elevations, Capacity and Volume	g Surface Impo and Volume	oundment
Parameters	S	Surface Impoundment	ent
	Pond A	Pond A Prime	Pond C
Minimum Depth/Elevation	418	418	418
Maximum Depth/Elevation	437	437	453
Present Depth/Elevation	434	432	451
Storage Capacity (acre-ft)	1190	113	775
Approximate Volume Water (acre-ft)	287.5	34.5	Dry
Approximate Volume CCR (acre-ft)	2967	93	700