

SCS ENGINEERS

February 17, 2016
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
2015-2, November 12, 2015

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 November 12, 2015. 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. IPL had completed excavation of about 100,000 cubic yards of ash from Pond C at the time of the inspection and had completed dredging of materials from Pond A at the time of this inspection.

There was seepage noted in the northeast corner of Pond C during the inspection. The nature and extent of the seepage was visibly increased from previous inspections as a result of the dredging activities completed prior to this inspection. There were 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 recommended for this area. If changes are observed in either condition, it is recommended that IPL notify Mr. Hendron immediately.



All future ash processing activities associated with dredging of ash materials from Pond A will be done in Pond C. IPL will restrict ash processing activities in Pond C, to the southern half of Pond C, to provide additional flow length for seepage in the northeast corner of Pond C where the maximum seepage volumes have been observed in past inspections.

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 cool.

SUMMARY OF VISUAL OBSERVATIONS

Since the last inspection on April 22, 2015, IPL recently completed excavation of materials from Pond C and dredging ash materials from Pond A into Pond C.

One item was observed during this (15-2) inspection that requires 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 greater than amounts observed during previous uses of Pond C. Additionally, there was substantial evidence of discoloration of the seepage fluids caused by the presence of fine material observed in the seepage occurring in this area of Pond C at the time of the inspection. We recommend close observation be continued to observe any changes to the nature and extent of seepage or movement of materials. IPL should notify Mr. Hendron immediately if changes are observed.

Operational Status of the Ash Ponds

1. Prior to making the site inspections, there was a discussion of the present and projected future status on the use of ash ponds at the Petersburg Station.
2. Future use of Pond C will be to process wet bottom ash and FGD slurry materials. This will extend until at least September 2017 and then cease depending on the results of analyses being performed by IPL to determine future processing methods for these two materials. If new methods are selected, Pond C closure will be implemented in accordance with regulatory agreements.

Pond A

1. No significant problems were observed during the inspection.
2. Pond A dredging was completed about two weeks prior to the time of the inspection.
3. There will be no further ash sluicing into Pond A except for bottom ash.

Pond A (Discharge)

1. No significant problems were observed during the inspection.
2. 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 appeared to be in good condition.

Pond C

1. Pond C will still be used for processing ash slurry materials generated from the dredging activities in Pond A. In the future, the only ash materials that will be slurred to Pond A will be bottom ash, so the use of Pond C will be required on a significantly less-frequent basis.
2. IPL had completed the excavation of about 100,000 cubic yards of ash from Pond C.
3. There was seepage noted along the toe of the upper dike of Pond C, especially in the northeast corner of the pond. The water level in Pond C was relatively low since the completion of dredging activity.
4. Mr. Hendron did not observe the movement of fine materials from seepage occurring in the west and the northeast portions of the top dike of Pond C.

General Observations

1. There is need to repair MW-5 as a result of this piezometer being damaged during recent construction activity in the area.
2. There is a need to visually monitor the perimeter dike of Pond C on a frequent basis and note any changes to the nature or the extent of the seepage that is occurring at the downstream toe of the upper dike of Pond C.
3. Overall, all of the slopes of the ash ponds inspected look to be in satisfactory condition.

CONCLUSIONS AND RECOMMENDATIONS

Based on the visual inspection, the dikes that form Pond A and Pond 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 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.

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/AV

Enclosures: Figure 1 – Site Location Showing Basin Configuration
Attachment A – IPL Dike Field Review Checklist Form
Attachment B – Photographs

FIGURE 1

Site Location Showing Basin Configuration

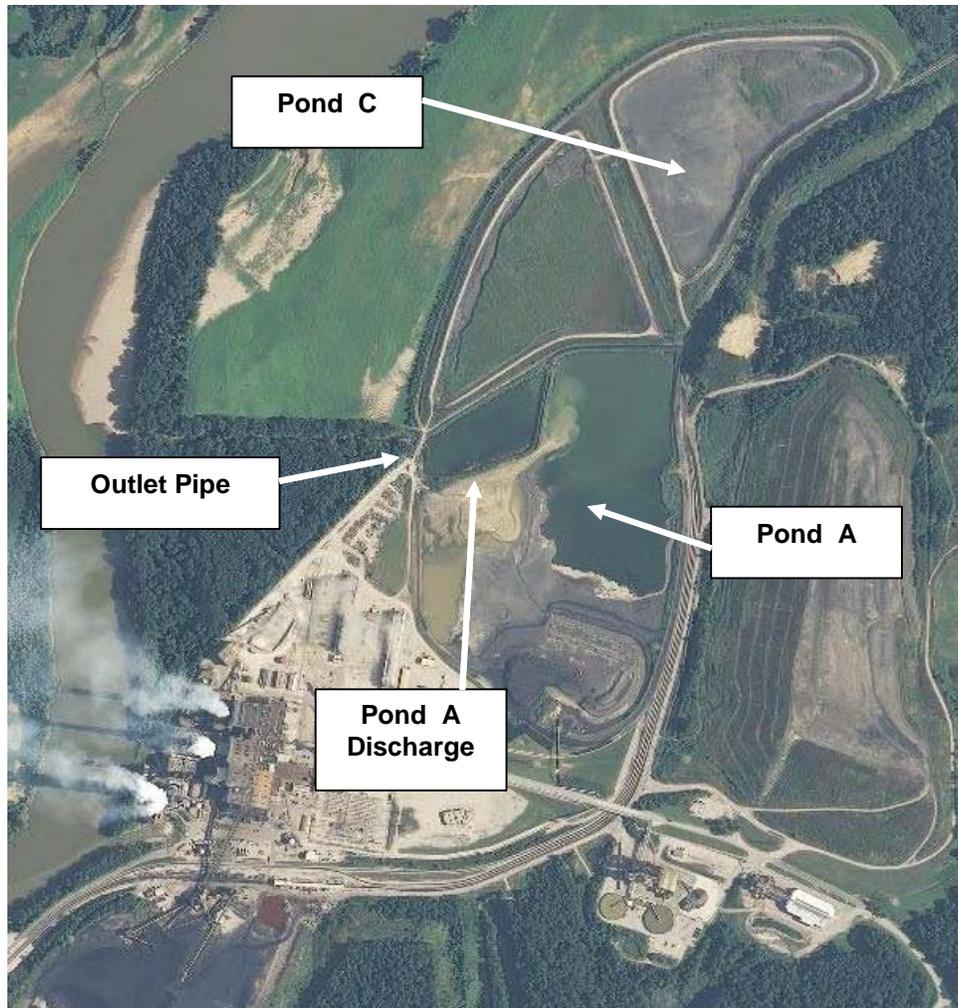


Figure 1. Site Location Showing Basin Configuration

ATTACHMENT A

IPL Dike Field Review Checklist Form

IPL Dike Field Review Checklist – 15-2 – Inspection Petersburg Station

- 1) Complete all Portions of this Section (Pre-review)
Date of Review: **November 12, 2015**
Name of Dike: **Ash Ponds A, A Discharge, and C** Project Number **25211357.33**
- 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**
Age of Dike: **Various**
- 3) General Information
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.**
Repair or modification (what & when): _____
Failure/Incident/Breach (max. pool): **None**
Downstream hazard status (recent changes): **None**
Dike Embankment Material: **Upper lift of Pond C – pozotec material. Lower lift of Pond A and Pond C – compacted natural soil materials – based on results of borings completed in 2011.**

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. Pond C excavation had been completed at the time of the inspection.**
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}

5) **INSIDE SLOPE** Gradient: Horizontal: **3.0** Vertical: **1.0** (est. meas.)

VEGETATION [no problem]

Trees: Quantity: (<5, sparse, dense) _____
Diameter: (<6", 6-12", >12") _____
Location: _____
Notes: _____

Brush: Quantity: (sparse, dense) _____
Location: _____
Notes: _____

Ground Cover: Type: (grass, crown vetch) Other: _____
Quantity: (bare, sparse, adequate, dense) _____
Appearance: (too tall, too short, good) _____
Notes: _____

SLOPE PROTECTION [no problem]

None
 Riprap: Average Diameter: _____
(adequate, sparse, displaced, weathered, vegetation) (bedding/fabric noted—yes, no)
Notes: _____

Wave Berm: _____
Vegetation: (adequate, bare, sparse, improper vegetation) _____
Notes: _____

Other:
Notes: _____

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: _____

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 Drain}

Cracks: Transverse Longitudinal Other
Quantity: _____ Length: _____ Width: _____ Depth: _____
Location: _____
Notes/Causes: _____

Bulges Depressions Hummocky
Size: _____ Height: _____ Depth: _____
Location: _____
Notes/Causes: _____

Bulges Depressions Hummocky
Size: _____ Height: _____ Depth: _____
Location: _____
Notes/Causes: _____

OTHER [no problem could not inspect thoroughly]
 Rodent Burrows: (few, numerous) **None observed**
Location: _____
Notes/Causes: _____

x

Other: **There was no FGD material being processed on Pond C at the time of the inspection. No instabilities observed.**

6) CREST Length: _____ Width: _____ (est. meas.)

VEGETATION [no problem]

Trees: Quantity: (<5, sparse, dense) _____
Diameter: (<6", 6-12", >12") _____
Location: _____
Notes: _____

Brush: Quantity: (sparse, dense) _____
Location: _____
Notes: _____

Ground Cover: Type: (grass, crown vetch) Other: _____
Quantity: (bare, sparse, adequate, dense) _____
Appearance: (too tall, too short, good) _____
Notes: _____

EROSION [no problem]

Runoff Erosion (Gullies): Quantity: _____ Depth: _____ Width: _____ Length: _____
Location: _____
Notes: _____

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

Required
Action
None
Monitor
Maintenance
Engineer

WIDTH [no problem]

- Too Narrow
Location: _____
Notes/Causes: _____

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: _____

OTHER [no problem]

- Rodent Burrows: (few, numerous) _____
Location: _____
Notes: _____
- Other: _____
Notes: _____

7) **OUTSIDE SLOPE** Gradient: Horizontal: **3.0** Vertical: **1.0** (est. meas.)

VEGETATION [no problem]

- Trees: Quantity: (<5, sparse, dense) _____
Diameter: (<6", 6-12", >12") _____
- Brush: Quantity: (sparse, dense) _____
Location: _____
Notes: _____

Ground Cover: Type: (grass, crown vetch) **Very lush vegetation on the outside slope of all of the perimeter dikes as a result of favorable growing season and mowing regime. Vegetation did not obscure the view of the downstream slope. Mowing will be completed when required and when slopes are dry to avoid rutting the slopes by mowing equipment.**

- Quantity: (bare, sparse, **adequate**, dense)
- Appearance: (too tall, too short, **good**)
- Notes: _____

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

None
Monitor
Maintenance
Engineer
Required
Action

EROSION [no problem]

Runoff Erosion (Gullies): Quantity: _____ Depth: _____ Width: _____ Length: _____

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. Some**

discoloration also noted in the seepage.

Notes/Causes: **The seepage is a result of the accumulation of water in Pond C during last dredging of material from Pond A. This dredging work had been completed at time of the inspection. 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.**

OTHER [no problem]

Rodent Burrows: (few, numerous) **None observed**

Location: _____

Notes: _____

Other: _____

Notes: **Plant personnel should continue to specifically monitor the seepage activity at the toe of Pond C during the periodic inspections.**

Recommendations for response to the use of Pond C and to observations are given in previous sections of this report.

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.

Aquatic Vegetation: **Significant cattail growth continues on downstream slopes of Pond C.**

Rust Colored Deposits None

Sediment in Flow None

Other: _____

Notes/Causes: _____

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

Required
Action
None
Monitor
Maintenance
Engineer

Wet Area Flow Boil Sinkhole
 Flow Rate _____ Size: _____
 Location: _____
 Aquatic Vegetation None
 Rust Colored Deposits None
 Sediment in Flow None
 Other: _____
 Notes/Causes: _____

8) OUTLET/INLET STRUCTURES

GENERAL INLET [no problem]

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 _____

OUTLET STRUCTURES [no problem]

Number of Outlet Structures: **One** _____
 Description/Location of Outlet Structures: **In the northwest portion of**

Pond A – Discharge.

Outlet Structure 1:
 Type: (steel, **concrete**, aluminum, stainless steel, corrugated metal wood, other):
Recommended 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}

None
Monitor
Maintenance
Engineer

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: _____

9) **POND DRAIN**

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: _____

Operated During Inspection (yes, **no**)

Notes: _____

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)

Location: _____

Notes: _____

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

Wood Deterioration
Notes: _____

Metal Deterioration (minor, moderate, extensive, other)
Notes: _____

x **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: _____

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

Required
Action

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
Monitor
Maintenance
Engineer

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

Required
Action

ATTACHMENT B

Photographs

**Petersburg Plant – Photos from 15-2 Inspection
2600 State Highway 57 North
SCS Engineers Project #25211357.33**



Photo 1: Downstream slope of Pond A, looking south.



Photo 2: Same as Photo 1, looking southwest.



Photo 3: Same as Photo 1, looking north.

**Petersburg Plant – Photos from 15-2 Inspection
2600 State Highway 57 North
SCS Engineers Project #25211357.33**



Photo 4: Looking southeast across Pond A.



Photo 5: Pond A, looking east.



Photo 6: Pond A, looking south.

**Petersburg Plant – Photos from 15-2 Inspection
2600 State Highway 57 North
SCS Engineers Project #25211357.33**



Photo 7: Discharge from Pond A into Lick Creek.



Photo 8: Pond A, looking southeast.



Photo 9: Pond A discharge into Lick Creek, looking southeast into the discharge pipe and rip-rap.

**Petersburg Plant – Photos from 15-2 Inspection
2600 State Highway 57 North
SCS Engineers Project #25211357.33**



Photo 10: Marker for Piezometer B-4.



Photo 11: West slope of Pond C, looking north. Note seepage on the intermediate roadway.



Photo 12: Same as photo 11.

**Petersburg Plant – Photos from 15-2 Inspection
2600 State Highway 57 North
SCS Engineers Project #25211357.33**



Photo 13: Same as Photo 12, looking southwest from the Northwest corner of Pond C.



Photo 14: Close up of seepage showing white discoloration.



Photo 15: Flow in the ditch along the East perimeter dike of Pond C.

**Petersburg Plant – Photos from 15-2 Inspection
2600 State Highway 57 North
SCS Engineers Project #25211357.33**



Photo 16: Same as photo 15.



Photo 17: Excavation of the perimeter ditch along the East perimeter dike of Pond C, looking south.



Photo 18: Pond C, looking north.

**Petersburg Plant – Photos from 15-2 Inspection
2600 State Highway 57 North
SCS Engineers Project #25211357.33**



Photo 19: Pond C, looking east.



Photo 20: Surface water collecting in Pond C.



Photo 21: Surface water collecting in Pond C, looking northeast.

**Petersburg Plant – Photos from 15-2 Inspection
2600 State Highway 57 North
SCS Engineers Project #25211357.33**



Photo 22: Pond C, looking east.



Photo 23: Pond C, looking south.



Photo 24: Pond C, looking southwest.

**Petersburg Plant – Photos from 15-2 Inspection
2600 State Highway 57 North
SCS Engineers Project #25211357.33**



Photo 25: Water level in the discharge box from Pond C.



Photo 26: Same as Photo 25.

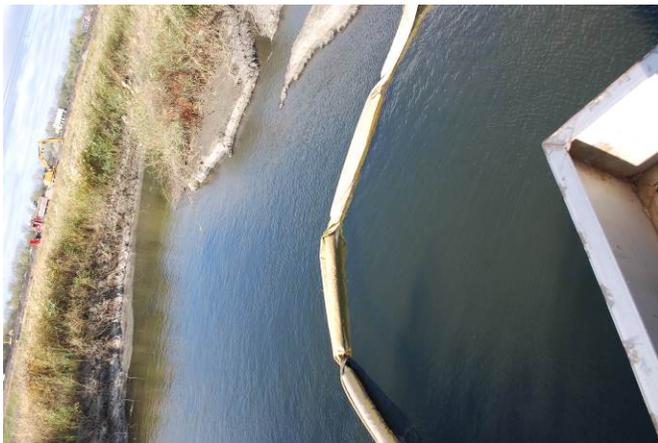


Photo 27: Same as Photo 25.

**Petersburg Plant – Photos from 15-2 Inspection
2600 State Highway 57 North
SCS Engineers Project #25211357.33**



Photo 28: Pond C, looking west from discharge box of Pond C.



Photo 29: Same, looking north.