

# VALDES

ENGINEERING COMPANY

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May 29, 2015

Mr. Chris Lux  
NRG – Waukegan Station  
401 East Greenwood Avenue  
Waukegan, Illinois 60087-5197

Re: Ash Pond Berm  
Visual Assessment  
Valdes Project Number 2015-033 BG04

Dear Mr. Lux:

On May 19, 2015 an engineer from Valdes Engineering Company (VEC) visited Waukegan Station to perform a visual assessment of the condition of the berm around the outside of the two bottom ash ponds. The assessment was performed both from the road around the perimeter of the ponds on top of the berm and from the toe of the berm on the east and south sides of the ponds.

Prior to the site visit in 2014 we performed a drawing search looking for underground utilities that may pass beneath the ash ponds. The records reviewed were mainly the NUS drawings of the original pond construction. No utilities were identified beneath the ponds.

The following is a description of the pond construction and a summary of our observations and our recommendations.

## **INTRODUCTION**

The ash ponds were constructed in the late 1970's as part of the waste water improvements required by the Clean Water Act. The ponds were created by building a berm, likely with on-site materials consisting of mainly sand and bottom ash. The slope of the berm is 2H to 1V. The ponds are lined with a waterproof membrane. The membrane is anchored in a trench at the top of the berm and covered with sand and crushed stone on the floor of the pond. A wetland area is located outside the berm on the south and east sides of the ash ponds. The elevation change from the top of the berm to the water level is about 20 feet. The ground west of the ponds is at the elevation of the top of the berm. The coal pile and coal handling areas of the power plant are located north of the ponds. The elevation change here is about 15 feet.

## **OVERVIEW**

Based on our observations the berm is in good condition. While fairly steep at 2:1 (per the original design drawings) they are very well vegetated. No significant erosion was noted during our walk around. A 2:1 slope is the approximate angle of repose for loose sand. Under ordinary circumstances the slope will be very stable.

We did not discover any conditions that threaten the short term integrity of the berm during our assessment.

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We are aware a new regulation has been issued governing the construction and operation of coal combustion residue storage facilities. We are not fully versed on the contents of the regulation. We understand the regulations include restrictions on the height of vegetation on the berms and bushes and trees are not acceptable. Our observations and recommendations take this into account.

We used a four foot length of #4 rebar to probe the soil of the berm. In places where tree roots were not present we were generally able to push the bar most of the way into the ground.

## **OBSERVATIONS**

### **South Berm:**

The slope of the south berm is well vegetated with trees, bushes and ground cover. Photos 1 and 2 were taken at the bottom of the berm. Photos 3 and 4 are at the top of the berm looking west and east respectively. Notice the amount of trees and bushes growing on the slope. This type of growth restricts access for inspection to some areas of the berm. Most of the larger trees are located in the east half of this berm. We estimate there are 30 trees with trunks six inches in diameter or larger and more than 50 smaller trees on this berm.

Most of the berm can be inspected from the toe of the berm looking up the slope under branches. There are a few areas that are obscuring by reeds in the ditch or thick brush at the base of the berm.

There is some minor stepping of the slope in a few areas indicating previous erosion or sloughing.

At about the center of Pond I a tree has fallen near the top of the berm (Photo 5). The uprooted tree left a hole in the slope of the berm. No significant erosion was observed during our inspection.

There is a small patch of bare earth with some erosion just east of the center dike in Pond I (Photo 6).

There is an area of bare earth that is steeper than the rest of the slope located in line with the berm separating the two ponds. The area measures about 12 feet long by five feet wide (Photo 7). The area has not changed significantly since the 2014 inspection.

The wooded areas of the berm have less ground cover than the open areas (Photo 8 west edge of Pond II). There may be a potential for erosion although we did not see wide spread erosion during our inspection.

The blockage mentioned in the 2014 inspection report in the south ditch due south of center dike in Pond II was not seen during this inspection.

There is a second fallen tree (Photo 9) on the south berm in line with the center dike of Pond II. As with the other location, the uprooted tree has left a hole in the slope of the berm but no other significant erosion was observed during this inspection.

### **East Berm:**

Much of the east berm, especially the north half, was not visible from the toe of the berm because of the tall reeds in the wetland and the dense bushes on the slope. The slope however is more accessible than the slope of the south berm. Photos 12 and 13 show the typical berm looking south and north.

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We counted 27 trees along the length of the east berm.

The crushed stone placed to repair a washout in 2008 is in good condition (Photo 10). However most of the rest of the east berm has a one foot flat area between the fence and the top of the slope. The flat area is missing in this repair area (Photo 10). This is also the case near the end of the center dike in Pond II (Photo 14).

There are fewer trees and bushes on the east berm. As on the south berm, there is bare soil under thick growths of trees and bushes (Photo 11 is near the north end of the berm).

## **Ponds and Road:**

The gravel road around the pond is in fair condition. There are two distinct tire ruts. The outside edge of the road is higher than the pond side as designed preventing runoff to the wetlands.

There is a hole at the edge of the liner membrane and a tear nearby on the west side at north end of Pond II center dike (Photo 15).

## **RECOMMENDATIONS**

We suggest performing the inspections in March or April before the trees and bushes leaf out. This will provide easier access to the outside of the berm as well as a better view of the slope.

Rebuild the areas along the east berm where the top of the slope is at the fence line. Any erosion from the current condition will affect the road which is the design feature that prevents runoff into the wetlands. A sketch of the recommended repair detail is attached.

To meet the requirements of the new coal combustion residue (CCR) regulations we feel the bushes and trees must be removed from the berms. After completing the removal hydro-seed the slope to establish ground cover on the areas of bare earth.

If you have any comments or questions about this report call us at (630) 792-1886 extension 1075.

Sincerely,  
Valdes Engineering Company



Michael J. Smith S.E., P.E.  
Principal Structural Engineer

**PHOTOGRAPH INDEX**

<u>PHOTO No.</u>	<u>DESCRIPTION</u>
<b>SOUTH BERM</b>	
1	South berm looking west at bottom of berm near edge of west pond (Attempt to recreate Photo 1 from 2014)
2	South berm looking east at bottom of berm near edge of west pond (Attempt to recreate Photo 2 from 2014)
3	South berm looking west at top of berm near edge of west pond
4	South berm looking east at top of berm near edge of west pond
5	Fallen tree near top of south berm at center dike of west pond
6	Bare earth just east of Photo 5
7	Bare earth at toe of south berm (Attempt to recreate Photo 3 from 2014)
8	Bare earth beneath trees on south berm
9	Fallen tree near top of south berm at center dike of east pond
<b>EAST BERM</b>	
10	Wash out repair area
11	Bare earth under bushes on east berm
12	East berm looking south at top of berm near the middle of the east pond (Attempt to recreate Photo 5 from 2014)
13	East berm looking north at top of berm near the middle of the east pond (Attempt to recreate Photo 6 from 2014)
14	Top of east berm across from the end of the center dike in the east pond
<b>PONDS</b>	
15	Tears in liner on west side at north end of Pond II center dike



PHOTO 1 – West Side of Pond I - Bottom of south berm looking west



PHOTO 2 – West side of Pond I - Bottom of south berm looking east

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PHOTO 3 – South berm looking west at top of berm near edge of west pond



PHOTO 4 – South berm looking east at top of berm near edge of west pond



PHOTO 5 – Fallen tree near top of south berm at center dike of west



PHOTO 6 – Bare earth just east of Photo 5



PHOTO 7 – Bare earth at toe of south berm



PHOTO 8 - Bare earth beneath trees on south berm





PHOTO 9 - Fallen tree near top of south berm at center dike of east pond

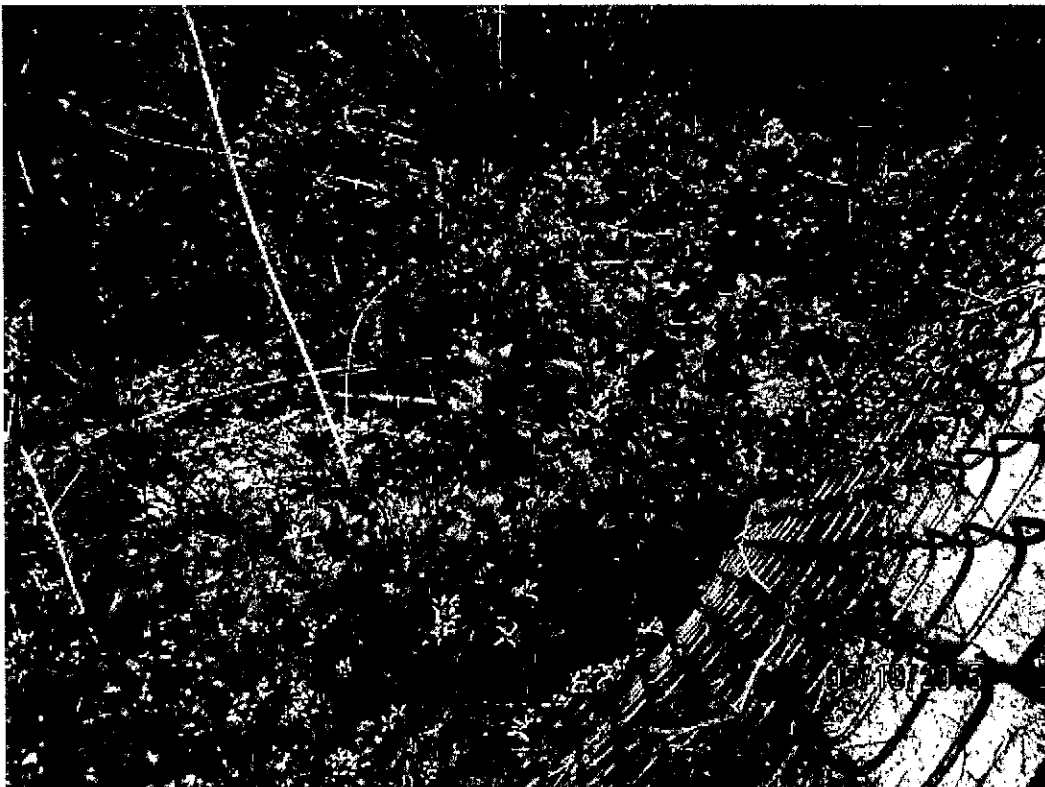


PHOTO 10 - Wash out repair area

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PHOTO 11 - Bare earth under bushes on east berm



PHOTO 12 - East berm looking south at top of berm near the middle of the east pond



PHOTO 13 - East berm looking north at top of berm near the middle of the east pond



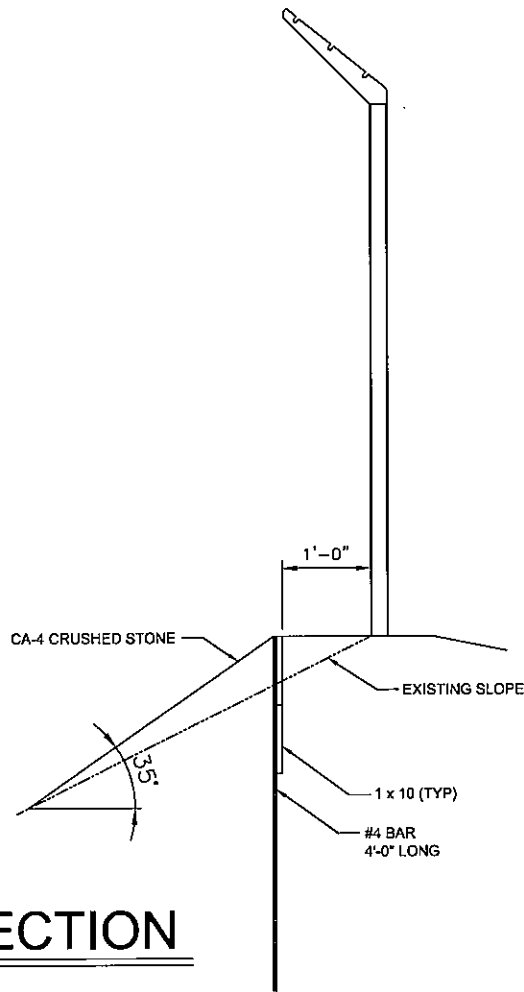
PHOTO 14 - Top of east berm across from the end of the center dike in the east pond

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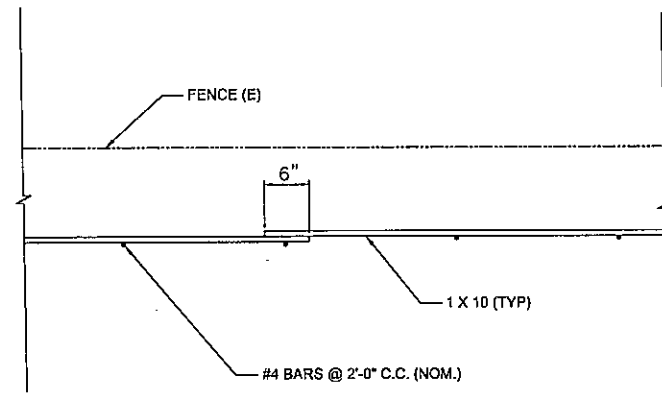
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PHOTO 15 - Tears in liner on west side at north end of Pond II center dike



SECTION



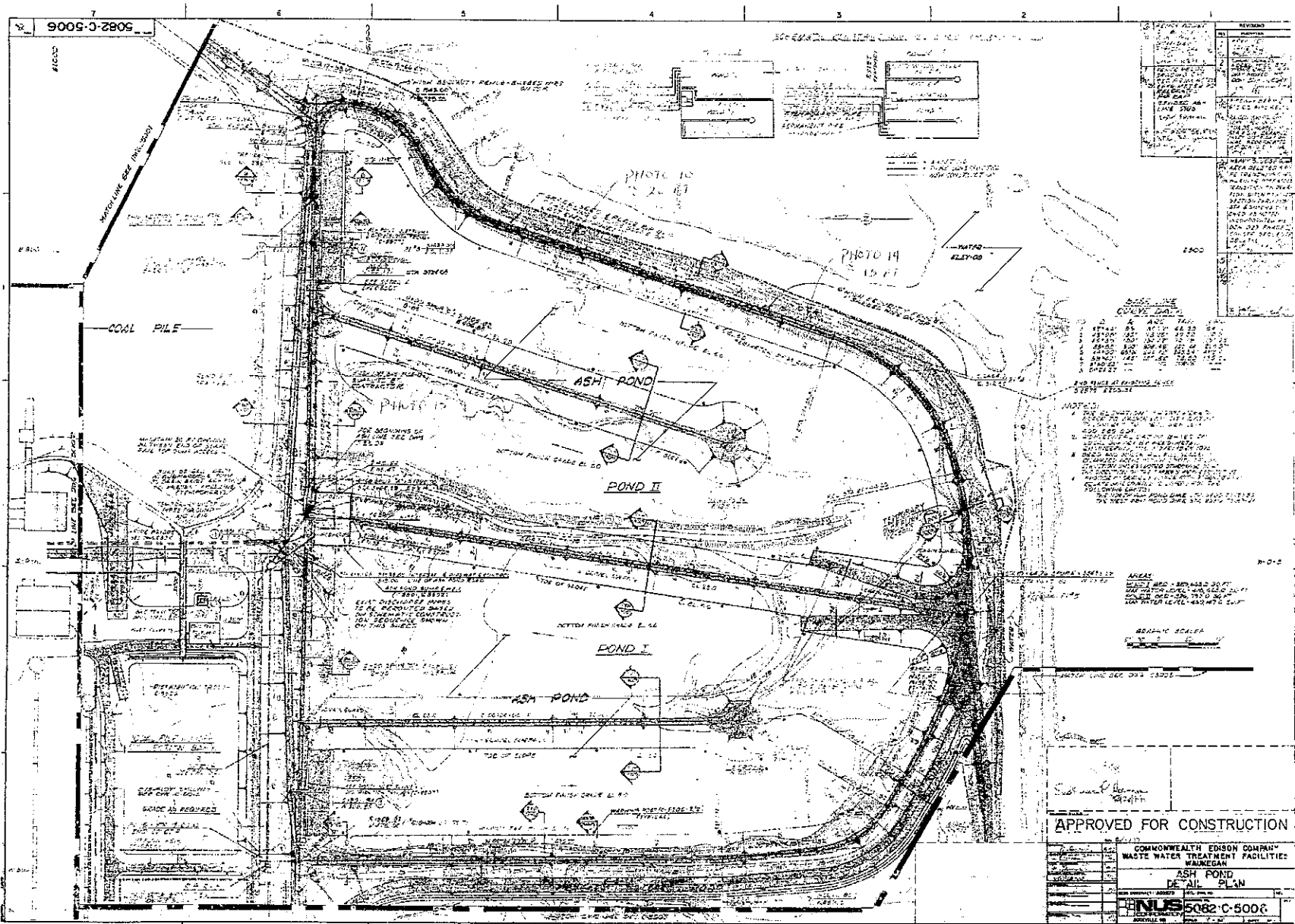
PLAN

REV.	DATE	BY	DESCRIPTION OF REVISION	CHK.	APP.
0	05/29/15	MJS	ISSUED FOR INFORMATION	MJS	SLP

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NRG - WAUKEGAN STATION  
ASH POND  
SLOPE REPAIRS  
PLAN AND SECTION

DRAWN BY MIKE SMITH	SCALE NONE	DATE 05/29/15
CHECKED BY SLP	DESIGNED BY MJS	DRAWING No. 2015-033-04-001
APPROVED BY SLP	CAD FILE NAME	REV. 0



2015 ASH POND BERM INSPECTION MWG13-15\_49285