Carlson McCain

ENVIRONMENTAL • ENGINEERING • LAND SURVEYING

January 10, 2018

Xcel Energy, Inc.
Sherburne County Generating Station
13999 Industrial Blvd.
Becker, MN, 55308

Re: 2017 Annual Inspection of Scrubber Solids Pond No. 3

The Scrubber Solids Pond No. 3 (Pond 3) inspection was conducted on November 8th, 2017 by Daniel J. Riggs, a professional engineer licensed in the State of Minnesota. This was the third inspection done in accordance with the EPA's published Coal Combustion Residual (CCR) Rules under section 257.83. Prior inspections were conducted in 2008, 2009, 2013 by the Minnesota Department of Natural Resources (DNR); in August 2009 by the EPA; annually from 2010 to 2014 by Qualified Professional Engineers in accordance with the DNR and Minnesota Pollution Control Agency (MPCA) inspection requirements; and annually since 2015 by a Qualified Professional Engineer in accordance with EPA CCR Rules.

The following items were evaluated as a part of the Section 257.83 Inspection:

i) Any changes in geometry of the impounding structure since the previous inspection

Annual topographic surveys have been conducted on the Pond since initial construction in 2004. During that time, no changes in pond geometry or embankment alignment have been observed.

ii) The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection

The only instrumentation on Pond 3 is a staff gauge used to determine water surface elevation, located on the west side of the discharge structure. The minimum elevation measured since the last inspection was 996.0 Mean Sea Level (MSL), the maximum elevation was 997.1 MSL. The top of clay liner elevation is 1004 MSL. No instrumentation is needed for dike stability.

iii) The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection

The lowest elevation of the Pond 3 Liner is 938 MSL, therefore the minimum depth of water impounded since the previous annual inspection was 58.0 feet. The maximum and present depth of impounded water is 59.1 feet.

Two forms of CCR are deposited or placed in Pond 3. Solid bottom ash is excavated and hauled from the Bottom Ash Pond (see figure 1) and used above the water level in Pond 3 and compacted as a structural fill, or deposited in the pond, and not compacted. The highest elevation of bottom ash diked

inside of the clay liner is elevation 1010 MSL. This equates to a depth of 72 feet. The scrubber solids are sluiced to the Pond and create a delta at an elevation of approximately 1001 MSL, therefore the maximum depth of scrubber solids is 63 feet. The lowest elevation of deposited CCR recorded in Pond 3 from a bathymetric survey conducted in June 2017 is 949 MSL. This equates to a depth of 11 feet.

iv) The storage capacity of the impounding structure at the time of the inspection

The remaining capacity of Pond 3 to elevation 1004 MSL (top of currently-constructed clay liner) is:

- 3.40 Million Cubic Yards (from the surface of CCR)
- 0.53 Million Cubic Yards (from top of water, elevation 997.1 MSL)

v) The approximate volume of the impounded water and CCR at the time of the inspection

There was approximately 2.60 Million Cubic Yards of impounded water and 4.0 Million Cubic Yards of CCR in the Pond at the time of inspection.

vi) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit and appurtenant structures

The exterior of the Pond was inspected for structural weakness in the form of seepage by walking a traverse at the base, mid-slope, and top of the embankment. Signs of seepage would include saturated areas, patches of grass more lush than the surrounding area or flowing “springs”. There were no signs that seepage had previously or is presently occurring on Pond 3.

The discharge pipe corridor was inspected for signs of a leakage, such as saturated areas or sinkholes. No signs of leakage were observed along the pipe corridor or in the vault located north of Pond 3.

The water level in Pond 3 has remained static or increased throughout the past year. Increases can be attributed to scrubber solid deposition and water accumulation from storm events.

vii) Any other changes(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection

There have not been any changes that have affected the stability of the pond.

I have reviewed the CCR Unit Design and Construction information and have observed no deviations from those documents.

Sincerely,
Daniel J. Riggs, PE
License No. 49559
Senior Engineer
Carlson McCain, Inc.

RECYCLE BASIN
(INCISED AND DOES
NOT RECEIVE DIRECT
CCR DEPOSITS)

BOTTOM ASH POND

POND 3 DISCHARGE PIPE
(UNDERGROUND)

F-COV

EDGE OF FINAL COVER
(APPROXIMATE)

POND 3 DISCHARGE STRUCTURE

POND 1 (CLOSED)

POND 2 (CLOSED)

SCRUBBER PIPES

POND 3

PROPERTY BOUNDARY

MEQB

N

0 500 1000

SCALE IN FEET

NOTE: AERIAL PHOTO FROM NOVEMBER, 2014
LIDAR SURVEY

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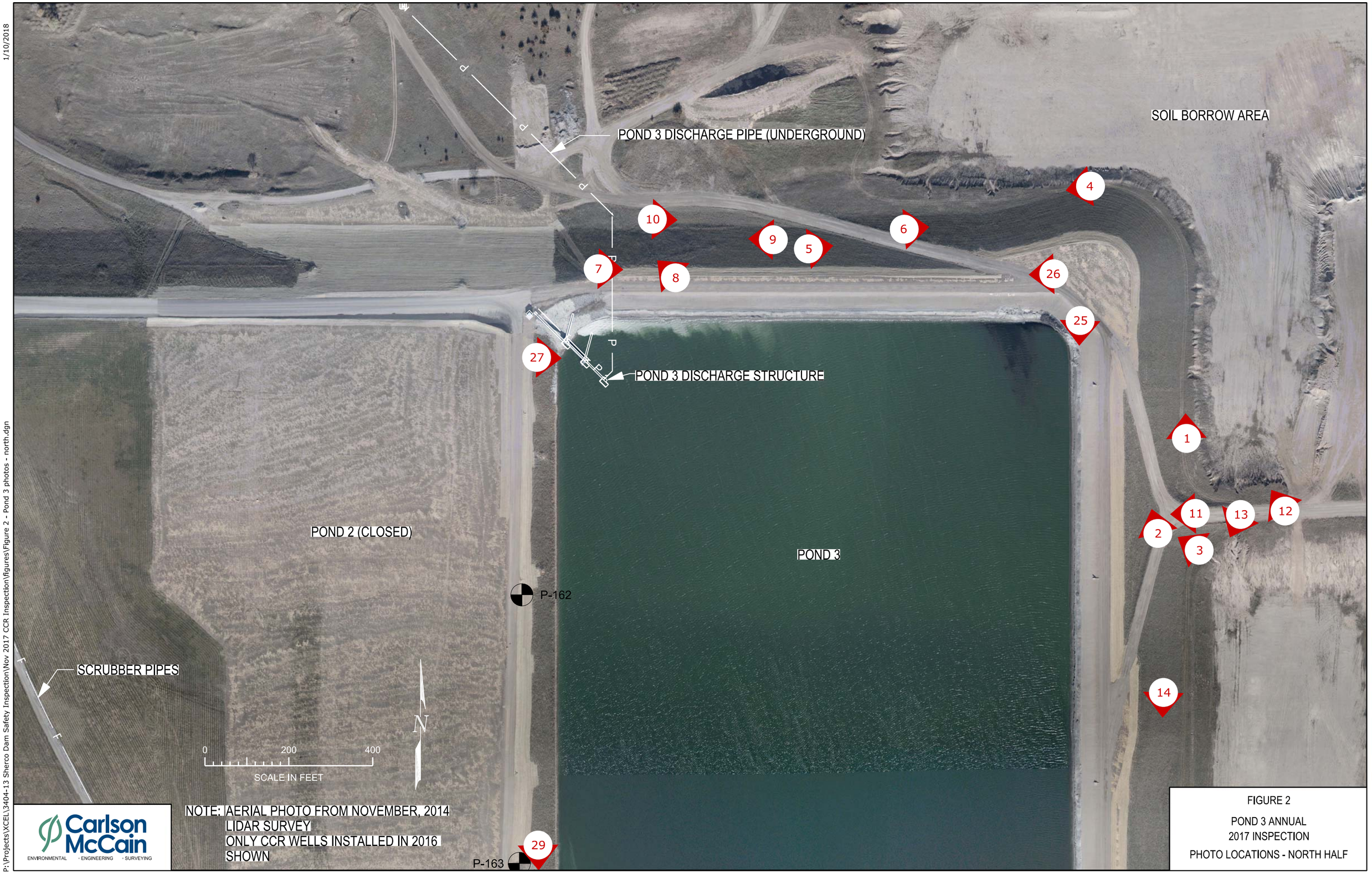
FIGURE 1
POND 3 ANNUAL
2017 INSPECTION
POND LAYOUT

1/9/2018

P:\Projects\XCEL\3404-13 Sherco Dam Safety Inspection\Nov 2017 CCR Inspection\figures\Figure 1 - Pond 3 inspection.dgn



NOTE: AERIAL PHOTO FROM NOVEMBER, 2014
LIDAR SURVEY
ONLY CCR WELLS INSTALLED IN 2016 SHOWN

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FIGURE 2

POND 3 ANNUAL
2017 INSPECTION

PHOTO LOCATIONS - NORTH HALF

1/10/2018

P:\Projects\XCEL\3404-13 Sherco Dam Safety Inspection\Nov 2017 CCR Inspection\figures\Figure 2 - Pond 3 photos - north.dgn

1/10/2018

P:\Projects\XCEL\3404-13 Sherco Dam Safety Inspection\Nov 2017 CCR Inspection\figures\Figure 3 - Pond 3 photos - south.dgn

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FIGURE 3

POND 3 ANNUAL
2017 INSPECTION

PHOTO LOCATIONS - SOUTH HALF

Pond 3 Annual Inspection - November 2017

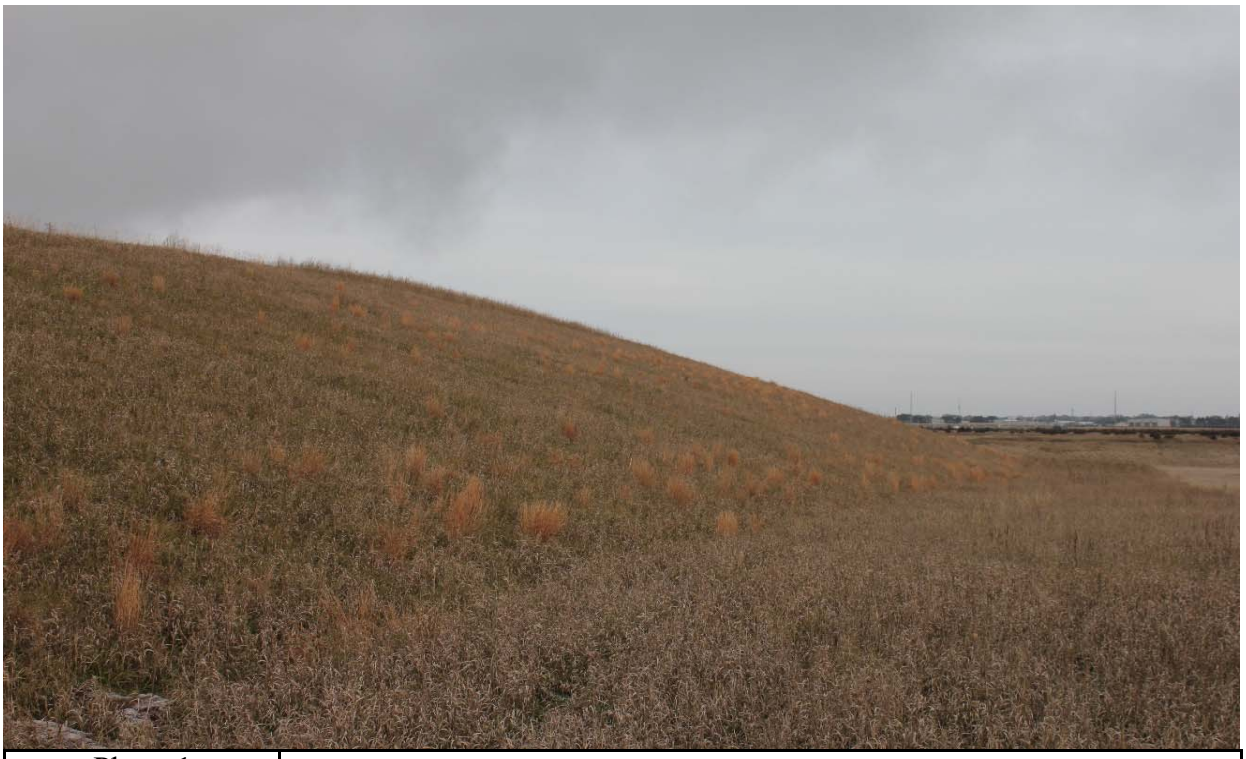

Photo 1 11/8/2017	Outer east slope of north embankment, looking north.

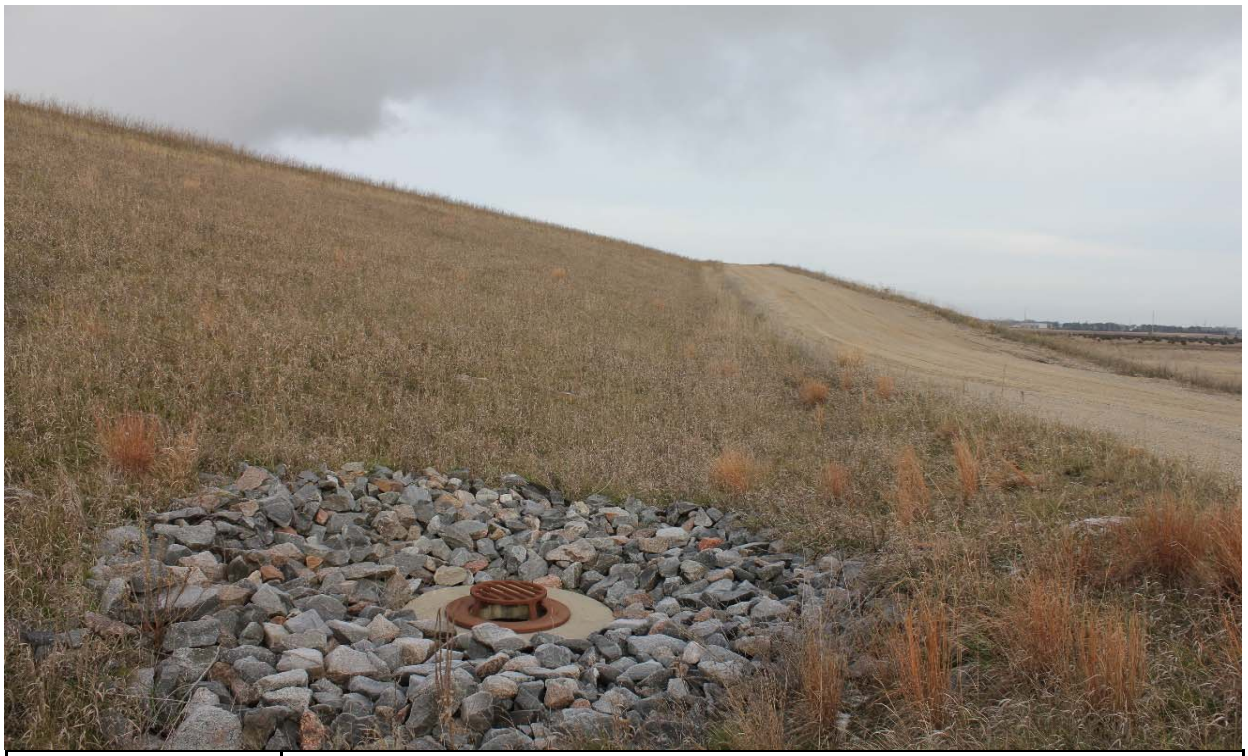

Photo 2 11/8/2017	East embankment north ramp and stormwater inlet, looking north.

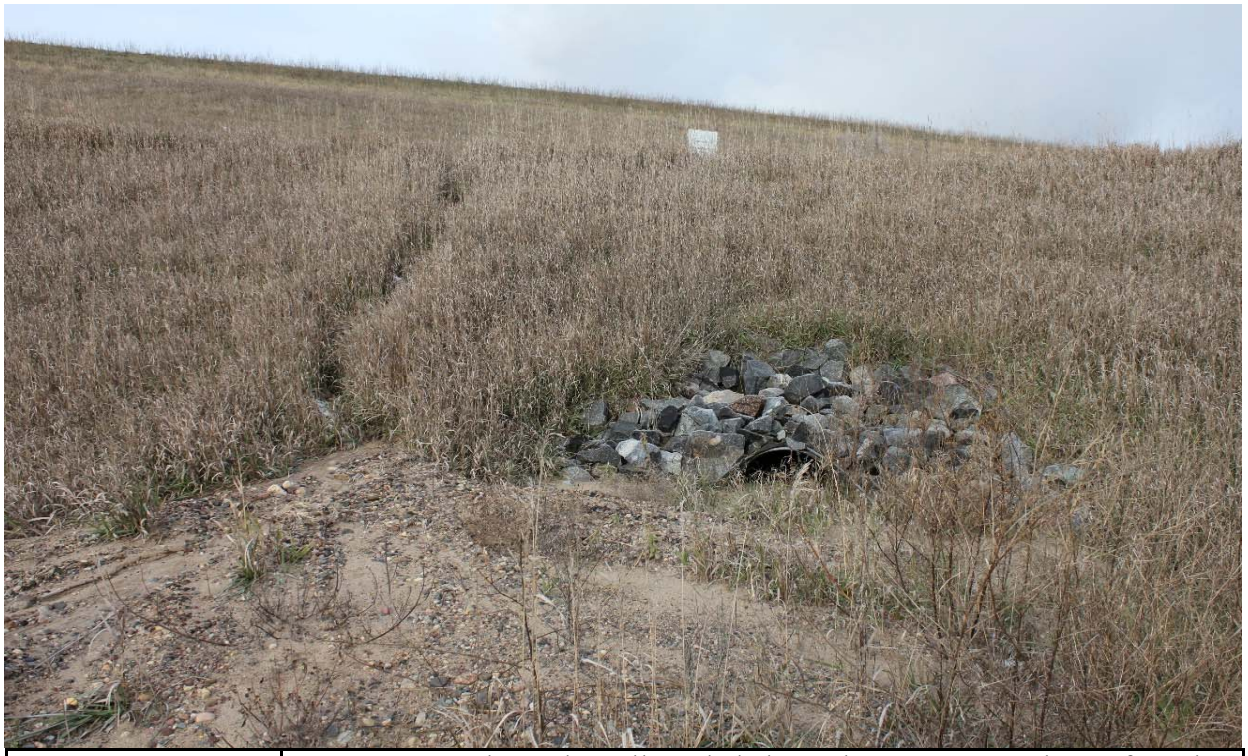

Photo 3 11/8/2017	Stormwater outlet and small eroded channel on outer east slope of south embankment, looking northwest.

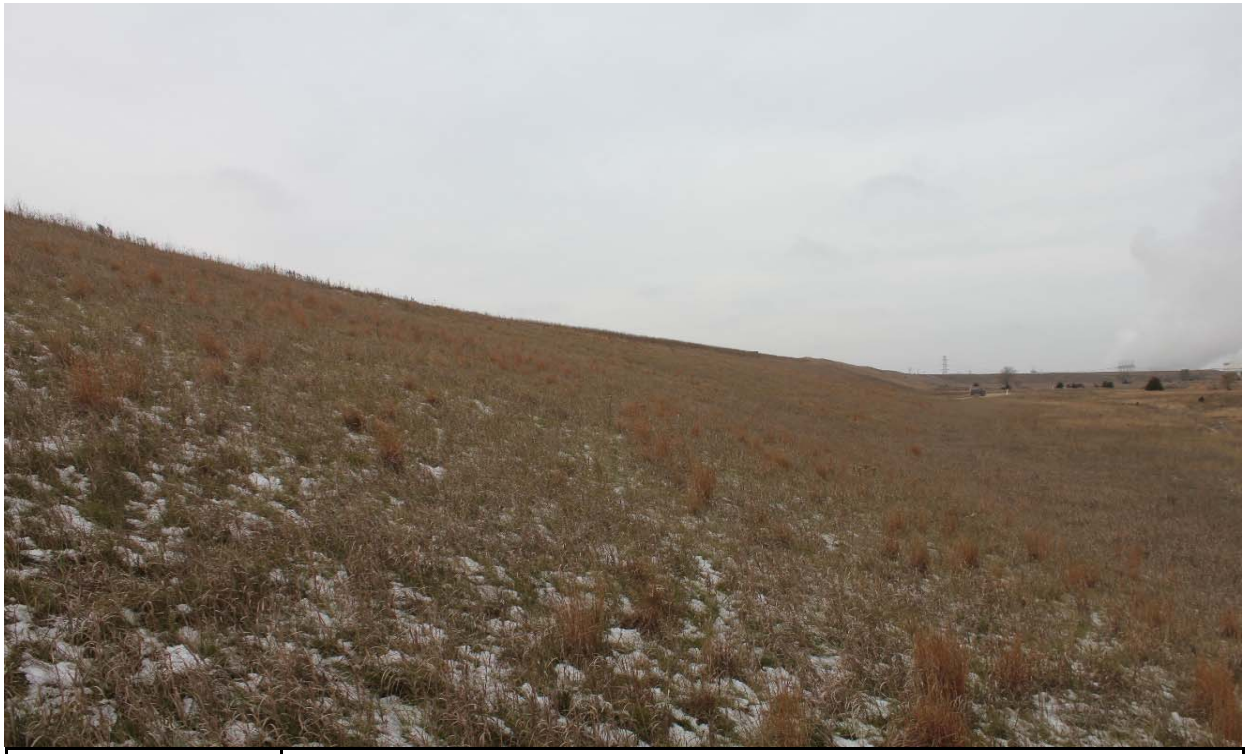

Photo 4 11/8/2017	Outer slope of north embankment, looking west.

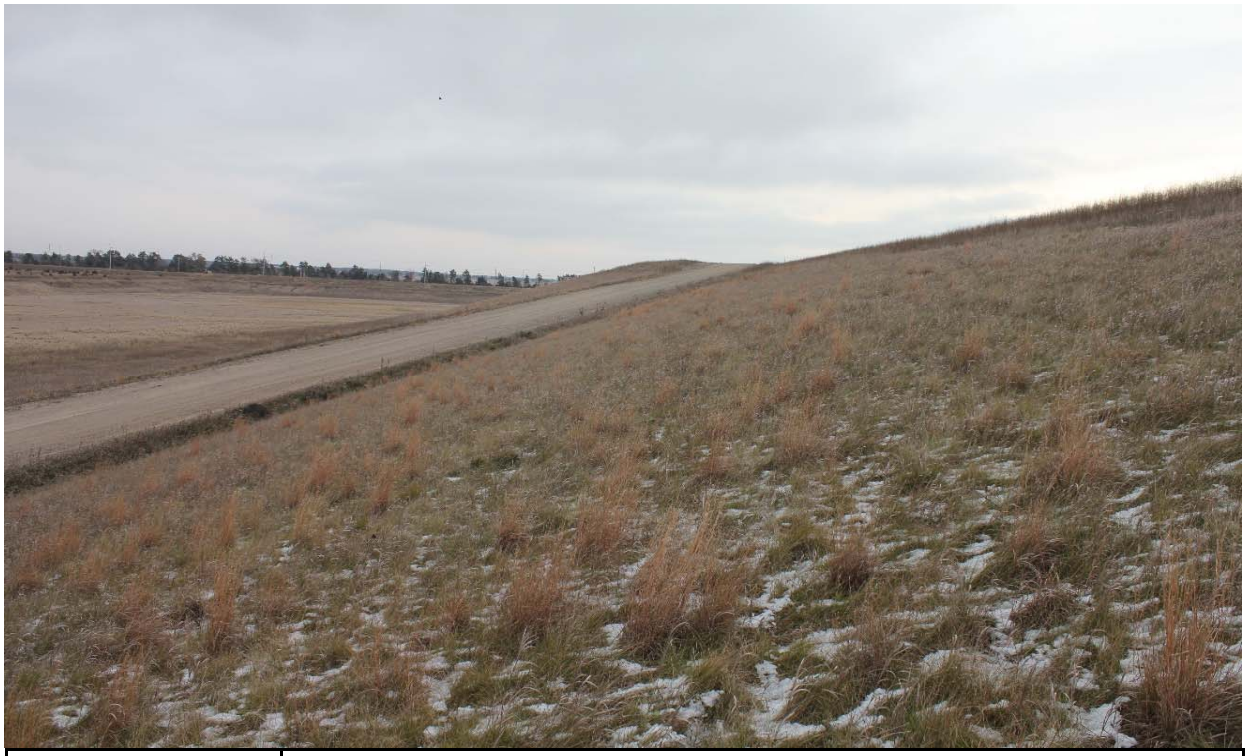

Photo 5 11/8/2017	North embankment ramp, looking east.

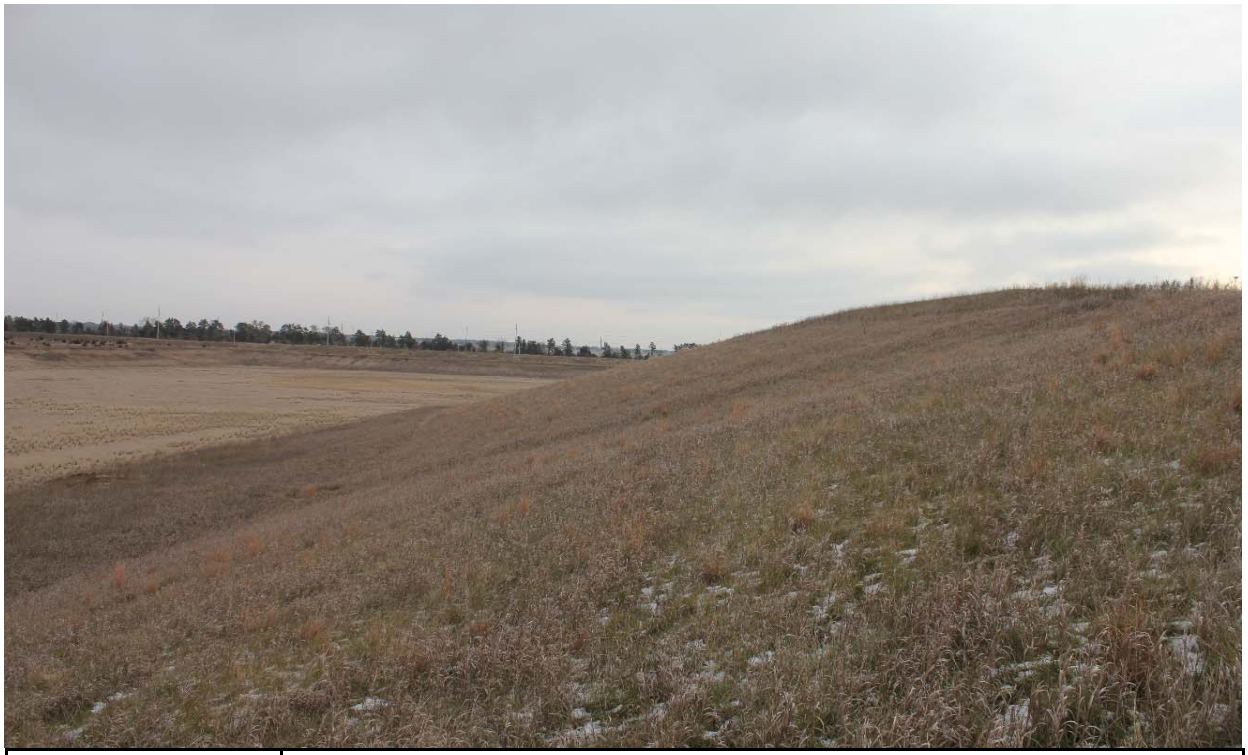

Photo 6 11/8/2017	Pond north embankment mid-slope, looking east.

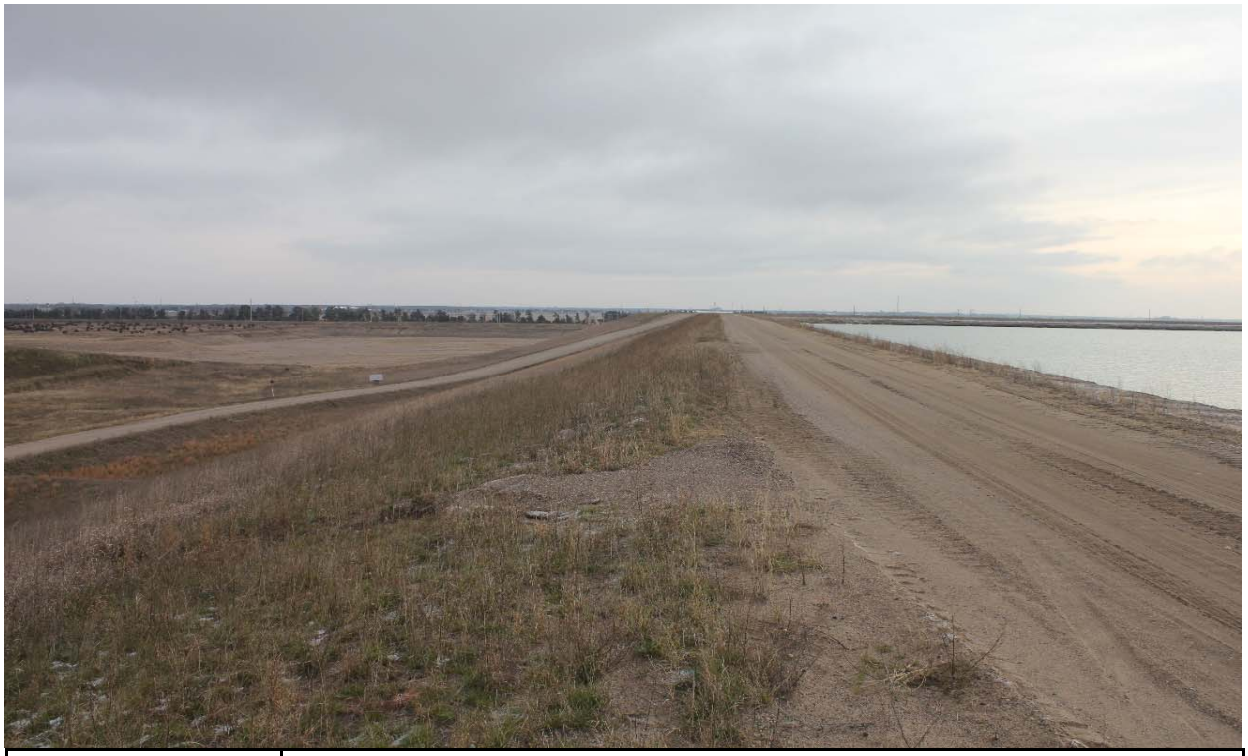

Photo 7 11/8/2017	Top of pond north embankment, looking east.

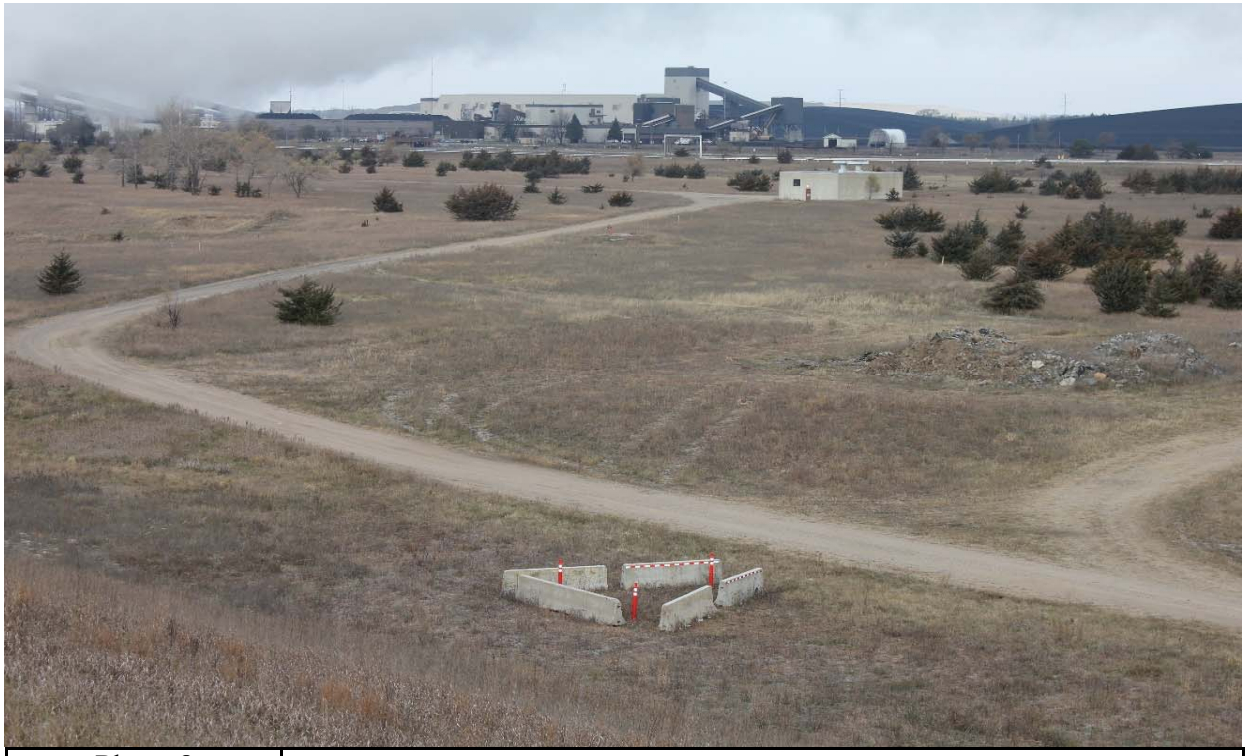

Photo 8 11/8/2017	Underground discharge pipe corridor, looking northwest.

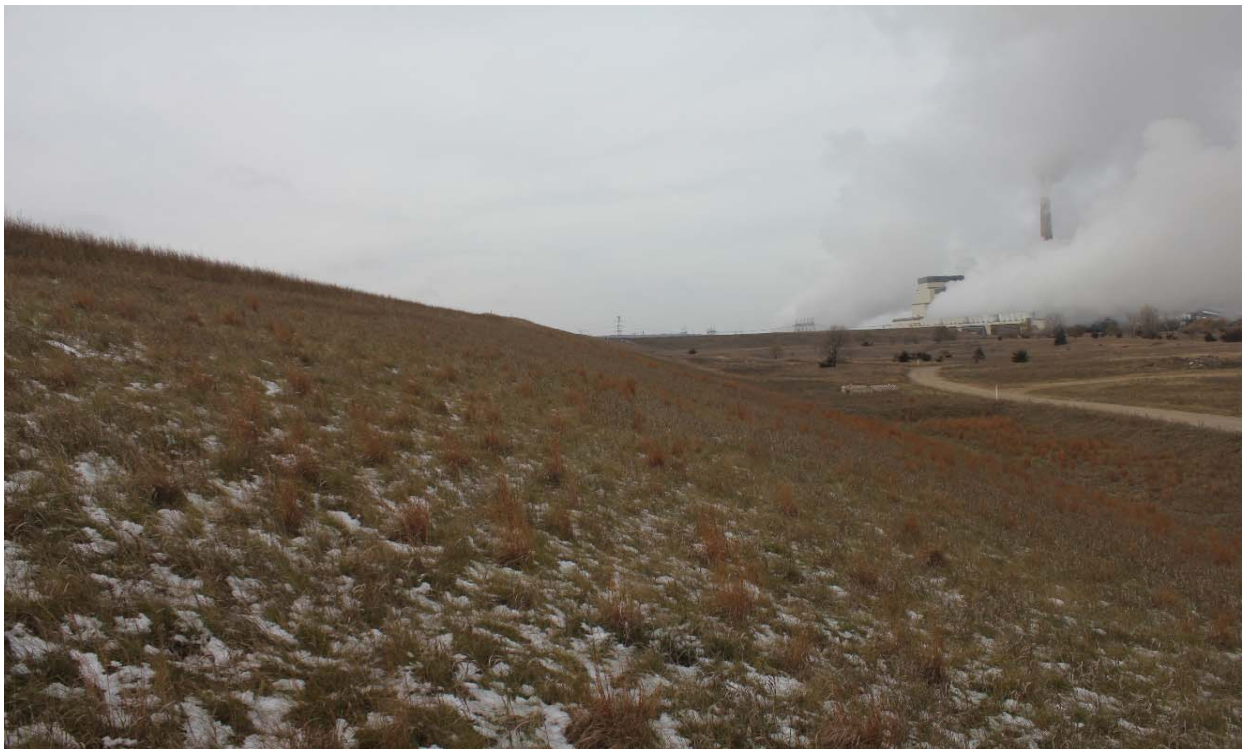

Photo 9 11/8/2017	Pond north embankment mid-slope, looking west.

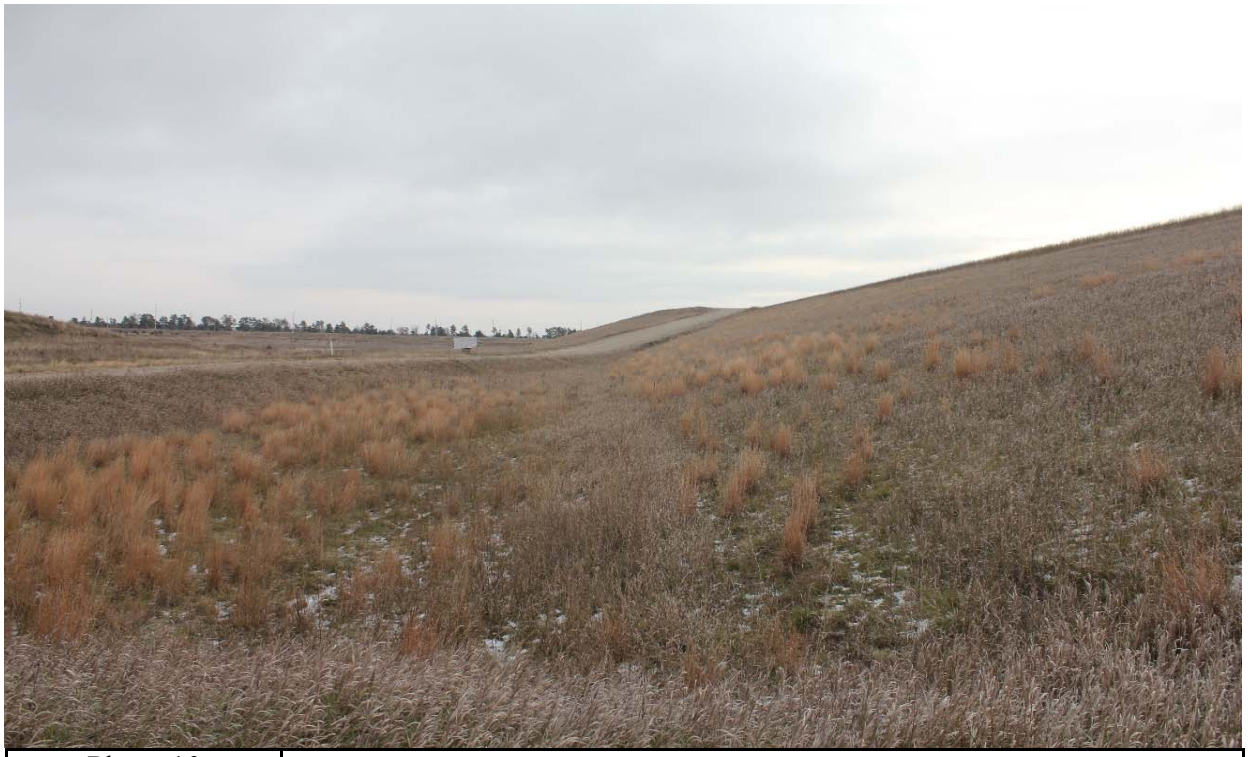

Photo 10 11/8/2017	Pond north embankment and infiltration pond, looking east.

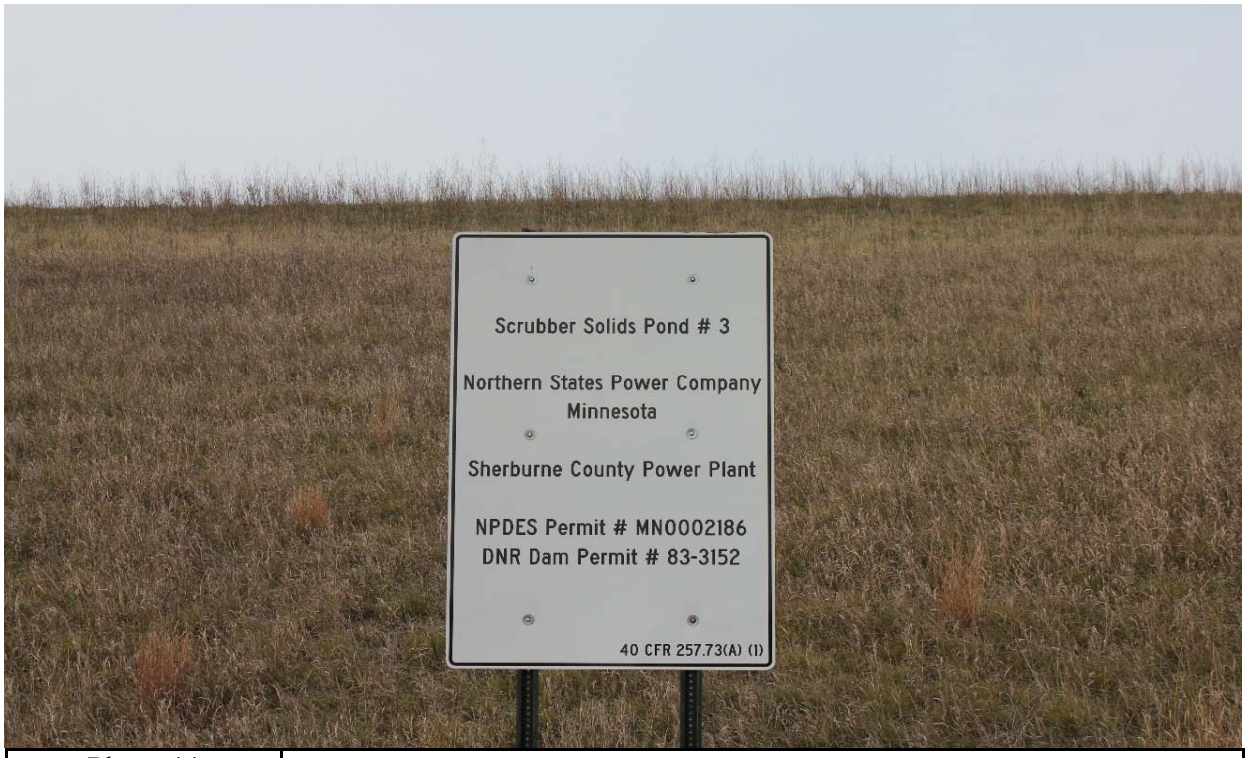

Photo 11 11/8/2017	CCR Unit identification marker placed in accordance with Section 257.73

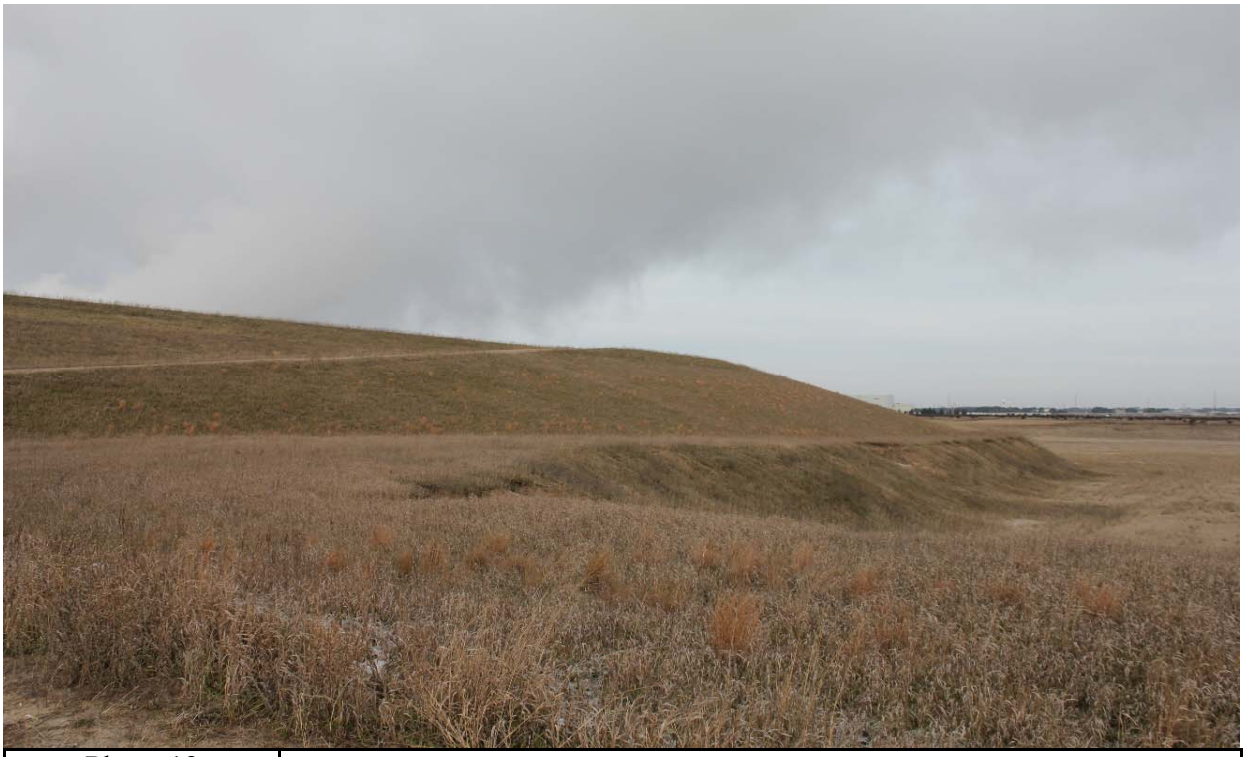

Photo 12 11/8/2017	North end of pond east embankment, looking northwest.

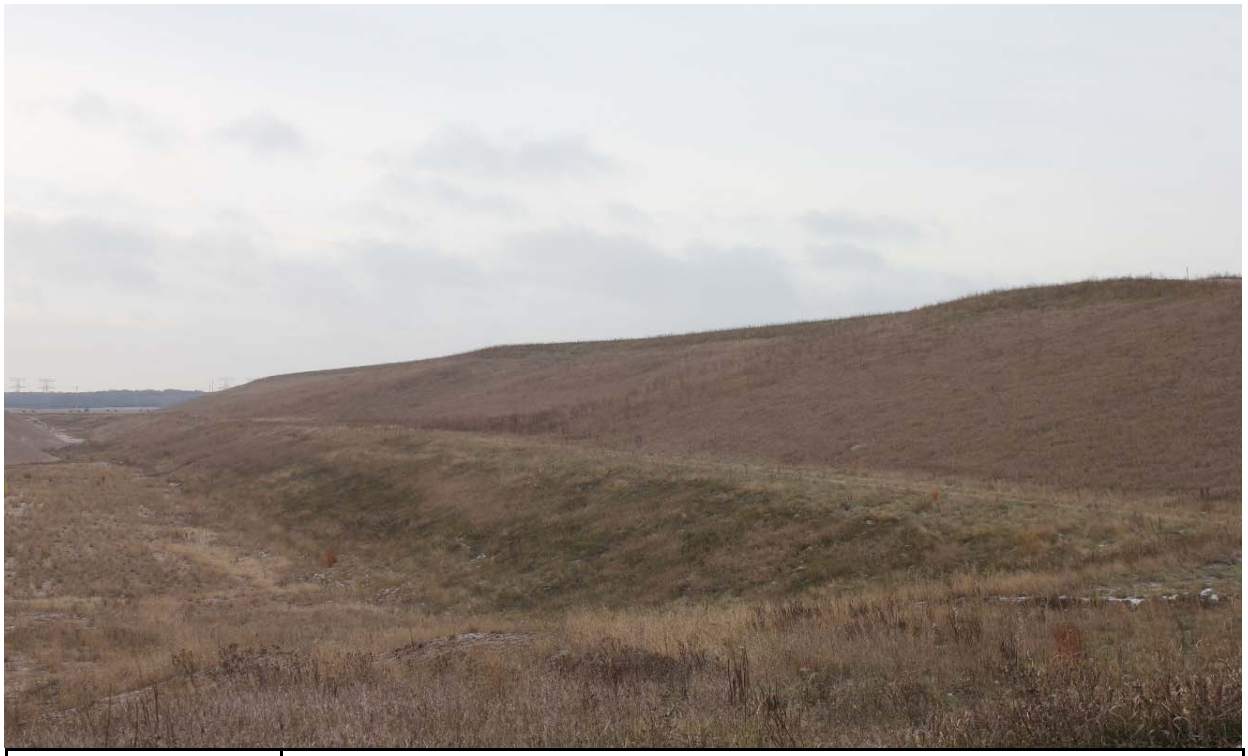

Photo 13 11/8/2017	South end of pond east embankment, looking southwest.

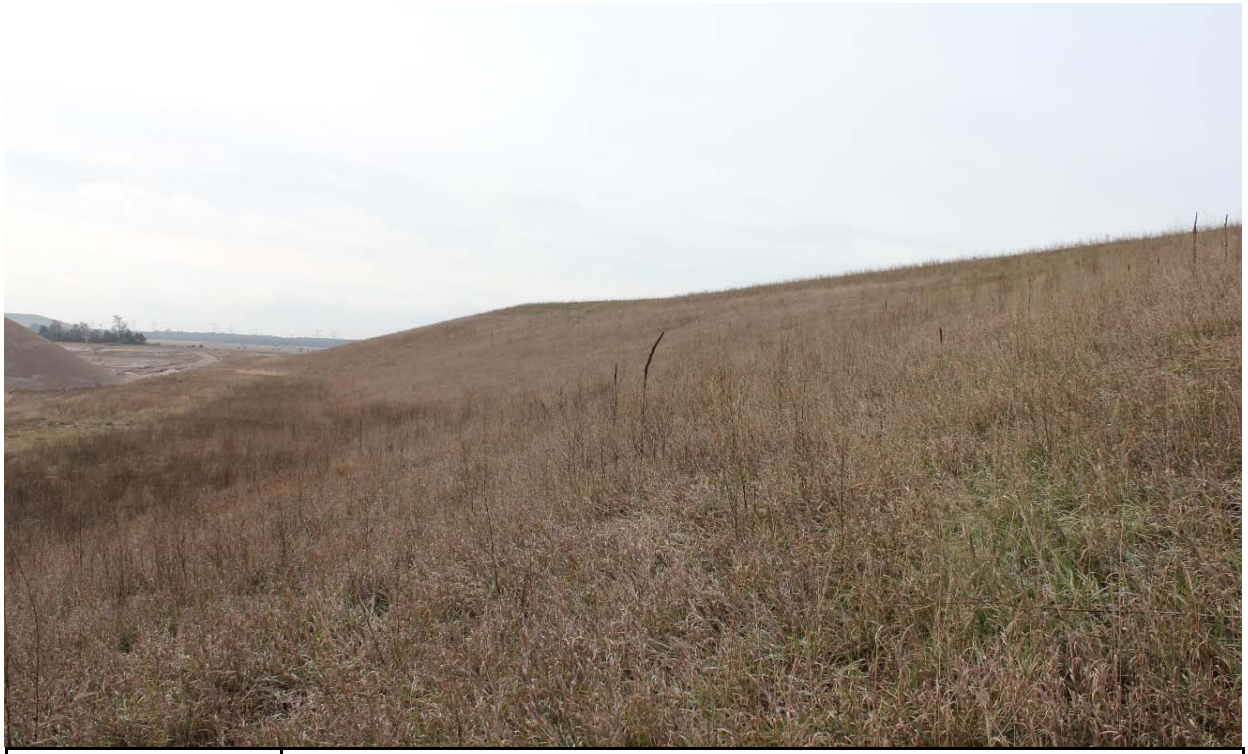

Photo 14 11/8/2017	Pond east embankment mid-slope, looking south.

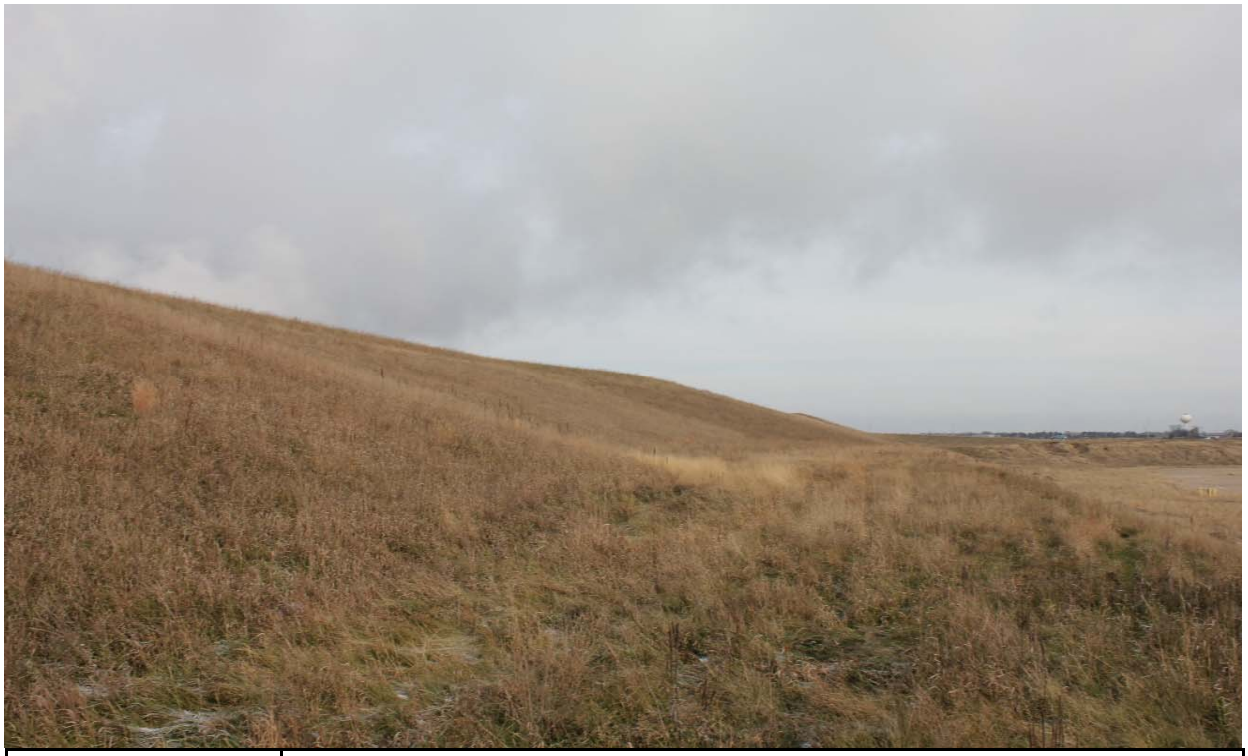

Photo 15 11/8/2017	Pond east embankment, looking north.

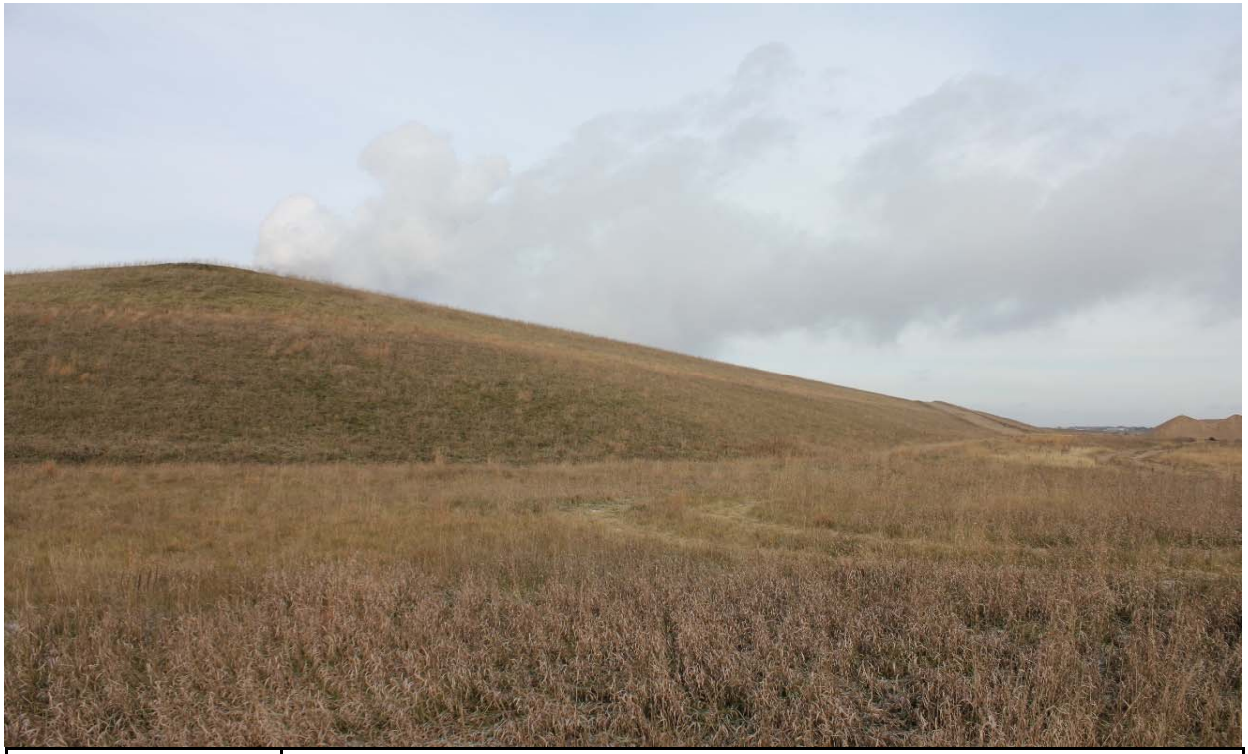

Photo 16 11/8/2017	Southeast corner of outer embankment, looking north.

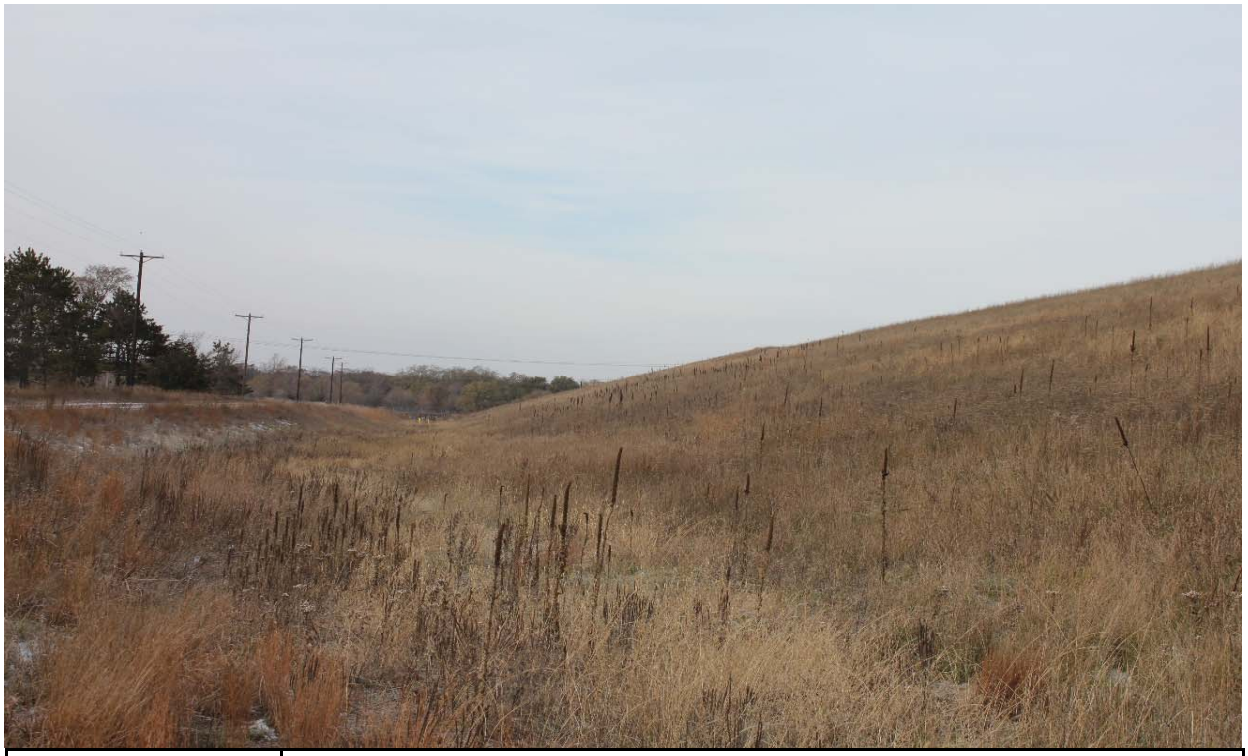

Photo 17 11/8/2017	Pond south embankment, looking west.

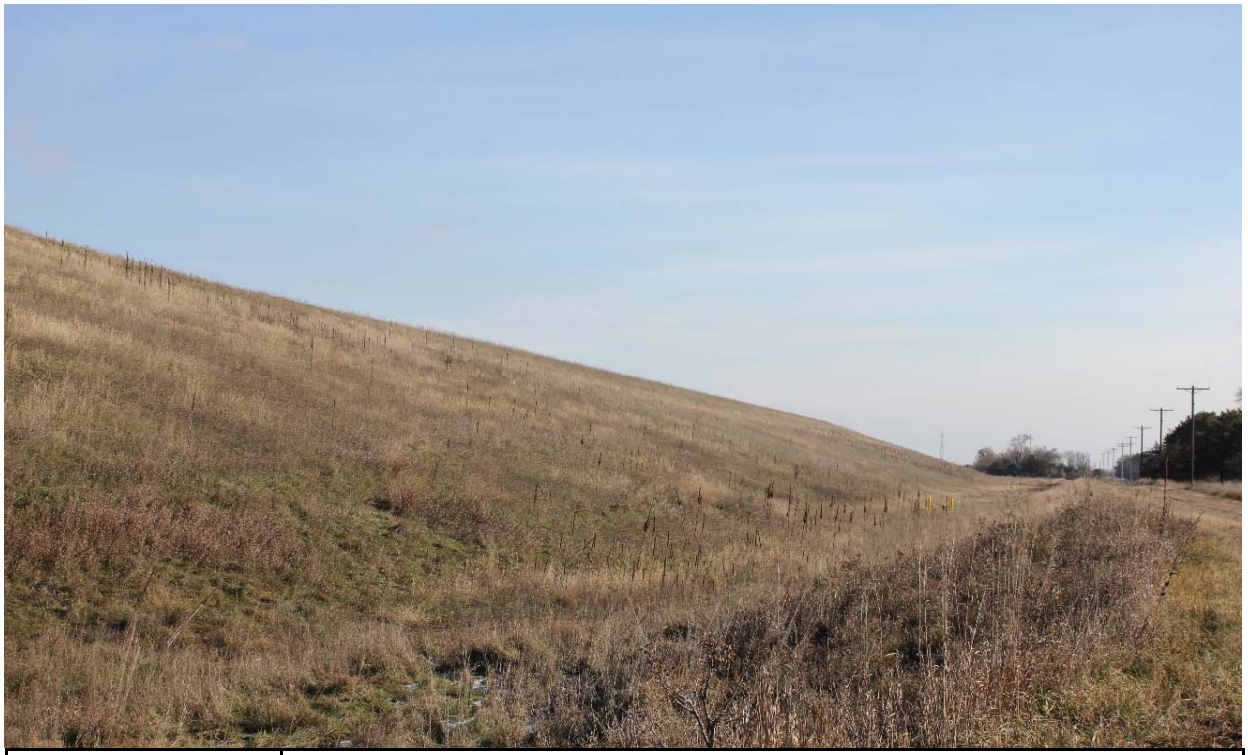

Photo 18 11/8/2017	Pond south embankment, looking east. Middle right: Pond 3 CCR monitoring well (between yellow bollards).

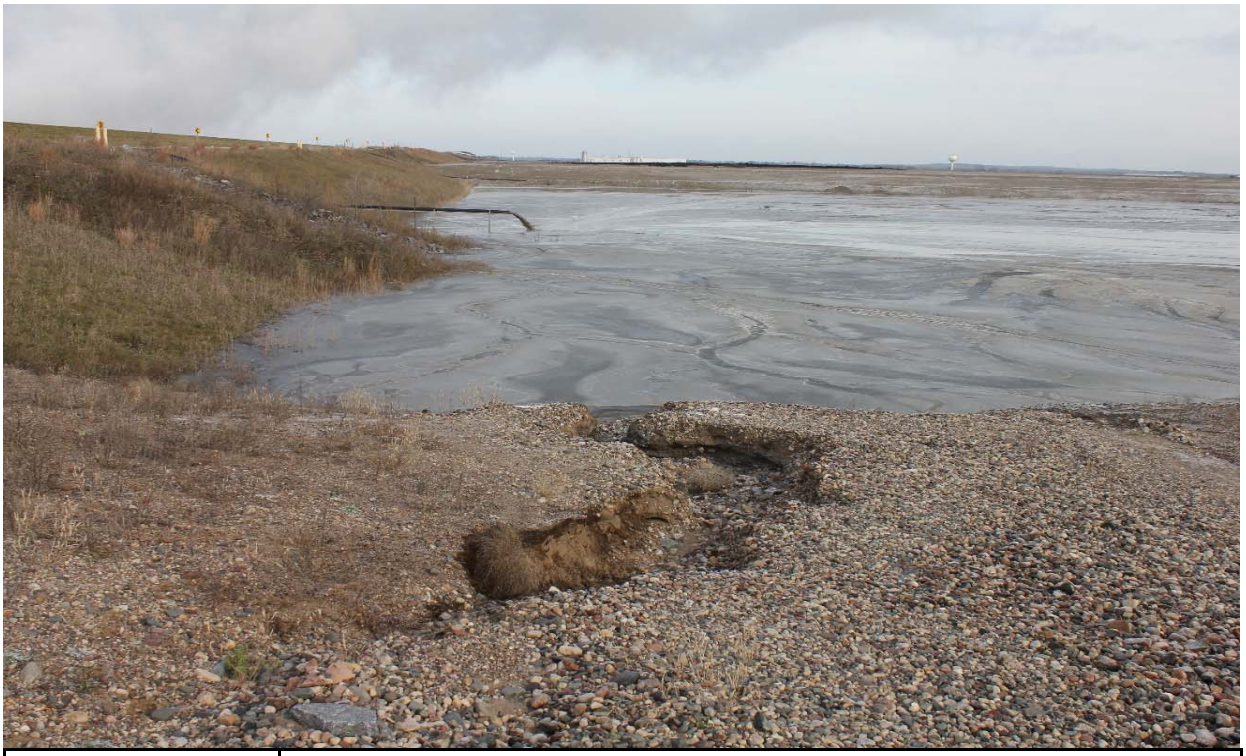

Photo 19 11/8/2017	Pond interior west embankment, looking north.

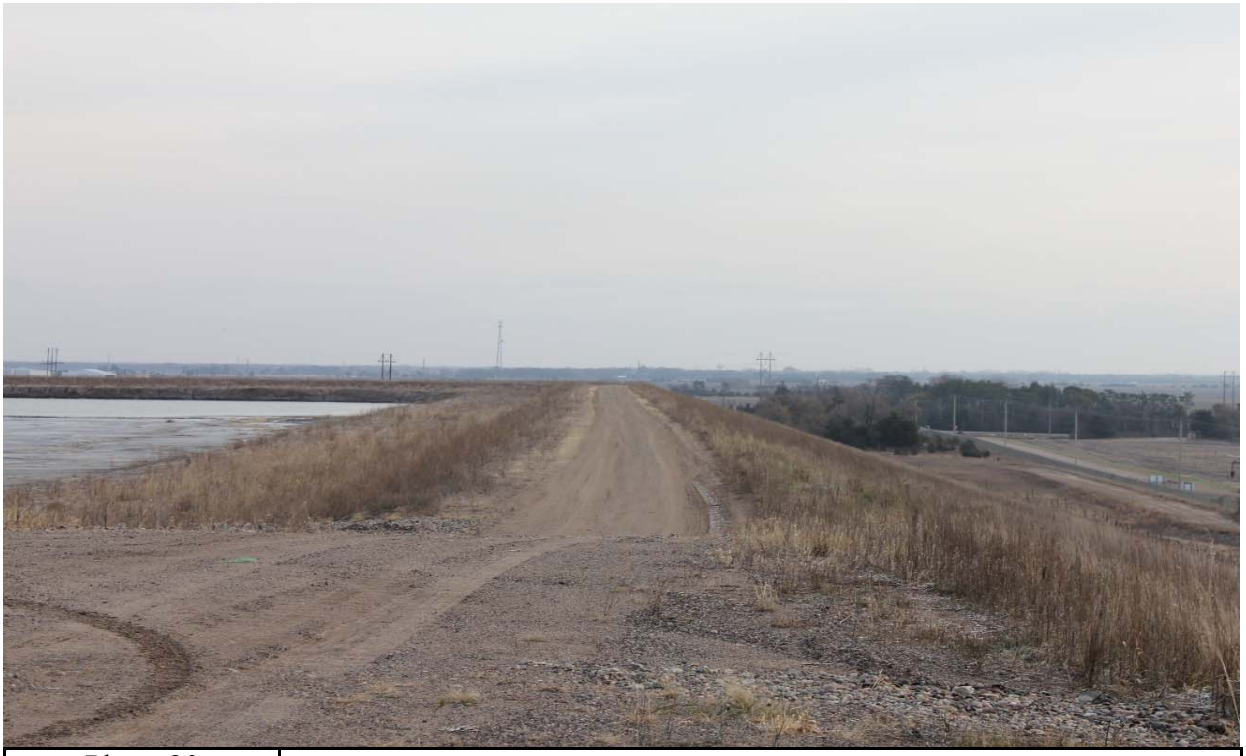

Photo 20 11/8/2017	Top of pond south embankment, looking east

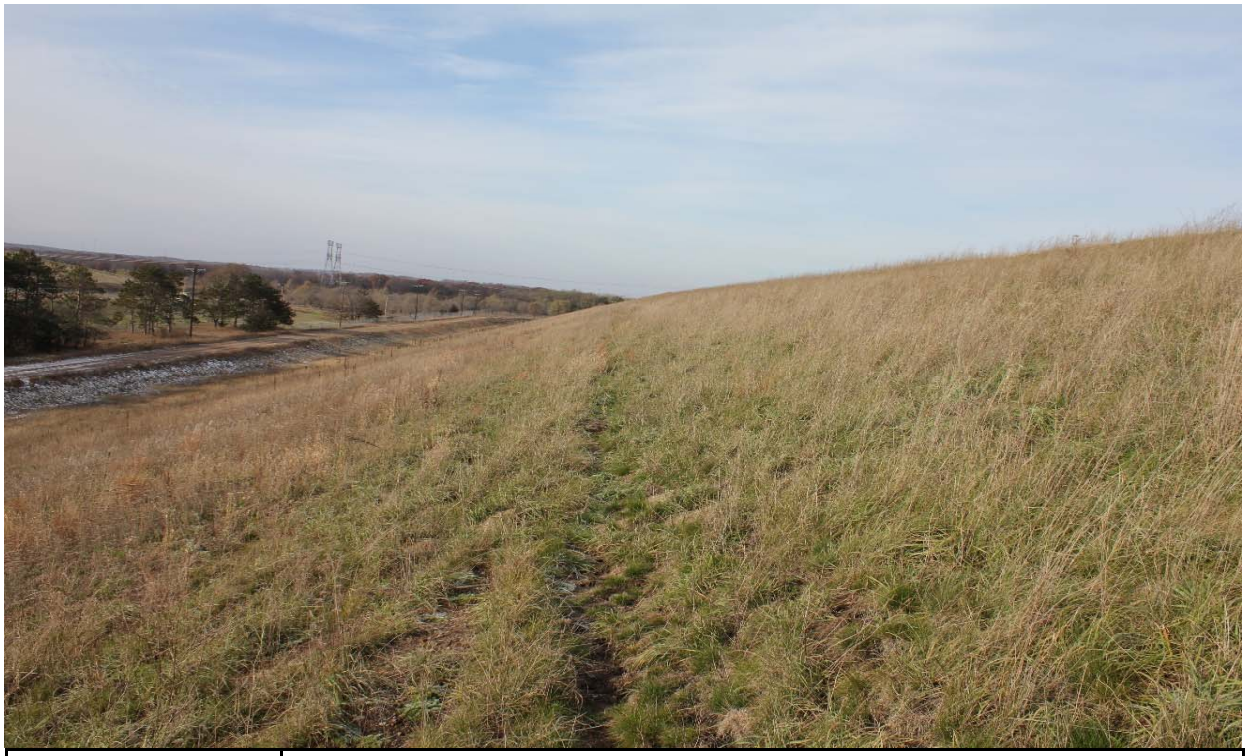

Photo 21 11/8/2017	Mid-slope of south embankment, looking west.

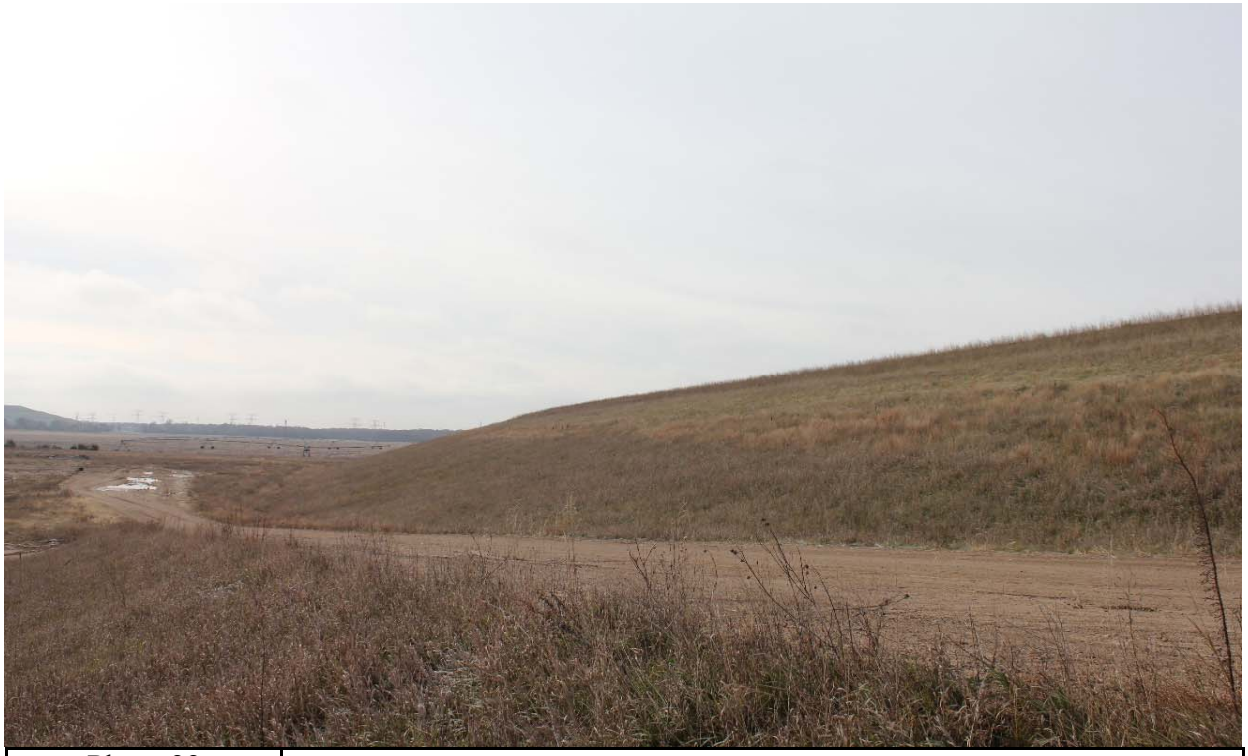

Photo 22 11/8/2017	Pond southeast ramp and embankment, looking south.

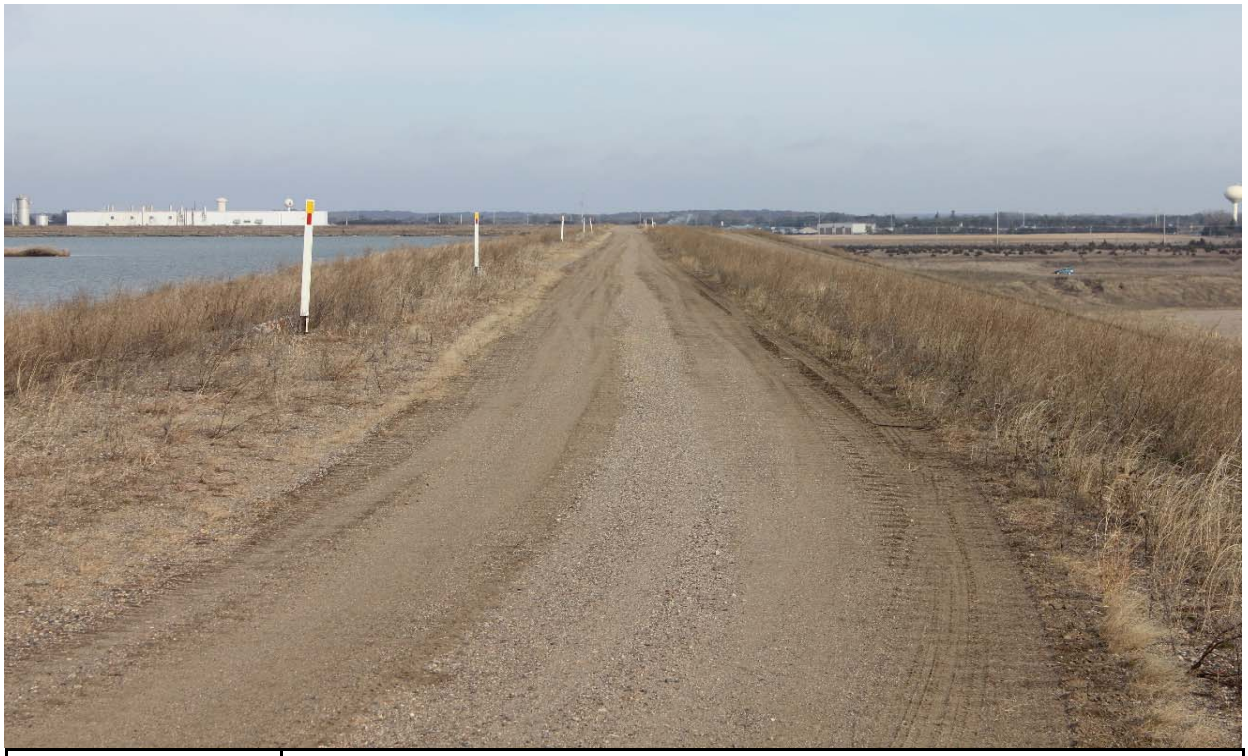

Photo 23 11/8/2017	Top southeast corner of east embankment, looking north.

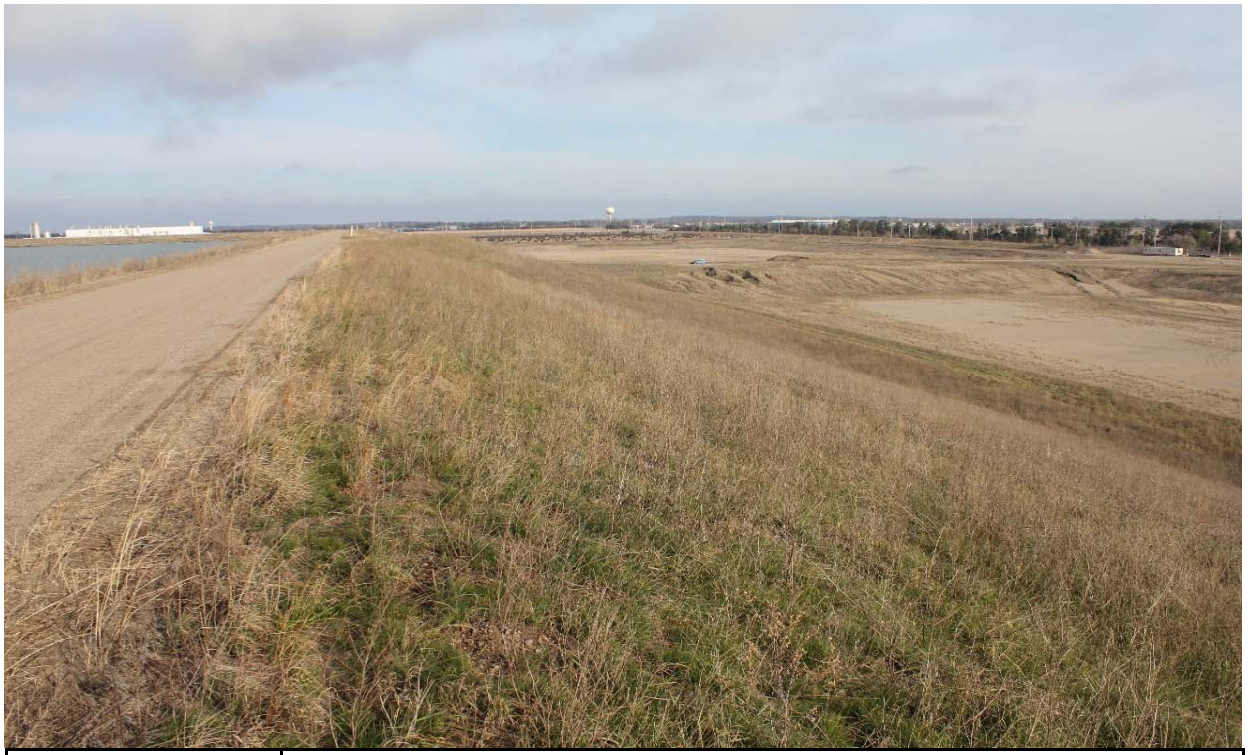

Photo 24 11/8/2017	Top-center of east embankment, looking north.

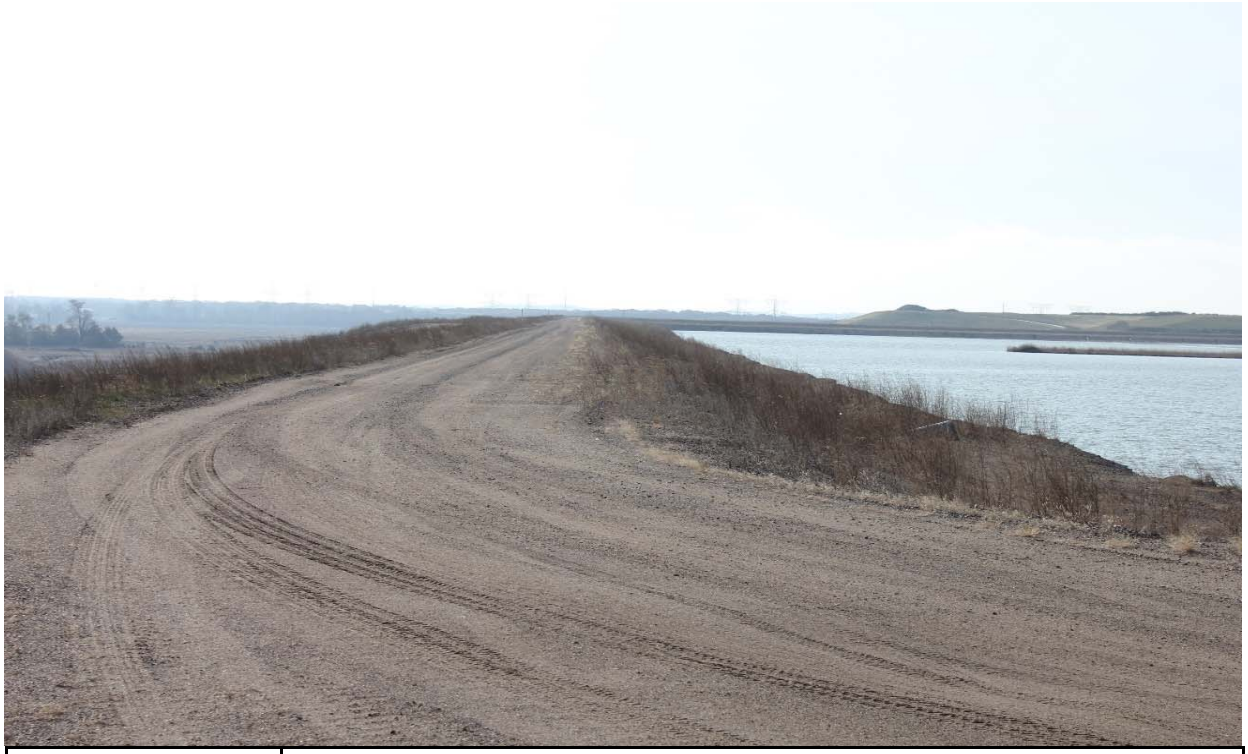

Photo 25 11/8/2017	Top northeast corner of east embankment, looking south.

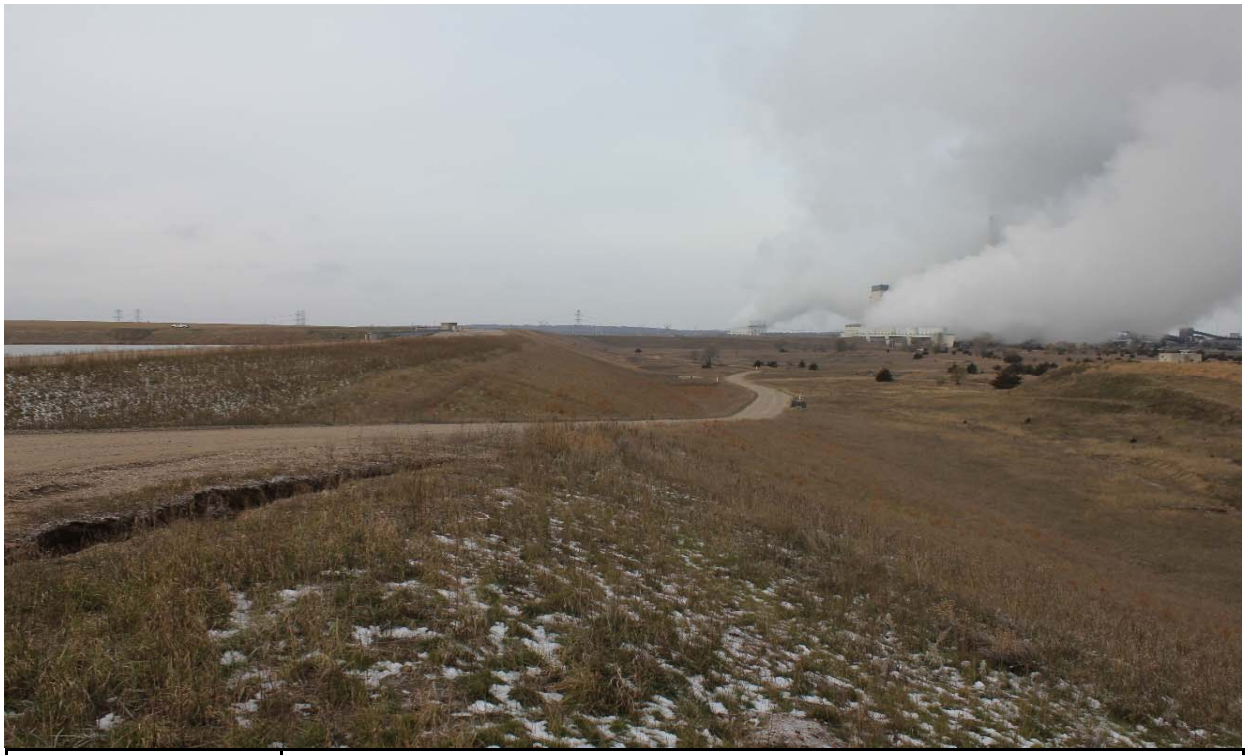

Photo 26 11/8/2017	Top northeast corner of north embankment and small eroded channel, looking west.

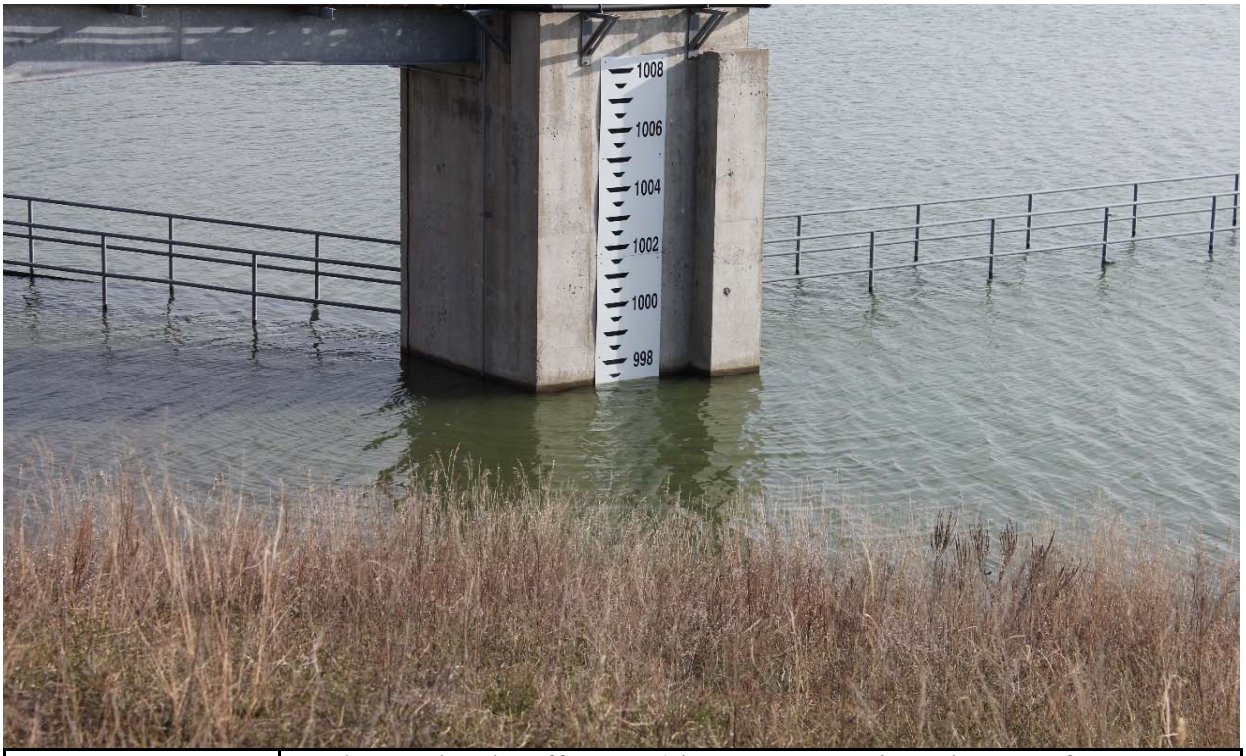

Photo 27 11/8/2017	Pond water level staff gauge (shown at approximately 997.1 feet of elevation mean sea level).

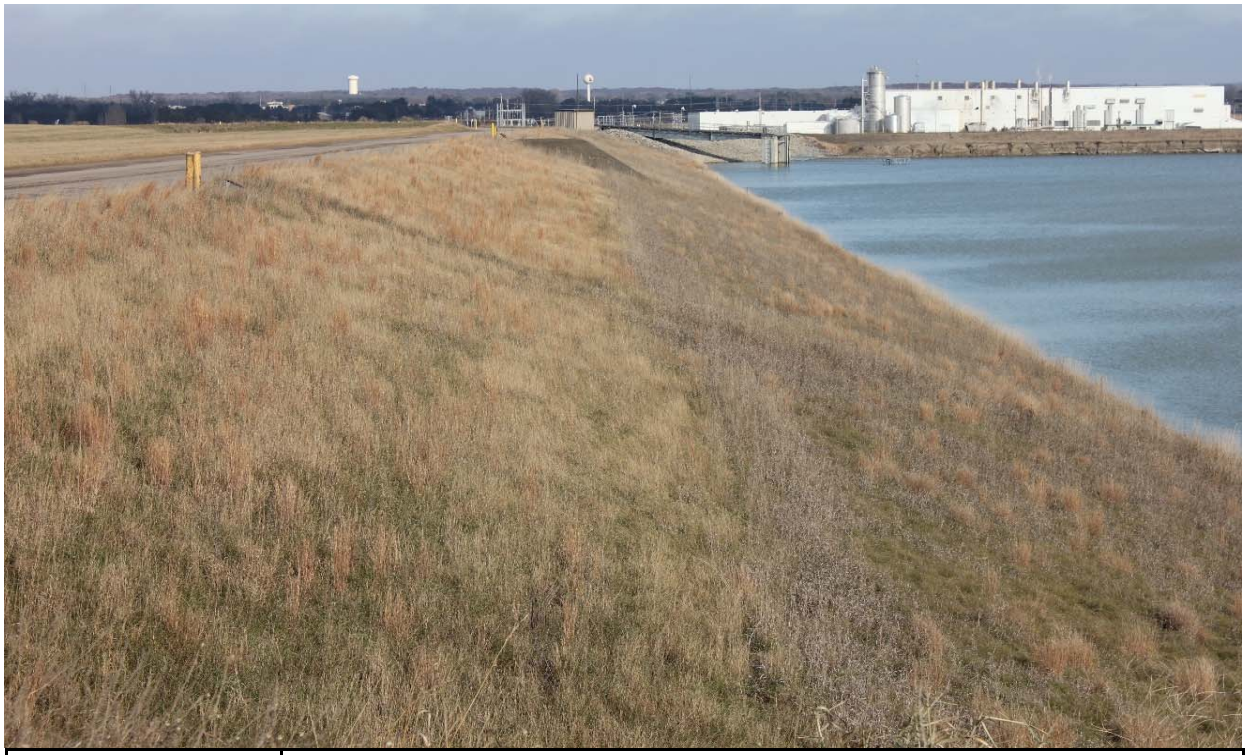

Photo 28 11/8/2017	Pond interior west slope, looking north.

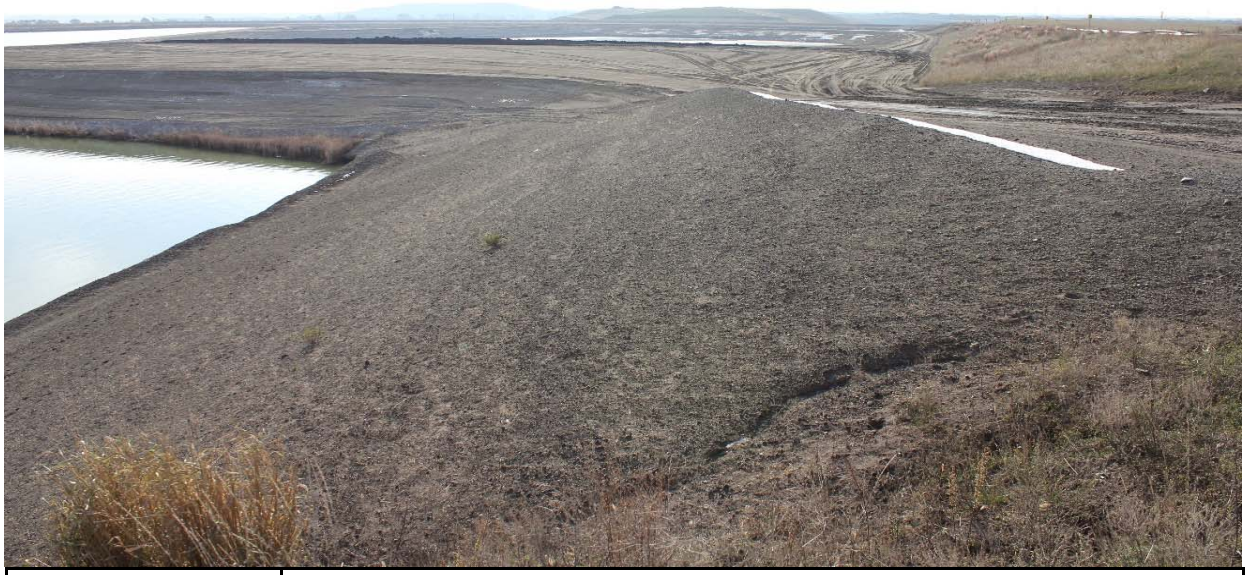

Photo 29 11/8/2017	Pond interior west slope and bottom ash diking, looking south.

Photo 30 11/8/2017	Foreground: Pond stainless steel scrubber solid pipes. Middle-left: CCR angled well.

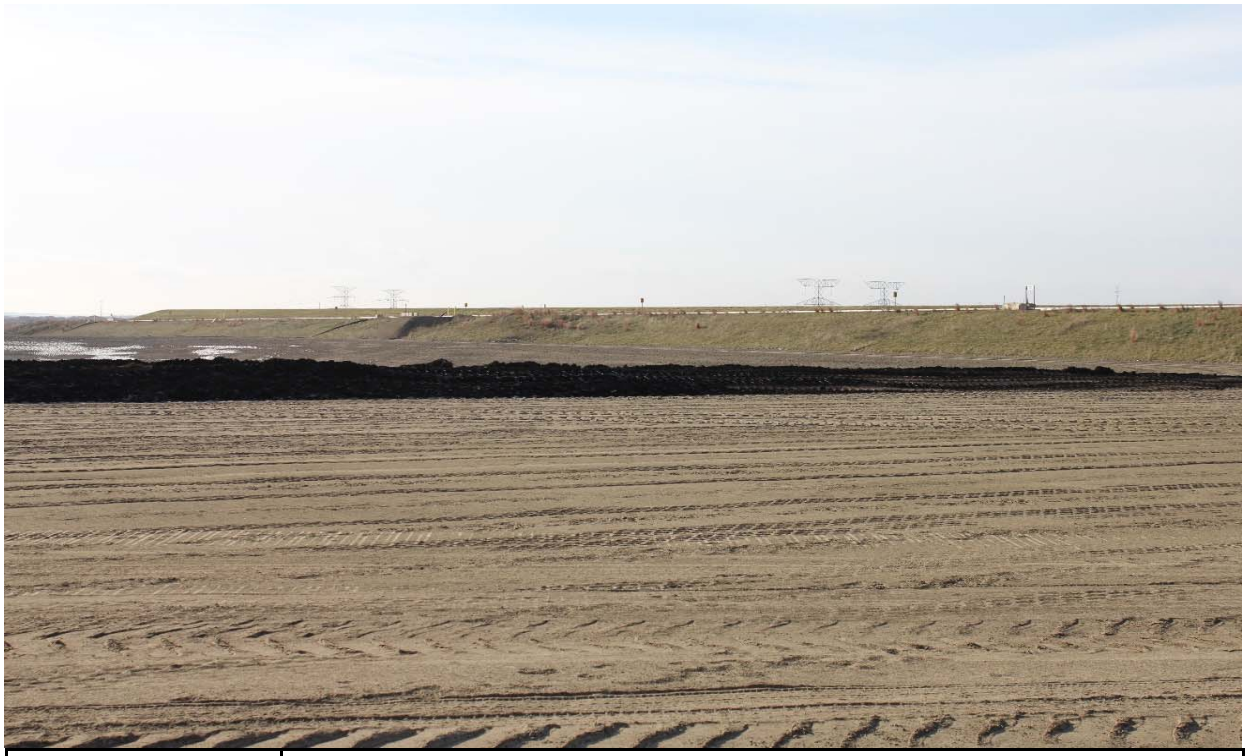

Photo 31 11/8/2017	Pond west embankment south end, looking southwest.

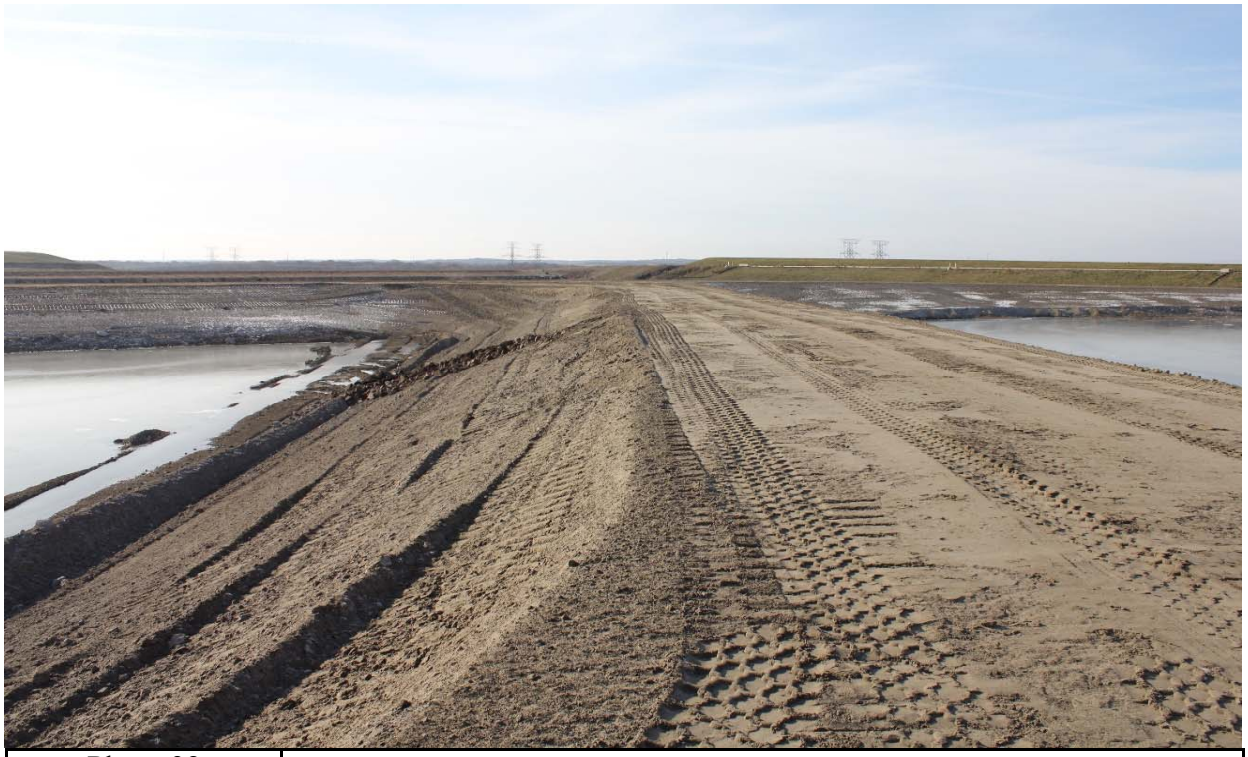

Photo 32 11/8/2017	Bottom ash diking, looking southwest.