DAM & DIKE INSPECTION
REPORT

CCR Surface Impoundments

OKLAUNION POWER STATION
WASTEWATER POND COMPLEX
VERNON, TX

INSPECTION DATE   May 27 & 28, 2015

PREPARED BY       DATE
William R. Smith, P.E.   1/13/2016

REVIEWED BY       DATE
Gary F. Zych, P.E.   1/13/2016

APPROVED BY       DATE
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Manager – Geotechnical Engineering

GERS-15-011

PROFESSIONAL ENGINEER
SEAL & SIGNATURE
INTRODUCTION

American Electric Power Service Corporation’s (AEPSC) Civil Engineering Division administers the Oklaunion Power Station Dam Inspection and Maintenance Program (DIMP). As part of the DIMP, staff from the Geotechnical Engineering Services Section periodically conducts dam and dike inspections. The 2015 inspection of the CCR pond complex at Oklaunion Station was performed by Mr. William R. Smith, P.E. of AEPSC Civil Engineering. This report presents a summary of the inspection and an assessment of the condition of the facilities.

The inspection was performed on May 27 and 28, 2015. Mr. Peter A. Civitarese, energy production superintendent was the plant contact and accompanied Mr. Smith during the inspection. Weather conditions on May 27 were partly cloudy with good visibility, temperatures in the mid to high 80's, and east to south winds from 0-5 mph. Weather conditions on May 28 were sunny with good visibility, temperatures in the mid 80's, and west winds from 0-5 mph. Increasing cloudiness was observed in the afternoon on both days, and thunderstorms were approaching at the end of the inspection on May 28. Inspection observations were briefly discussed with Mr. Civitarese after completion of the field work.

General Facility Information

The Oklaunion Power Station is owned by American Electric Power and is located at 12567 FM Rd 3430, Vernon, TX 76384. The plant is a coal-fired facility, which includes a number of wastewater evaporation ponds containing cooling tower blowdown. Five of the ponds are used to manage coal combustion residuals and other wastewater treatment solids.

Coal combustion residuals are sluiced to the ponds. The five CCR surface impoundments at the plant are referenced as Ponds 6, 21, 22, 23, and the Sludge Pond. A general site plan showing the ponds is provided in Appendix A.

The CCRs sluiced into Ponds 21, 22, 23, and the Sludge Pond are periodically excavated and placed in Pond 6 for final disposal.

As shown on the general site plan, all of the CCR ponds, except Pond 6, are confined by dikes comprising wastewater treatment and evaporation ponds. The interior and exterior slopes of the dikes separating Ponds 21, 22, 23 and the Sludge Pond are not exposed for inspection except for the interior portions above the normal operating levels. The normal operating levels are generally 3-5 feet below the crest of the dikes. Only the eastern, southern and western dikes of Pond 6 have exposed downstream slopes.

All of the dikes are homogeneous earthen embankments having side slopes of 3H:1V and crest widths averaging 20 feet. The highest dike section is about 23 feet and located in the southwestern corner of Pond 6. The following table is a summary of current water levels; water volume and solids volume based on conditions in December 2015.
<table>
<thead>
<tr>
<th>Units</th>
<th>Pond 6</th>
<th>Pond 21</th>
<th>Pond 22</th>
<th>Pond 23</th>
<th>Sludge Pond</th>
</tr>
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<tbody>
<tr>
<td>Crest Elev</td>
<td>Feet</td>
<td>1208</td>
<td>1215</td>
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<td>Water vol</td>
<td>Ac-ft</td>
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<td>103.6</td>
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<tr>
<td>Solids vol</td>
<td>Ac-ft</td>
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<tr>
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<td>Not measurable</td>
<td>Not measurable</td>
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<tr>
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<td>1195</td>
<td>1190</td>
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SUMMARY OF VISUAL OBSERVATIONS

The summary of the visual observations presented herein uses terms to describe the general appearance or condition of an observed item, activity or structure. The meaning of these terms is understood as follows:

Good: A condition or activity that is generally better or slightly better than what is minimally expected or anticipated from a design or maintenance point of view.

Fair/Satisfactory: A condition or activity that generally meets what is minimally expected or anticipated from a design or maintenance point of view.

Poor: A condition or activity that is generally below what is minimally expected or anticipated from a design or maintenance point of view.

Minor: A reference to an observed item (e.g. erosion, seepage, vegetation, etc.) where the current maintenance condition is below what is normal or desired, but which is not currently causing concern from a structure safety or stability point of view.

Significant: A reference to an observed item (e.g. erosion, seepage, vegetation, cracks, concrete surface etc.) where the current maintenance program has neglected to improve the condition. Usually, conditions that have been identified in previous inspections, but have not been corrected.

Excessive: A reference to an observed item (e.g., erosion, seepage, vegetation, cracks, concrete surface etc.) where the current maintenance condition is above or worse than what is normal or desired, and which may have affected the ability of the observer to properly evaluate the structure or particular area being observed or which may be a concern from a structure safety or stability point of view.

Results of the visual inspection are summarized below with inspection photographs included in Appendix B. The inspection focused on the eastern, southern, and western dikes impounding the main pond complex area (see general site plan in Appendix A). A general note for this inspection is that the area experienced severe to exceptional drought conditions for about five years prior to 2015 leaving all vegetation stressed during those years and making new vegetation establishment and preservation extremely difficult. Contrastingly, the spring of 2015 was very wet with weather reports indicating the wettest May on record for the area. As a consequence of these climate extremes, some areas that had been seeded with a mix of native, perennial grasses during the years of drought were overrun with weedy vegetation that had recently proliferated during the very wet spring of 2015.
Wastewater Evaporation Pond #6

Pond #6 is located at the south-central edge of the main evaporation pond complex area. The upstream slope has been filled with solid waste materials to the crest and is not visible. The pond still contains a small amount of water, but the water surface is at least 120 feet back from the former inboard crest line (photo 1). The pond's east embankment forms the western side of the Pond #7 spillway discharge channel.

The crest of the embankment appeared to be in good condition with no unusual cracking, rutting, settlement, deformation, or misalignment (photos 2 & 3).

The downstream slopes of the east, south and west dikes were in overall fair condition (photos 4-6). No signs of slope failure, slumping, or seepage were observed on the downstream slopes and no burrowing animal activity was noted although some moderately overgrown vegetation in certain areas of the eastern slope made observations difficult. Other small areas were sparsely vegetated, mostly on the south slope, but no erosional features were noted. All slopes were free of woody vegetation.

The eastern slope of Pond #6 is also the western slope of the Pond #7 spillway discharge channel. The channel was in fair condition, with its bed devoid of any vegetation and therefore susceptible to erosion (photo 4). The spillway of the adjacent Pond #7 has been blocked and no discharge can occur. However, the discharge channel below Pond #7 also receives runoff from the surrounding area and should be monitored for erosion as part of the periodic visual inspections.

The toe of the western dike parallels a drainage channel. Some erosion of the channel slope has occurred over the years and is starting to encroach near the toe (photo 6). This progression of erosion should be monitored during the periodic visual inspections.

Ponds 21, 22, 23 and Sludge Pond

As described in the General Facility Information, the earthen embankments for these ponds are within the limits of the exterior dikes of the entire pond complex at the plant. The only visible portions of these dikes are the top 3-5 feet above the normal pool/solids level. Based on periodic inspection of these dikes by plant personnel, there are no visual observations to indicate any structural deficiencies that would impact the integrity of the dikes. Photos 7-10 provide views of each pond.

INSTRUMENTATION

At the time of this inspection, there was no instrumentation installed in the embankments at the plant. The pond levels are estimated by plant personnel.
CONCLUSIONS

Based on the visual observations during the inspection of the CCR surface impoundments at Oklaunion Station, the overall condition of the dikes at the facility is fair. As such, it is concluded that the dikes are performing as designed. However, a few areas were in fair to poor condition and should be addressed before conditions worsen.

RECOMMENDATIONS

A summary of recommendations for specific remedial activities is provided as follows.

Recommendations for Specific Remedial Activities
There are no recommendations for remedial activities.

Recommendations for General Maintenance and Monitoring Activities

- Areas on slopes with bare ground or sparse vegetation should be regraded if necessary, seeded with a mix of native, non-invasive perennial grasses, and mulched. Biodegradable erosion control matting with native seed and mulch, and possibly fertilization and watering, may be necessary to reestablish the grass cover in these areas. A recommended seed mix for this facility is as follows: Haskell sideoats (60%, 12#/ac.), buffalograss (40%, 24#/ac.) with an addition of 4#/ac. of green sprangletop for a quick first-year cover. Seeding rates are based on pure live seed (PLS) percentages.

- Any erosion gullies or slumps that are encountered should be repaired as soon as possible. Erosion gullies and slumps may be repaired by regrading, backfilling, and recompacting to a uniform slope then placing riprap underlain with anchored geotextile or revegetating with native, non-invasive perennial grasses to reestablish ground cover depending on the slope gradients and propensity for development of concentrated water flow. Biodegradable erosion-control matting with native seed and mulch, and possibly fertilization and watering, may be necessary to reestablish a ground cover.

- The earthen slopes of the dikes should be maintained free of excessive brush and woody vegetation. It is important to establish a thick, native, non-invasive perennial grass cover as soon as possible after disturbing the ground for brush or tree clearing activities.

- Grassed areas should be mowed regularly. Mowing at least twice per year (typically in late spring and late fall) and maintaining vegetation height at a maximum of 6 inches as per the CCR rule is recommended. Any areas that are not accessible to mowing equipment should be controlled by the use of weed trimmers, power brush-cutters, or other suitable vegetation control processes.

- All observed animal burrows in the embankments should be filled with a compacted impervious material or cementious grout, dressed with topsoil,
regraded if necessary, and any disturbed ground seeded with native, non-invasive perennial grasses and mulched to establish a complete ground cover for erosion protection. Biodegradable erosion-control matting with native seed and mulch, and possibly fertilization and watering, may be necessary to reestablish a ground cover. Following these repair efforts, the areas should be monitored for the reappearance of any burrowing animal activity and addressed accordingly.

- Plant inspection and monitoring procedures, maintenance activities, and reporting with respect to the dikes should be implemented in coordination with AEP Civil Engineering.

If you have any questions with regard to this report, please do not hesitate to contact Mr. William R. Smith, P.E. at 614-716-2906 (Audinet: 200-2906) or Gary Zych, P.E. at 614-716-2917 (Audinet: 200-2917).
APPENDIX A

General Site Plan
APPENDIX B

Inspection Photos
APPENDIX B
OKLAUNION WASTEWATER POND COMPLEX
CCR DIKE INSPECTION PHOTOGRAPHS

Photo 1
View of Pond 6 solids and water surface in the background

Photo 2
Crest of Pond 6 at the southeast corner

Photo 3
Crest of Pond 6 along south dike
### APPENDIX B
OKLAUNION WASTEWATER POND COMPLEX
CCR DIKE INSPECTION PHOTOGRAPHS

<table>
<thead>
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<th>Photo 4</th>
<th>Exterior slope of east dike, Pond 6</th>
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<td>Photo 7</td>
<td>View from south</td>
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