Coal Combustion Residual
Surface Impoundment
Annual Inspection

Basin Electric Power Cooperative
Laramie River Station

January 2017

Table of Contents

Purpose and Definitions

In accordance with 40 CFR §257.83, the purpose of this Surface Impoundment Annual Inspection (Inspection) is to provide an annual inspection and review of available information regarding the status and condition of Coal Combustion Residual (CCR) Surface Impoundments at the Basin Electric Power Cooperative (Basin Electric) Laramie River Station (LRS) Bottom Ash Ponds 1, 2, and 3 and East and West Emergency Holding Ponds.

LRS operates three coal-fired boilers, resulting in the production of CCRs. CCRs are defined in 40 CFR §257.53 (Definitions) as:

"*CCR means fly ash, bottom ash, boiler slag, and flue gas desulfurization materials generated from burning coal for the purpose of generating electricity by electric utilities and independent power producers.*"

CCRs generated at LRS (and thus regulated under 40 CFR §257) include bottom ash, flue gas desulfurization (FGD) materials and fly ash.

Impoundment Descriptions

The LRS impoundments contain waste water, bottom ash, lime slurry and other byproducts of the coal burning process. The Bottom Ash Ponds and the Emergency Holding Ponds presently contain CCR materials. The Bottom Ash Ponds are located to the west of the main plant, and the Emergency Holding Ponds are located to the north of the main plant.

The Bottom Ash Ponds are divided into Ponds 1, 2 and 3. Bottom Ash Pond 3 contains bottom ash and boiler slag whereas Bottom Ash Ponds 1 and 2 contain mostly decanted water. The bottom ash and boiler slag are first wet sluiced into Bottom Ash Pond 3. Water from Bottom Ash Pond 3 is then decanted into Bottom Ash Ponds 1 and 2.

Bottom Ash Ponds 1 and 2 have surface areas of approximately 15.5 and 30.9 acres, respectively, and are separated by a north-south oriented divider dike. The crests of the impoundment dikes for Bottom Ash Ponds 1 and 2 are at elevation +4565 feet and the toe is at elevation +4540 feet, resulting in an approximate 25-foot structural height. Bottom Ash Pond 3

is located directly south of Bottom Ash Ponds 1 and 2 and has a surface area of approximately 59.9 acres. The crest of the impoundment dike for Bottom Ash Pond 3 is at elevation +4590 feet and the toe is at elevation +4565 feet. The maximum height of the Bottom Ash 3 impoundment dikes is 50 feet, as measured from the crest of the north dike to the toe of the adjacent south dike for Bottom Ash Ponds 1 and 2. The total storage of Bottom Ash Ponds 1, 2 and 3 is approximately 2,100 acre-feet. The interior (i.e., pond side) and exterior (i.e., land side) slopes of the Bottom Ash Pond impoundment dikes were constructed at an approximately 3 Horizontal to 1 Vertical (3H:1V) inclination.

Bottom Ash Ponds 1, 2 and 3 were constructed with a 30 mil polyvinyl chloride (PVC) liner over 6 inches of bedding material covering the base of the ponds. The interior slopes of the impoundment dikes for Bottom Ash Ponds 1, 2 and 3 were generally constructed with a 30 mil PVC liner placed on 6 inches of bedding material; the liner was overlain by 12 inches of cover soil and then 12 inches of rip rap at the surface. Bottom Ash Pond 3 contains wet sluiced bottom ash and boiler slag whereas Bottom Ash Ponds 1 and 2 contain mostly water that has been decanted from Bottom Ash Pond 3.

The Emergency Holding Ponds are divided into the East Emergency Holding Pond and the West Emergency Holding Pond. Flue gas emission control residuals and water treatment plant spent lime slurry are wet sluiced into the West Emergency Holding Pond. Water from the West Emergency Pond is then decanted into the East Emergency Pond.

The East and West Emergency Holding Ponds have surface areas of approximately 27.9 and 30.1 acres, respectively, and are separated by a northwest-southeast oriented divider dike. The crests of the impoundment dikes are at elevation +4540.5 feet for both ponds. The toe elevation of the impoundment dikes is at elevation +4520.5 feet for both ponds resulting in a structural height of approximately 20 feet. The total storage of the East and West Emergency Holding Ponds is approximately 915 acre-feet.

The East and West Emergency Holding Pond impoundment dikes were constructed with a 30 mil Hypalon liner on the base of the ponds. The interior slopes of the impoundment dikes were constructed with a 30 mil Hypalon liner; the liner was overlain by overlain by 12 inches of filter gravel and then 12 inches of rip rap at the surface.

In 2016, the East and West Emergency Holding Pond southern impoundment dikes were flattened to a 3H:1V slope versus the existing 2:1 slope. This work was performed utilizing local fill material to strengthen the integrity of the dikes, thus increasing the factor of safety for stability. This work was completed based on recommendations from a third party engineer.

The five CCR impoundments were constructed about 1980 during original construction of LRS. The impoundment dikes were largely constructed by excavating out the impoundment basins and placing the excavated material directly along the perimeter of the basins to form the impoundment dikes.

Periodic Inspections

The Bottom Ash and Emergency Holding Ponds are periodically inspected by LRS personnel once a week. The inspection checklists are completed and filed in the operating record. The checklists address visual inspections and any action needed to correct issues.

Upon review of these inspection records, there are no appearances of actual or potential structural weakness nor other conditions that are disrupting or have the potential to disrupt the operation or safety of the impoundment.

Annual Inspections

The Bottom Ash and Emergency Holding Ponds are periodically and annually inspected by Basin Electric qualified professional engineers. The inspections address signs of distress or malfunction of the impoundment and appurtenant structures. The hydraulic structures underlying the base of the impoundment or passing through the dikes are also visually inspected for structural integrity and continued safe and reliable operation.

Based on the inspection of the Bottom Ash Ponds on November 1, 2016 the following points are addressed:

i. There have been no changes in the geometry of the impounding structures since the previous annual inspection.
ii. Instrumentation for Bottom Ash Pond 1 consists of a staff gauge mounted on the concrete intake structure on the western side of the pond. The staff gauge level at 5.4' is equivalent to the top of concrete of the intake at 4565.00 msl.

iii. Instrumentation for Bottom Ash Pond 2 consists of a staff gauge mounted to the west side of the pumphouse. The staff gauge level at 16.5' is equivalent to the top of concrete of the wing wall at 4561.33 msl.

iv. Instrumentation for Bottom Ash Pond 3 consists of a staff gauge mounted to the concrete inlet structure. The staff gauge level at 19.3' is equivalent to the top of concrete of the inlet structure at 4590.00 msl.

v. The maximum recorded reading since the previous annual inspection:
   a. Bottom Ash Pond 1: 3.0' on the staff gauge which equates to 4562.6' msl
   b. Bottom Ash Pond 2: 11.8' on the staff gauge which equates to 4556.63' msl
   c. Bottom Ash Pond 3: 16.4' on the staff gauge which equates to 4587.1' msl

vi. The approximate minimum depth of impounded water and CCR since the previous annual inspection:
   a. Bottom Ash Pond 1: 1.7' on the staff gauge which equates to 4561.3' msl
   b. Bottom Ash Pond 2: 7.6' on the staff gauge equating to 4552.43' msl
   c. Bottom Ash Pond 3: 12.6' on the staff gauge equating to 4583.3' msl

vii. The approximate maximum depth of impounded water and CCR since the previous annual inspection:
   a. Bottom Ash Pond 1: 22.6'
   b. Bottom Ash Pond 2: 16.63'
   c. Bottom Ash Pond 3: 22.1'

viii. The present depth and elevation of the impounded water and CCR since the previous annual inspection:
   a. Bottom Ash Pond 1: Depth of 21.7' with a water elevation of 4561.7'msl
   b. Bottom Ash Pond 2: Depth of 15.43' with a water elevation of 4555.43'msl
   c. Bottom Ash Pond 3: Depth of 19.1' with a water elevation of 4584.10'msl.

ix. The remaining storage capacity at the time of inspection:
   a. Bottom Ash Pond 1: approximately 99.6 ac-ft.
   b. Bottom Ash Pond 2: approximately 144.67 ac-ft.
   c. Bottom Ash Pond 3: approximately 344.89 ac-ft.

x. The approximate volume of the impounded water and CCR at the time of inspection:
   a. Bottom Ash Pond 1: approximately 654.94 ac-ft
   b. Bottom Ash Pond 2: approximately 233.26 ac-ft
   c. Bottom Ash Pond 3: approximately 1,116.51 ac-ft.

xi. There are no appearances of an actual or potential structural weakness of the impoundments, nor are there any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the Ponds and appurtenant structures.

xii. There are no other changes that may affect the stability or operation of the impounding structure since the previous annual inspection.

Based on the inspection of the Emergency Holding Ponds on November 1, 2016 the following points are addressed:

i. There have been outer slope gradient changes on the eastern, southern, and part of the western slopes of the impounding structures since the previous annual inspection. The northern and part of the western slopes have not changed in geometry.

ii. There currently is no instrumentation for the Emergency Holding Ponds. The ponds are manually checked daily by plant personnel.

iii. The maximum recorded reading since the previous annual inspection:
   a. West Emergency Holding Pond: 24" below the top of the dike or 4538 msl
   b. East Emergency Holding Pond: 24" below the top of the dike or 4538 msl

iv. The minimum recorded reading since the previous annual inspection:
   a. West Emergency Holding Pond: 48" below the top of the dike or 4536 msl
   b. East Emergency Holding Pond. 48" below the top of the dike or 4536 msl

v. The approximate maximum depth of impounded water and CCR since the previous annual inspection:
   a. West Emergency Holding Pond: 17.5'
   b. East Emergency Holding Pond: 18'

vi. The approximate minimum depth of impounded water and CCR since the previous annual inspection:
   a. West Emergency Holding Pond: 15.5'
   b. East Emergency Holding Pond: 16'

vii. The present depth and elevation of the impounded water and CCR since the previous annual inspection:
   a. West Emergency Holding Pond: present elevation is 4536.75', or 16.5' deep
   b. East Emergency Holding Pond: present elevation is 4536.75', or 16.75' deep

viii. The storage capacity at the time of inspection:
   a. West Emergency Holding Pond: 95.47 ac-ft.
   b. East Emergency Holding Pond: 88.49 ac-ft.

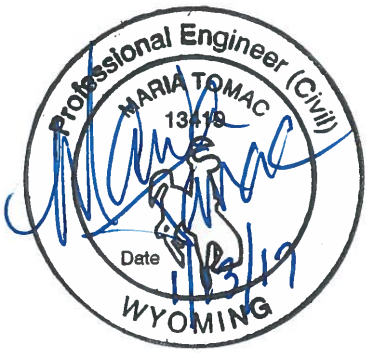
ix. The approximate volume of the impounded water and CCR at the time of inspection:
    a. West Emergency Holding Pond: 477.35 ac-ft.
    b. East Emergency Holding Pond: 456.09 ac-ft.

x. There are no appearances of an actual or potential structural weakness of the impoundment, nor are there any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the Emergency Holding Ponds and appurtenant structures.

xi. There are no other changes which may affect the stability or operation of the impounding structure since the previous annual inspection.

Certification Statement

I certify that this Surface Impoundment Annual Inspection meets the requirements of 40 CFR §257.83 specifying Inspection requirements for CCR surface impoundments in the *Standards of Coal Combustion Residuals in Landfills and Impoundments.*



Maria Tomac, WY PE-13419
January 13, 2017