Coal Combustion Residual
Surface Impoundment
Closure Plan

Basin Electric Power Cooperative
Laramie River Station

October 2016

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Purpose and Definitions

In accordance with 40 CFR §257.83, the purpose of this Surface Impoundment Closure Plan is to provide a written closure plan that describes the steps necessary to close the 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. 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 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 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.

The five CCR impoundments were constructed about 1980 during original construction of LRS and have not been expanded since. 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.

Pond Closure Narrative

The Bottom Ash and Emergency Holding Ponds will be closed in accordance with EPA and Wyoming DEQ regulations. In general, pond closure will consist of dewatering and stabilizing CCRs, constructing subgrade to promote drainage, the placement of final cover material, establishment of vegetation on the cover, and the surface water drainage system. These activities will be implemented to achieve the following closure design and performance standards.

Bottom Ash Ponds

Closure will be achieved by leaving the existing ash within the ponds. The ash will be graded to allow construction of the final cover, so as to no longer impound water. Subgrade soils will be used for placement of fill to cover the ash and achieve the design subgrade elevations. The ponds will be sequentially dewatered while the ash is being graded.

The dikes for the ponds will be graded, utilizing the dike material for subgrade fill and additional subgrade fill will be placed as necessary. Since there is a synthetic component in the bottom liner of the pond, accordingly there must be a synthetic component in the cap. Thus, a High Density Polyethylene (HDPE) or PVC-equivalent liner will be placed on top of the graded ash. The additional subgrade and final cover soils will be obtained from an off-site borrow area. The upper soil horizon material in the borrow area will be stripped and stockpiled for the plant root zone and vegetative layers. The vegetative layer will be permanently seeded with grass to minimize erosion and maintenance.

The final cover will be graded to achieve grades between 3 and 15 percent to promote runoff while limiting excessive erosion. The final cover will consist of the following:

- An HDPE or PVC-equivalent liner
- A 1.5 foot thick infiltration layer;
- A 0.5 foot thick plant root zone layer; and
- A 0.5 foot thick vegetative layer.

Temporary sediment and erosion controls will be installed. Silt fencing, erosion protection matting, check dams, sediment traps, and/or temporary sediment ponds will be designed for both the borrow area and the pond closure.

Emergency Holding Ponds

Closure will be achieved by leaving the existing material within the ponds. The existing material will be graded to allow construction of the final cover, so as to no longer impound water. Subgrade soils will be used for placement of fill to cover the material and achieve the design subgrade elevations. The ponds will be sequentially dewatered while the material is being graded.

The dikes for the ponds will be graded, utilizing the dike material for subgrade fill and additional subgrade fill will be placed as necessary. Since there is a synthetic component in the bottom liner of the pond, accordingly there must be a synthetic component in the cap. Thus, a High Density Polyethylene (HDPE) or Hypalon-equivalent liner will be placed on top of the graded material. The additional subgrade and final cover soils will be obtained from an off-site borrow area. The upper soil horizon material in the borrow area will be stripped and stockpiled for the plant root zone and vegetative layers. The vegetative layer will be permanently seeded with grass to minimize erosion and maintenance.

The final cover will be graded to achieve grades between 3 and 15 percent to promote runoff while limiting excessive erosion. The final cover will consist of the following:

- An HDPE or Hypalon-equivalent liner
- A 1.5 foot thick infiltration layer;
- A 0.5 foot thick plant root zone layer; and
- A 0.5 foot thick vegetative layer.

Temporary sediment and erosion controls will be installed. Silt fencing, erosion protection matting, check dams, sediment traps, and/or temporary sediment ponds will be designed for both the borrow area and the pond closure.

Impoundment Quantities

The exact volumes of CCR materials in the Bottom Ash and Emergency Holding Ponds is not known. The estimated volumes of the ponds at the projected time of closure is as follows:

- The maximum inventory of CCR in Bottom Ash Pond 1 will be approximately 430,000 cubic yards.
- The maximum inventory of CCR in Bottom Ash Pond 2 will be approximately 860,000 cubic yards.
- The maximum inventory of CCR in Bottom Ash Pond 3 will be approximately 2,000,000 cubic yards.
- The maximum inventory of CCR in West Emergency Holding Pond will be approximately 750,000 cubic yards.
- The maximum inventory of CCR in East Emergency Holding Pond will be approximately 688,000 cubic yards.

Impoundment Area

The areas requiring final cover in the Bottom Ash and Emergency Holding Ponds is limited to the dike locations on all the ponds. The estimated areas of cover at the projected time of closure is as follows:

- The largest area requiring final cover for Bottom Ash Pond 1 is approximately 16 acres.
- The largest area requiring final cover for Bottom Ash Pond 2 is approximately 31 acres
- The largest area requiring final cover for Bottom Ash Pond 3 is approximately 60 acres.
- The largest area requiring final cover for West Emergency Holding Pond is approximately 31 acres.
- The largest area requiring final cover for East Emergency Holding Pond is approximately 29 acres.

Closure Schedule

The estimated closure schedule for all ponds will be at the time of facility closure, cessation of material deposition into the ponds, or when the ponds have been filled. The remaining life of the facility may vary depending on factors such as ash content of coal, diversion of CCRs for beneficial use, and electrical generation rates, among others. The Bottom Ash and Emergency Holding Ponds would not reach capacity for approximately 60 years, which is likely beyond the operating life of LRS.

Recordkeeping and Reporting

A copy of this document will be placed into the facility's operating record in accordance with 40 CFR §257.105 (Recordkeeping Requirements) and will be posted to Basin Electric Power Cooperative's CCR Web site in accordance with 40 CFR §257.107 (Publicly accessible internet site requirements). Notification will be sent to the relevant State Director in accordance with 40 CFR §257.106 (Notification Requirements).

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
October 14, 2016