

# **Talen Montana LLC. Coal Combustion Residual (CCR) Beneficial Use Summary**

## **1/31/2023**

The following is a status summary of Talen Energy's (Talen) efforts to evaluate a beneficial use program for Coal Combustion Residuals (CCR) material at the Colstrip Steam Electric Station (Colstrip), which is operated by its subsidiary Talen Montana.

### **Background**

In August 2012, DEQ and Talen Montana entered into an Administrative Order on Consent (AOC) to address impacts from wastewater facilities at the Colstrip Power Plant. The AOC was entered as part of an enforcement action taken by DEQ, and it includes a step-by-step plan for remediation of the groundwater downgradient of the ash ponds, including closure of coal ash impoundments. For purposes of the AOC process, the site has been divided into three areas: the Plant Site area, the Units 1 and 2 Stage One Evaporation Pond (SOEP) /Stage Two Evaporation Pond (STEP) area, and the Units 3&4 Effluent Holding Pond (EHP) area. The Montana DEQ maintains Colstrip Coal Ash Pond Cleanup information on its public website for reference.

The Units 1 and 2 SOEP/STEP area includes approximately eight million tons of CCR impoundments. Talen Montana, as signatory to the Colstrip Wastewater AOC on behalf of the Colstrip Owners, is currently working to implement the remediation and closure activities under the AOC. For the Units 1&2 SOEP/STEP area, the current presumptive plan is to close the CCR impoundments by removal and place the CCR material in a newly designed and constructed landfill adjacent to the existing impoundments. All work, including closure of the new landfill, is to be completed by 2031.

### **Efforts to Date**

Talen has been actively exploring potential solutions that will beneficially use the CCR material as an alternative to placing the material in a new landfill. At current, our efforts to identify a viable option have not yet been successful. As we pursue options, we must remain mindful of the regulatory requirement to complete closure activities for the SOEP and STEP areas by the end of 2031 in a way that is protective of human health and the environment. It is essential that any beneficial use option must be a proven technology with a demonstrated track record of safe, environmentally compliant, and successful implementations.

Talen has engaged with groups regarding beneficial use for over eight years and through this effort, has identified three main areas for potential CCR beneficial use. We have been actively evaluating these areas to determine if any type of beneficial use of CCR is feasible. These three areas are:

1. Rare Earth Element (REE) Extraction
2. Cementitious Type Applications
3. Emerging Technology Applications

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### **Rare Earth Element Extraction**

Talen has performed sampling, testing, and screening of Colstrip CCR material with five different vendors (Elixsys, Winner Waters, Neodymia LLC, American Resources, and Battelle) in efforts to evaluate the viability of REE beneficial use for Colstrip's CCR. Talen has also been collaborating with different universities (University of Wyoming, Montana Tech, Cornell, and recently Penn State) that are developing a REE extraction process specific to Powder River Basin Ash (PRB) which is the type of coal utilized at the Colstrip Power Plant.

Talen has also been collaborating with the Montana Department of Commerce and Southeastern Montana Development Corporation (SEMDC) regarding beneficial use of Colstrip Power Plant CCR.

Additionally, Talen has had discussions with companies that are already in the REE industry including Mountain Pass, Bear Lodge, Energy Fuels, and American Fuels.

Talen has also been active with the DOE and National Energy Technology Laboratory (NETL), as both organizations are managing grants/funding included in the recent Bilateral Infrastructure Law and the Inflation Reduction Act - BIL and IRA respectively. Testing to date has shown that Colstrip CCR has a concentration of ~300ppm REE which is the threshold set by the US Department of Energy (DOE). Talen responded to the DOE request for information and has applied to their teaming lists to be visible to companies that may have a solution but wish to use Talen's feedstock, in this case the Colstrip Power Plant CCR.

#### **Key findings:**

- REE extraction will only utilize 1-3% of the gross volume of Colstrip CCR
- Any REE solution would need to be paired with another process (for example cementitious type) to achieve full beneficial utilization of Colstrip's CCR.
- Specific to Colstrip CCR, there is a concentration of REE ~ 300 ppm which is the threshold for DOE involvement/funding, however we have not been contacted for participation in support of potential efforts through their programs.
- REE extraction from CCR has not been developed into the separation of individual elements, which limits potential opportunities.

### **Cementitious Type Beneficial Uses**

Talen has also been in discussions with more than ten vendors, including Ashcor, Boral, Eco-Materials, CementLock, Engineered Aggregates, NuRock, Ashtek, Tephra, SEFA, Cinder Residuals, PSI/Winner Water Solutions, RamRock, and ReSolve, in ongoing efforts to see if any cement type uses would be applicable.

Talen has an internal resource dedicated to Beneficial Use of CCR. This individual is highly active in the ACAA (American Coal Ash Association), USWAG (Utility Solid Waste Activities Group), and in the ASTM (American Society for Testing and Materials) which governs the requirements for use of coal fly ash (CFA) in cement/ready mix type products. The individual continues to explore opportunities through these avenues.

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### Key findings:

- The chemical characteristics of the Colstrip CCR, including its collection in the Colstrip Power Plant wet scrubber system, results in a material that is not ideal for cement type use.
- There are potential processes/techniques for utilizing the Colstrip CCR in concrete type materials for the purpose of building or construction materials. Talen continues to evaluate these process/techniques.

### Emerging Technology Applications

Talen has been actively monitoring emerging technologies through existing contacts and by attending industry conferences (7 in 4 states) that were specific to CCR beneficial use and clean energy initiatives. This has been in addition to our previously mentioned industry involvement. We continue to follow developments around the following emerging technologies:

- The Dar-Stim process which utilizes Coal Fly Ash for a fracking medium. This process increases yields on new/existing gas wells and is currently being utilized in various parts of Texas.
- A Carbon Capture technology that can be injected into fly ash that is being utilized for cement type uses – chemically it creates a faster cure and better compressive strength in initial results.
- Potential asphalt and anti-skid processes are among other emerging technologies that could help enable 100% beneficial use of Colstrip CFA.

### Key finding:

- Because they are novel technologies, more study will be required.

### Considerations

Through our continued exploration of beneficial use options, the following considerations have been identified, which are universal across the various potential areas outlined within.

- Through discussions regarding virtually all beneficial use opportunities, each has identified the same economic and logistical challenges with regards to the geographic location of the Colstrip site and limited modes of transportation that could be utilized to bring necessary materials in and take the finished product out.
- Rail access has also been identified as essential for any beneficial use option. Colstrip does have rail to the plant site area, however it would need evaluation/refurbishment/modification to provide a cost-effective transportation method for any proposed beneficial use product.

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### **Conclusion**

Talen remains open to and interested in exploring beneficial use options, however, despite significant efforts to explore options, and engage with a reputable, experienced industry partner, efforts have not yet identified an opportunity for beneficial use at Colstrip that can be viable at this time. While future advancements may lead to a viable option, given the extensive work that needs to be completed to execute closure plans at Colstrip, the window of time for identifying a viable method continues to shrink. Notwithstanding the timing, we are always interested in various beneficial uses of CCR material. As we continue to move forward, Talen's focus remains on activities that are feasible, proven, and protective of human health and the environment, and which will permit us to meet our requirements to complete the required ash pond closure efforts on time and with this focus in mind.