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# SEMI-ANNUAL REMEDY SELECTION AND DESIGN PROGRESS REPORT

## PLANT WATSON FORMER CCR UNIT MISSISSIPPI POWER COMPANY

*Prepared for*

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Project Number: FR3795

March 31, 2021

# Semi-Annual Remedy Selection and Design Progress Report

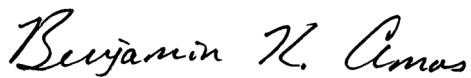
## Plant Watson Former CCR Unit Mississippi Power Company

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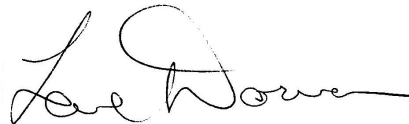
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**TABLE OF CONTENTS**

1. INTRODUCTION .....1

2. FORMER CCR UNIT CLOSURE AND SOURCE CONTROL.....2

3. SUMMARY OF WORK COMPLETED .....3

    3.1 Semi-Annual Groundwater Monitoring .....3

    3.2 SSL Nature and Extent Assessment .....3

        3.2.1 Additional Background Wells .....3

        3.2.2 Horizontal Delineation .....3

        3.2.3 Vertical Delineation .....3

    3.3 Hydraulic Performance Testing.....4

    3.4 Combined Radium Alternate Source Demonstration .....4

    3.5 Geochemical Evaluation.....4

    3.6 Groundwater Flow Modeling .....4

    3.7 Temporary Remedy .....5

4. PLANNED ACTIVITIES AND ANTICIPATED SCHEDULE.....6

5. REFERENCES .....7

**LIST OF FIGURES**

Figure 1      Plant Watson Location Map

## ACRONYMS AND ABBREVIATIONS

ACM	assessment of corrective measures
ASD	alternate source demonstration
CCR	coal combustion residuals
CFR	Code of Federal Regulations
cm/sec	centimeters per second
EPA	Environmental Protection Agency
GWPS	groundwater protection standards
HPT	hydraulic performance testing
LLDPE	linear low-density polyethylene
MDEQ	Mississippi Department of Environmental Quality
MNA	monitored natural attenuation
NPDES	National Pollutant Discharge Elimination System
PRB	permeable reactive barrier
SSL	statistically significant level

## 1. INTRODUCTION

In accordance with the U.S. Environmental Protection Agency's (EPA's) coal combustion residuals (CCR) rule 40 Code of Federal Regulations (CFR) § 257.97(a), this *Semi-Annual Remedy Selection and Design Progress Report* was prepared to provide a semi-annual progress update on the remedy selection process for the former CCR unit at Mississippi Power Company (Mississippi Power) Plant Watson in Gulfport, Mississippi (Site). The location of the former CCR unit is shown in **Figure 1**.

In August 2020, Mississippi Power completed an *Assessment of Corrective Measures (ACM)* to address the occurrence of arsenic, lithium, molybdenum, and combined radium 226 and 228 in Unit 3 groundwater at statistically significant levels (SSLs) (Geosyntec, 2020a). The ACM was placed in the operating record and posted to the Site's CCR Rule Compliance Data and Information website. An Alternate Source Demonstration (ASD) has subsequently been prepared for combined radium 226 and 228, as discussed further in Section 3.4.

Pursuant to § 257.97, Mississippi Power is evaluating potential groundwater remedies presented in the ACM to identify a plan to implement a remedy, or combination of remedies, as soon as feasible. As discussed in the ACM, the following groundwater remedies are potentially viable at the Site:

- In-situ injections;
- Pump-and-treat (hydraulic containment and dewatering);
- Monitored natural attenuation (MNA);
- Permeable reactive barrier (PRB);
- Phytoremediation; and
- Subsurface vertical barrier walls.

Data obtained during on-site investigations, or to evaluate corrective action alternatives, will be included in the *2021 Annual Groundwater Monitoring and Corrective Action Report (Annual Report)* in accordance with § 257.90(e). The Annual Report will be placed in the operating record by August 1, 2021.

The following sections describe: (i) former CCR unit closure and source control; (ii) summary of work completed since the ACM; and (iii) planned activities schedule.

## 2. FORMER CCR UNIT CLOSURE AND SOURCE CONTROL

Mississippi Power completed closure of the former CCR unit in 2018 via closure in place and capping. During closure, the former CCR unit was dewatered sufficiently to remove free liquids. The CCR material remaining in the former CCR unit was graded and a final cover system installed. The final cover system consists of a ClosureTurf cover system by WatershedGeo that utilizes a 50-mil linear low-density polyethylene (LLDPE) geomembrane overlain by an engineered synthetic turf. The final cover system was designed to limit infiltration of precipitation by providing sufficient grades and slopes to promote precipitation runoff to discharge points along the intake and discharge canals along the perimeter of the former CCR unit. The permeability of the final cover system is less than the permeability of the natural subsoils beneath the surface impoundment and not greater than  $1 \times 10^{-5}$  centimeters per second (cm/sec).

The closure of the former CCR unit in the manner described above provides a source control measure that reduces the potential for migration of CCR constituents to groundwater.

### 3. SUMMARY OF WORK COMPLETED

Since completion of the ACM in August 2020, multiple remedy-selection-related activities have been performed as described below.

#### 3.1 Semi-Annual Groundwater Monitoring

Semi-annual assessment monitoring of the certified CCR groundwater monitoring network has continued at the Site in accordance with § 257.95. Groundwater samples were analyzed for Appendix III and Appendix IV constituents. Groundwater monitoring data and associated statistical analyses will be documented in the *Annual Groundwater Monitoring and Corrective Action Reports*, due by August 1 of each year.

#### 3.2 SSL Nature and Extent Assessment

Several activities to assess the nature and extent of SSLs were initiated prior to ACM completion in August 2020. These activities include installation, sampling, and data analysis associated with additional background wells, and horizontal and vertical delineation. These activities have largely been completed, as documented in the December 2020 *Comprehensive Groundwater Investigation Report* (Geosyntec, 2020b), and are briefly summarized below.

##### 3.2.1 Additional Background Wells

Four additional background monitoring wells (APMW-13, APMW-14, APMW-15, and APMW-16) were installed northeast of the former CCR unit to expand the background monitoring well network and provide background groundwater quality from a tidal marsh environment similar to that of the former CCR unit. The additional background wells had a more saline groundwater geochemical environment than existing background wells and, therefore, are more representative of the groundwater monitored at the former CCR unit.

##### 3.2.2 Horizontal Delineation

To assess the horizontal nature and extent of arsenic, lithium, and molybdenum SSLs in Unit 3 groundwater, a synoptic surface water sampling event of 17 locations was conducted. This assessment was completed in surface water because the former CCR unit at Plant Watson is surrounded by surface water (e.g., the intake canal to the north, discharge canal to the west, and tidal marsh to the east). Surface water concentrations were below applicable groundwater protection standards (GWPSs), indicating that the SSLs of arsenic, lithium, and molybdenum observed in Unit 3 groundwater are spatially limited to the area immediately surrounding the former CCR unit.

##### 3.2.3 Vertical Delineation

To assess the vertical nature and extent of arsenic, lithium, and molybdenum SSLs in Unit 3 groundwater, seven vertical delineation monitoring wells (APMW-2D, APMW-3D, APMW-4D, APMW-5D, APMW-6D, APMW-8D, and APMW-10D) were installed adjacent to existing CCR compliance monitoring wells with observed SSLs. Concentrations were below GWPSs, except at APMW-4D and APMW-10D. Additional monitoring has been conducted at APMW-4D and APMW-10D with data to be reported in the Annual Report. Vertical delineation efforts at these

locations will continue to be evaluated. Downward vertical migration from Unit 3 is impeded by Unit 4: a low-permeability marine clay deposit identified throughout the area surrounding the Site.

### 3.3 Hydraulic Performance Testing

Hydraulic Performance Testing (HPT) was initiated prior to ACM completion in August 2020 but completed following ACM finalization. HPT was documented in Geosyntec (2020b) and briefly summarized below.

HPT was designed to evaluate the physical hydraulic properties of the ash within the former CCR unit and the sand aquifer below the former CCR unit (Unit 3) as well as the interaction between the former CCR unit and Unit 3 during pumping. HPT included individual pumping of multiple, existing wells, while simultaneously recording water levels at numerous observation wells within the vicinity of each pumping well location. Key results include:

- HPT demonstrated the effectiveness of the final cover system to quickly shed precipitation and halt infiltration to the former CCR unit during a significant rainfall event.
- Analysis of HPT data from Unit 3 indicate a confined aquifer, consistent with other data interpretations for this unit.
- Aquifer parameters estimated from HPT will be used to inform subsequent project activities (e.g., remedial selection and design).

### 3.4 Combined Radium Alternate Source Demonstration

Statistical analyses identified combined radium (i.e., the sum of radium isotopes <sup>226</sup>Ra and <sup>228</sup>Ra) as one of the constituents with SSLs above applicable GWPS. Combined radium SSLs were identified in the following wells: APMW-1R, APMW-2, APMW-3, APMW-7, and APMW-9. An ASD was completed in December 2020 and concluded that radium SSLs are likely naturally occurring and not from the former CCR unit. The radium ASD is documented in the *Radium Alternate Source Demonstration* (Geosyntec, 2020c). Given the results of the combined radium ASD, groundwater delineation and remedial evaluation activities will no longer be performed for combined radium.

### 3.5 Geochemical Evaluation

A geochemical evaluation of groundwater and ash porewater was completed, as documented in Geosyntec (2020b). The geochemical signatures of ash porewater and Unit 3 groundwater downgradient of the former CCR unit resemble seawater and the saline surface water that surrounds the former CCR unit.

### 3.6 Groundwater Flow Modeling

A groundwater flow model was previously constructed for the Site. Data from HPT and other 2019 and 2020 characterization efforts were used to update and recalibrate the model. Subsequently, the flow model has been used to evaluate groundwater extraction as an



enhancement to source control and as a temporary groundwater corrective measure within the footprint of the former CCR unit.

### **3.7 Temporary Remedy**

In a letter to the Mississippi Department of Environmental Quality (MDEQ) dated December 14, 2020 (Mississippi Power, 2020), Mississippi Power proposed installing a groundwater extraction system at the former CCR unit as a temporary remedy. The letter indicates that the system is anticipated to consist of 2 to 4 extraction wells withdrawing groundwater from Unit 3 below the footprint of the former CCR unit and within the existing slurry wall. The goals of the proposed temporary extraction system are to:

- Begin affirmative groundwater corrective action while a long-term remedy strategy is developed;
- Reduce head in the uppermost aquifer (Unit 3) within the slurry wall footprint;
- Establish an inward flow gradient, thereby minimizing outward flow potential from the former CCR unit;
- Provide a means of enhanced source control; and
- Provide further data and information regarding hydraulic connectivity and interrelationship of water-bearing units at the Site.

In a letter dated January 29, 2021, MDEQ concurred with the conceptual approach. Initial planning and permitting activities are ongoing.

#### 4. PLANNED ACTIVITIES AND ANTICIPATED SCHEDULE

During the next 6 to 12 months, the following activities are planned to support the remedy selection process:

- Semi-annual groundwater assessment monitoring, including sampling of horizontal and vertical delineation locations;
- Initiating studies to evaluate natural attenuation mechanisms in Unit 3 for arsenic, lithium, and molybdenum. The attenuation study, which is anticipated to take 4 to 6 months to complete, will evaluate the EPA-recommended tiered analysis approach to develop multiple lines of evidence for confirming the appropriate application of natural attenuation as a component of a corrective remedy strategy. The attenuation study is anticipated to include:
  - Aquifer matrix, groundwater, and surface water sampling;
  - Laboratory testing, which may include one or more of the following:
    - chemical and mineralogic characterization;
    - batch sorption/desorption testing; and/or
    - column testing; and
  - Data evaluation and documentation of the attenuation mechanisms.
- Continue assessment of other corrective measures identified in the ACM, including evaluating if additional field data collection, laboratory studies, and/or field pilot tests are needed to support remedy selection;
- Continue groundwater flow modeling to refine plans for groundwater extraction as a temporary corrective measure, including potential extraction well locations, depths, and flow rates;
- Design, install, and test groundwater extraction wells for the temporary groundwater remedy;
- Coordinate permitting activities as appropriate with the MDEQ to obtain a National Pollutant Discharge Elimination System (NPDES) discharge permit and groundwater withdrawal permit for the temporary remedial system; and
- Design, install, and commission the temporary remedial system.

As appropriate, data obtained during these activities will be included in the *Annual Groundwater Monitoring and Corrective Action Report* due August 1, 2021.

Final selection of an appropriate remedy will occur as soon as feasible in accordance with the CCR Rule. Until remedy selection is complete, semi-annual remedy selection and design progress reports will continue to be prepared. The next semi-annual progress report will be completed by September 30, 2021.

## 5. REFERENCES

- Geosyntec. 2020a. Assessment of Corrective Measures. Former CCR Unit. Mississippi Power Company. Plant Watson. August 2020.
- Geosyntec. 2020b. Comprehensive Groundwater Investigation Report. Former CCR Unit. Mississippi Power Company. Plant Watson. December 2020.
- Geosyntec. 2020c. Radium Alternate Source Demonstration. Former CCR Unit. Mississippi Power Company. Plant Watson. December 2020.
- Mississippi Power. 2020. Mississippi Power – Plant Watson. Agreed Order No 7010-19. Temporary Remedy. December 2020.

# FIGURE



- Legend**
- Former CCR Unit Boundary
  - RaceTrac Gas Station Property Boundary
  - Plant Watson Property Boundary

**Notes:**  
 1. Property boundary georeferenced from Southern Company Services, 2020. Groundwater Monitoring Report. Mississippi Power Company. Plant Watson Ash Pond. 21 February.  
 2. CCR - Coal Combustion Residuals  
 3. Aerial Source: Google Earth Imagery 3/18/2019



**Plant Watson Location Map**

Plant Watson  
 Gulfport, Mississippi



Pensacola, FL

March 2021

**Figure**

**1**