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SEMI-ANNUAL REMEDY SELECTION AND DESIGN PROGRESS REPORT

PLANT WATSON FORMER CCR UNIT MISSISSIPPI POWER COMPANY

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Project Number: FR3795A

March 31, 2022

Semi-Annual Remedy Selection and Design Progress Report

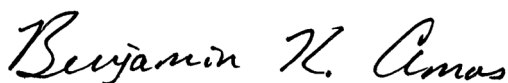
Plant Watson Former CCR Unit Mississippi Power Company

Prepared for

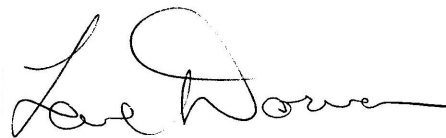
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TABLE OF CONTENTS

1. INTRODUCTION	1
2. FORMER CCR UNIT CLOSURE AND SOURCE CONTROL.....	3
3. SUMMARY OF WORK COMPLETED	4
3.1 Semi-Annual Groundwater Monitoring	4
3.2 SSL Nature and Extent Assessment	4
3.3 Monitored Natural Attenuation (MNA) Evaluation.....	4
3.4 Temporary Remedy	5
4. PLANNED ACTIVITIES AND ANTICIPATED SCHEDULE.....	7
5. REFERENCES	8

LIST OF FIGURES

Figure 1	Plant Watson Location Map
Figure 2	Extraction Well Locations

ACRONYMS AND ABBREVIATIONS

ACM	assessment of corrective measures
ASD	alternate source demonstration
CCR	coal combustion residuals
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
GWPS	groundwater protection standards
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
SEP	sequential extraction procedure
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 3¹ groundwater at statistically significant levels (SSLs) (Geosyntec, 2020a). In December 2020, Mississippi Power completed a *Radium Alternate Source Demonstration* showing that naturally occurring sources of combined radium 226 and 228 result in the radium SSLs downgradient of the former CCR unit (Geosyntec, 2020b). In March and September 2021, Mississippi Power completed *Semi-Annual Remedy Selection and Design Progress Reports* (March progress report, Geosyntec, 2021a; September progress report, Geosyntec, 2021b) detailing remedy selection activities during the period of August 2020 through February 2021, and March 2021 through July 2021, respectively. The ACM and 2021 progress reports were placed in the operating record and posted to the Site's CCR Rule Compliance Data and Information website.

Pursuant to 40 C.F.R. § 257.97, Mississippi Power is continuing to evaluate 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.

Groundwater monitoring activities completed from July 2021 through June 2022 will be included in the *2022 Annual Groundwater Monitoring and Corrective Action Report* (Annual Report) in

¹ Four distinct geologic units have been encountered near the former CCR unit. Unit 1 is comprised of dike fill material and is underlain by Unit 2, a sandy clay aquitard. Material in the former CCR unit is at the same elevation as Unit 1 and above Unit 2. Unit 3, below Unit 2, is the uppermost aquifer beneath the former CCR unit and consists primarily of sand. The CCR monitoring well network is screened in Unit 3. Finally, Unit 4 (the deepest unit) acts as a clay aquitard underlying Unit 3.

accordance with 40 C.F.R. § 257.90(e). The Annual Report will be placed in the operating record by August 1, 2022.

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

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

3. SUMMARY OF WORK COMPLETED

Since completion of the *Semi-Annual Remedy Selection and Design Progress Report*, submitted on September 30, 2021, further 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 40 C.F.R. § 257.95. Groundwater samples were analyzed for Appendix III and Appendix IV constituents. Groundwater monitoring data and associated statistical analyses are documented in the *Annual Groundwater Monitoring and Corrective Action Reports*, due by August 1 of each year.

3.2 SSL Nature and Extent Assessment

Assessment of the nature and extent of SSLs, which was initiated prior to ACM completion in August 2020, has continued. The activities completed since September 2021 include groundwater and surface water sampling (October 2021) and data analysis associated with background monitoring wells, CCR monitoring wells, surface water sampling locations (horizontal delineation), and deep groundwater monitoring wells (vertical delineation). Surface water concentrations were below applicable groundwater protection standards (GWPSs), indicating the SSLs of arsenic, lithium, and molybdenum observed in Unit 3 groundwater are spatially limited to the area immediately surrounding the former CCR unit. Therefore, horizontal delineation is completed.

Groundwater data collection and evaluation are ongoing at each deep well. In addition, an investigation using isotopic signatures was initiated to evaluate groundwater constituent concentrations in deeper groundwater bearing zones. Based on the results of the isotopic data evaluation, an alternate source demonstration (ASD) may be developed for certain CCR constituents observed in deep groundwater in select locations. If successful, the ASD would be included as an attachment to the *2022 Annual Groundwater Monitoring and Corrective Action Report* (Annual Report) and vertical delineation will be completed. We note that at the time of this report, preliminary data analysis indicates that the ASD will successfully demonstrate that constituents observed in the deep delineation wells are naturally occurring and not the result of a release from the former CCR unit.

3.3 Monitored Natural Attenuation (MNA) Evaluation

An ongoing monitored natural attenuation (MNA) study was initiated to support remedy evaluation at the Site. This attenuation study is being completed pursuant to the EPA-recommended tiered analysis approach to develop multiple lines of evidence for application of MNA as a component of a groundwater remedy system. To support this evaluation, the following were initiated:

- Development of spatial and temporal trends for arsenic, lithium, and molybdenum in site groundwater.
- Collection of groundwater and aquifer matrix solids in October 2021 for chemical and mineralogical characterization including major ionic, organic, and metal content. In addition, samples were analyzed via a sequential extraction procedure (SEP) for arsenic, lithium and molybdenum to assess the mineral phase associated with these constituents.
- Site-specific laboratory testing to evaluate corrective measures for arsenic, lithium, and molybdenum.

Upon completion of these activities, the data will be evaluated and recommendations for next steps will be developed.

3.4 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 temporary remedy design has been finalized in the last 6 months and currently includes four groundwater extraction wells (TW-3 through TW-6), with TW-7 as a contingent location if needed. Groundwater will be extracted from Unit 3 below the footprint of the former CCR unit and within the existing slurry wall. Extracted groundwater will undergo bag filtration treatment prior to discharge to the Site leachate pond.

The goals of the temporary remedy 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 further data and information regarding hydraulic connectivity and interrelationship of water-bearing units at the Site.

Temporary remedy inputs to the Site leachate pond will be included in the National Pollutant Discharge Elimination System (NPDES) permit renewal for the Site that has been submitted. The temporary remedy will not be operated until the modified NPDES permit for the Site has been approved to include the temporary remedy inputs to the sedimentation pond.

As part of the temporary remedy system, four groundwater extraction wells (TW-4, TW-5, TW-6, and TW-7) were installed in November and December 2021 in the footprint of the former CCR unit as shown on **Figure 2**. TW-4 through TW-6 will be incorporated into the temporary remedy system along with existing groundwater extraction well TW-3. TW-7 will be available as a

contingent extraction well to be incorporated into the system, if needed. The extraction wells were developed following installation and capacity tests were completed to evaluate potential groundwater extraction rates. Revised groundwater flow rates based on results of capacity tests were incorporated into the temporary remedy final design.

4. PLANNED ACTIVITIES AND ANTICIPATED SCHEDULE

The following activities are planned to support the remedy selection process over the next 6 to 12 months:

- Semi-annual groundwater assessment monitoring, including sampling of horizontal and vertical delineation locations, is planned for April 2022.
- Complete an ASD for vertical delineation utilizing data obtained from a study of unique isotopic signatures in surface water, porewater, and Unit 3 and Unit 4 groundwater.
- Complete the study to evaluate natural attenuation mechanisms in Unit 3.
- 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.
- Submit the issued-for-construction design and schedule to MDEQ for the temporary groundwater remedy.
- Construct and commission the temporary groundwater remedy.

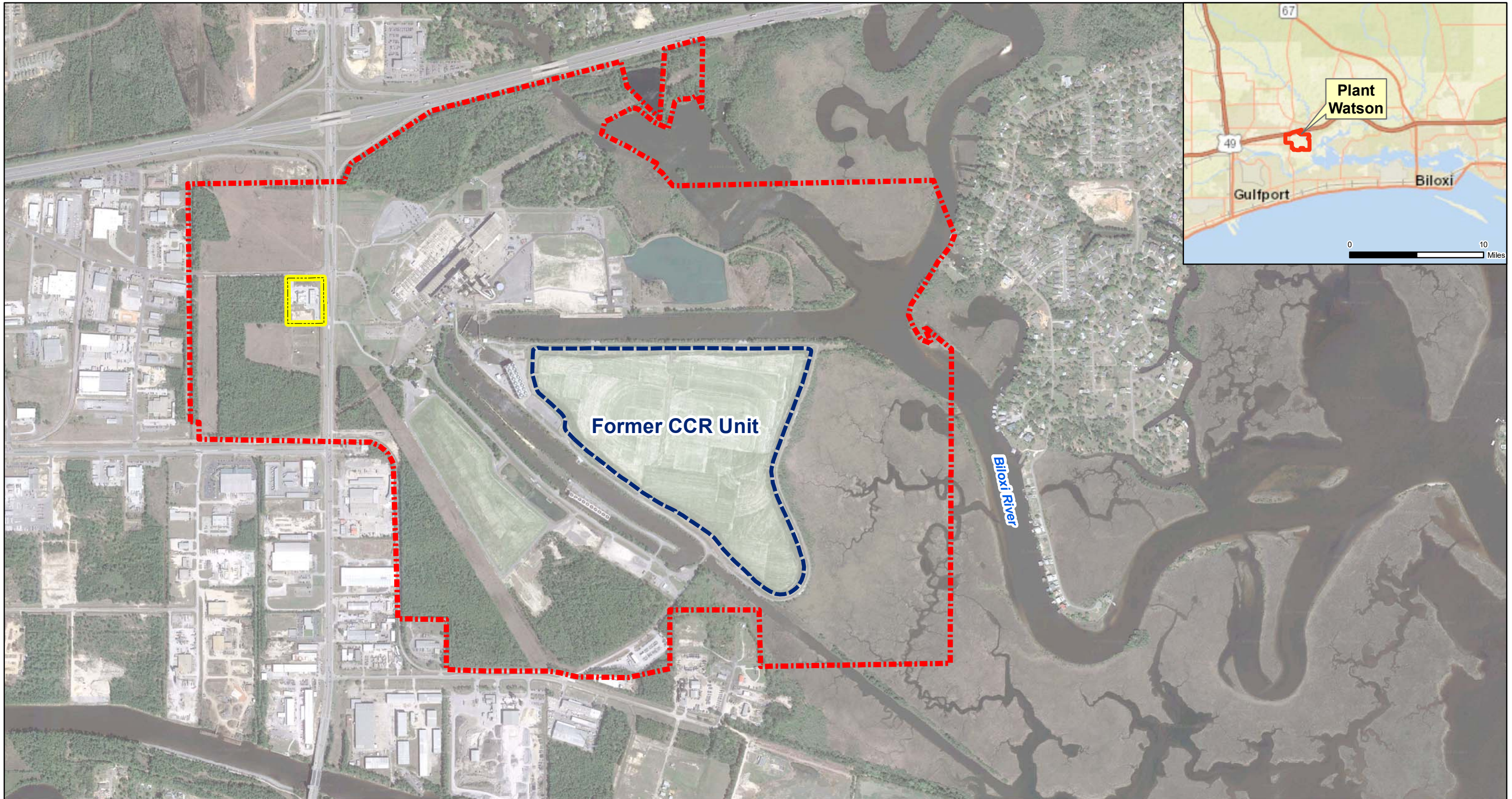
As appropriate, data obtained during these activities will be included in the *Annual Groundwater Monitoring and Corrective Action Report* due August 1, 2022.

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, 2022.

5. REFERENCES

- Geosyntec, 2020a. Assessment of Corrective Measures. Former CCR Unit. Mississippi Power Company. Plant Watson. August 2020.
- Geosyntec, 2020b. Radium Alternate Source Demonstration. Former CCR Unit. Mississippi Power Company. Plant Watson. August 2020.
- Geosyntec, 2021a. Semi-Annual Remedy Selection and Design Progress Report. Plant Watson Former CCR Unit. Mississippi Power Company. March 31, 2021.
- Geosyntec, 2021b. Semi-Annual Remedy Selection and Design Progress Report. Plant Watson Former CCR Unit. Mississippi Power Company. September 30, 2021.
- Mississippi Power, 2020. Mississippi Power – Plant Watson. Agreed Order No 7010-19. Temporary Remedy. December 2020.
- Southern Company Services, 2021. 2021 Annual Groundwater Monitoring and Corrective Action Report. Mississippi Power Company. Plant Watson Former CCR Unit. August 1, 2021.

FIGURES



- 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

Geosyntec
 consultants

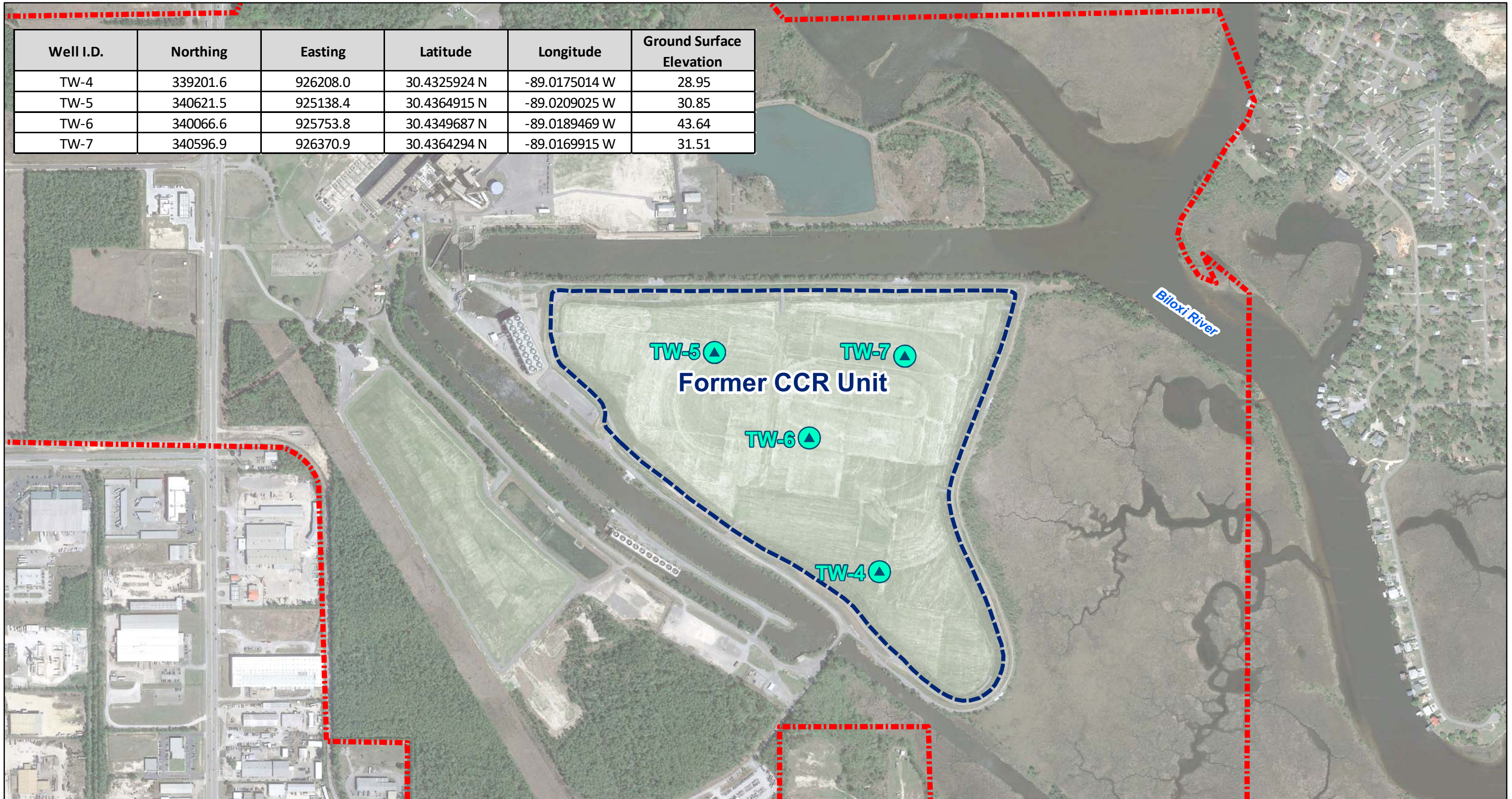
Pensacola, FL

March 2022

Figure

1

Well I.D.	Northing	Easting	Latitude	Longitude	Ground Surface Elevation
TW-4	339201.6	926208.0	30.4325924 N	-89.0175014 W	28.95
TW-5	340621.5	925138.4	30.4364915 N	-89.0209025 W	30.85
TW-6	340066.6	925753.8	30.4349687 N	-89.0189469 W	43.64
TW-7	340596.9	926370.9	30.4364294 N	-89.0169915 W	31.51



- Legend**
- TW-4 Extraction Well
 - Former CCR Unit Boundary
 - Plant Watson Property Boundary

- Notes:**
1. Locations TW-4 through TW-7 were surveyed on 26 January 2022 by Thompson Engineering.
 2. Northing and Eastings are presented in North American Datum of 1983 (NAD 83), Mississippi East State Plane US survey feet.
 3. Latitude and Longitude coordinates are presented in decimal degrees.
 4. Elevations are in feet relative to the North American Vertical Datum of 1988 (NAVD88).
 5. CCR - Coal Combustion Residuals
 6. Aerial Source: Google Earth Imagery 3/18/2019



Extraction Well Locations

Plant Watson
Gulfport, Mississippi

Geosyntec
consultants

Pensacola, FL

March 2022

Figure
2