

**REPORT ON**  
**HISTORY OF CONSTRUCTION – ASH POND A**  
**JEFFERIES GENERATING STATION**  
**MONCK'S CORNER, SOUTH CAROLINA**

by  
Haley & Aldrich, Inc.  
Greenville, South Carolina

for  
Santee Cooper  
Moncks Corner, South Carolina

File No. 0132892-103  
February 2026





HALEY & ALDRICH, INC.  
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Suite 100  
Greenville, SC 29601  
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February 6, 2026  
File No. 0132892-103

Santee Cooper  
1 Riverwood Drive  
Moncks Corner, South Carolina 29461

Attention: Mr. Poetzscher  
843.761.8311

Subject: History of Construction - Ash Pond A  
Jefferies Generating Station  
Moncks Corner, South Carolina

Dear Mr. Poetzscher:

On behalf of Santee Cooper, Haley & Aldrich, Inc. (Haley & Aldrich) has prepared the *History of Construction Report* for Jefferies Generating Station (JGS), Ash Pond A. Ash Pond A was designated as a legacy surface impoundment as defined in Title 40 Code of Federal Regulations (40 CFR) § 257.53 under the new 2024 Legacy Coal Combustion Residual (CCR) Rule. As such, Ash Pond A is now subject to the requirements of 40 CFR § 257.73(c) and § 257.100 (f)(2)(ii).

This report was prepared in accordance with the United States Environmental Protection Agency's (EPA) Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals from Electric Utilities, 40 CFR § 257.73(c)t and as outlined within the *Request for Proposal for Legacy CCR Surface Impoundment Rule Professional Services* agreement.

We appreciate the opportunity to provide environmental consulting and engineering services on this project. Please do not hesitate to call if you have any questions or comments.

Santee Cooper  
February 6, 2026  
Page 2

Sincerely yours,  
**HALEY & ALDRICH, INC.**



Rob Yeoman  
Staff Engineer



Nick Davis, P.E.  
Senior Engineer



Susan Jackson, P.E.  
Client Leader

Enclosures

[https://haleyaldrich.sharepoint.com/sites/SanteeCooper2/Shared Documents/0132892.Santee Cooper CCR Consulting Service/0\\_Jefferies Generating Station/Deliverables/1\) X\\_2025\\_01\\_HistoryofConstructionReport/2026-0206\\_SC\\_History\\_of\\_Construction-F.docx](https://haleyaldrich.sharepoint.com/sites/SanteeCooper2/Shared Documents/0132892.Santee Cooper CCR Consulting Service/0_Jefferies Generating Station/Deliverables/1) X_2025_01_HistoryofConstructionReport/2026-0206_SC_History_of_Construction-F.docx)

**SIGNATURE PAGE FOR**

**REPORT ON**  
**HISTORY OF CONSTRUCTION**  
**ASH POND A**  
**JEFFERIES GENERATING STATION**  
**MONCK'S CORNER, SOUTH CAROLINA**

**PREPARED FOR**  
**SANTEE COOPER**  
**MONCK'S CORNER, SOUTH CAROLINA**

PREPARED BY:

*Rob Yeoman*

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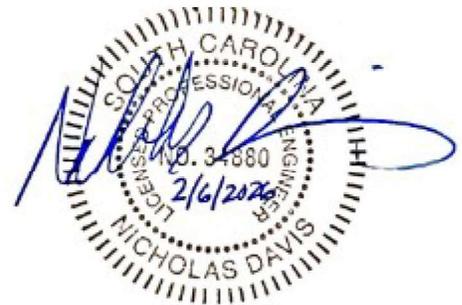
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REVIEWED AND APPROVED BY:

*Nicholas Davis*

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Senior Engineer  
Haley & Aldrich, Inc.



*Susan W Jackson, P.E.*

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Susan Jackson, P.E.  
Client Leader  
Haley & Aldrich, Inc.

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G	NPDES Permit Number SC0001091

## List of Abbreviations

### Abbreviation

40 CFR

ASTM

CCR

EPA

JGS

NAVD88

NPDES

pcf

RCP

SCDES

### Definition

Title 40 Code of Federal Regulations

ASTM International

Coal-combustion residuals

United States Environmental Protection Agency

Jefferies Generating Station

North American Vertical Datum of 1988

National Pollutant Discharge Elimination System

Pounds per cubic foot

Reinforced concrete pipe

South Carolina Department of Environmental Services

# 1. Introduction

Ash Pond A is the sole coal-combustion residual (CCR) legacy surface impoundment at the Jefferies Generating Station (JGS) as noted in the Santee Cooper JGS Applicability Report as specified by (40 CFR) § 257.100(f)(1). This document compiles the history of construction of Ash Pond A, which contains, to the extent feasible, the information specified within Title 40 Code of Federal Regulations (40 CFR) § 257.73(c)(1)(i) through § 257.73(c)(1)(xii) under the CCR Rule and as presented below. As indicated in the preamble to the CCR Rule, the compilation of this data is “only to the extent available” and the United States Environmental Protection Agency (EPA) does not expect the owners or operators to generate new information or provide anecdotal or speculative information regarding a CCR unit’s design and construction history. Therefore, the information presented is based on readily accessible information.

## 1.1 JEFFERIES GENERATING STATION FACILITY BACKGROUND

The JGS fossil fuel facility previously consisted of a four, 398-megawatt, generating units owned and operated by Santee Cooper. The first two fossil units entered commercial operation in 1954 and could initially burn both coal and oil. Prior to 1970, they were converted to oil fired units only. The second two fossil fuel units came online in 1970 and were coal-fired. The two coal-fired units were retired on December 31, 2012, and the oil-fired units were retired on October 1, 2015.

## 1.2 ASH POND BACKGROUND

The approximate 136-acre Ash Pond A was constructed in 1970 to support operations of the two coal-fired generating units. Ash Pond A received various industrial wastewaters streams, including ash sluice water. During unit operations, CCR was sluiced to Ash Pond A for settling and storage. The effluent wastewater from Ash Pond A entered the station’s Decant Pond, which was formally designated as Ash Pond B, for polishing and pH adjustment as needed. CCR was never sluiced to the Decant Pond.

Ash Pond A has not received CCR or CCR wastewater since the coal-fired units were retired in 2012. Since that time, operations and maintenance of Ash Pond A has been limited to industrial stormwater treatment from the site industrial runoff and activities associated with excavation and closure by removal of the CCR. Ash Pond A is in the late stages of closure by removal of CCR and a layer of subsurface soil in accordance with the South Carolina Department of Environmental Services (SCDES)-approved state closure plan, formerly known as the South Department of Health and Environmental Control (SCDHEC).

## 2. Required Data Pursuant to 40 CFR § 257.73(c)

### 2.1 OWNER'S GENERAL INFORMATION

*"The name and address of the person(s) owning or operating the CCR unit; the name associated with the CCR unit; and the identification number of the CCR unit if one has been assigned by the state."*

- 40 CFR § 257.73(c)(1)(i)

The following summarizes information relating to the owner and operator of the site as well as the name and location for the overall facility and the CCR unit itself.

Owner and Operator: South Carolina Public Service Authority (SCPSA) / Santee Cooper  
Santee Cooper contact: Brian Holmes  
Manager Waste Management, A203  
[brian@holmes@santeecooper.com](mailto:brian@holmes@santeecooper.com)  
843.761.8000 ext. 4975  
1 Riverwood Drive  
Moncks Corner, South Carolina 29461

Site Information: Jefferies Generating Station  
463 Power House Road  
Moncks Corner, South Carolina 29461

Associated CCR Unit: Ash Pond A  
Latitude: 33.241182°  
Longitude: -79.982358°

There is currently no state identification numbers associated with the CCR Rule for Ash Pond A, as a state CCR permit program was never pursued by the SCDES. However, the facility operates under an Industrial Wastewater Permit to Surface Waters (Permit Number SC0001091) issued by SCDES in accordance with the National Pollutant Discharge Elimination System (NPDES) program (Santee Cooper, 2024).

### 2.2 CCR LEGACY UNIT LOCATION

*"The location of the CCR unit identified on the most recent U.S. Geological Survey (USGS) 7 1/2-minute or 15-minute topographic quadrangle map, or a topographic map of equivalent scale if a USGS map is not available."*

- 40 CFR § 257.73(c)(1)(ii)

Ash Pond A and its former estimated horizontal limits of received CCR, circa July 6, 2015, after the retiring of the coal-fired generating units but prior to commencement of CCR removal through beneficial reuse or disposal activities are shown on **Figure 1**.

## 2.3 CCR UNIT PURPOSE

*“A statement of the purpose for which the CCR unit is being used.”*

- 40 CFR § 257.73(c)(1)(iii)

Ash Pond A is a 136-acre, unlined basin, constructed in 1970 in preparation of two coal-fired units coming online at JGS, that received sluiced CCR, consisting predominately of fly ash, bottom ash, boiler slag, and cenospheres until 2012 when the coal-fired units ceased operations upon retirement. Currently, Ash Pond A continues to operate under NPDES Permit Number SC0001091 and accepts industrial stormwater from site runoff. It is permitted to serve primarily as a settling basin prior to the wastewater entering the Decant Pond.

Ash Pond A is undergoing closure through removal of the CCR along with a subsurface layer of soil in accordance with the SCDES-approved state closure plan. Ash Pond A is maintained in a largely dewatered state to support excavation of the CCR. Dewatering is conducted by a series of temporary internal “ditches” within the pond created to direct the wastewater to the outfall where it is then pumped into the Decant Pond. The excavated CCR is primarily beneficially used by the cement industry. Any CCR or soils that are not able to be beneficially used are landfilled in a Santee Cooper Subtitle D Class 3 landfill. These efforts will continue until all visible CCR is removed while overall excavation and closure activities will be completed by December 2030 in accordance with the SCDES-approved closure plan (Santee Cooper, 2022 and Geosyntec, 2016). The approximate ponded CCR volume was estimated at 2,402,000 cubic yards in July 2015. Approximately 1,442,000 cubic yards remained, as of June 2022, to be reclaimed or disposed (Santee Cooper, 2022). At the end of 2024, Santee Cooper estimated approximately 400,000 cubic yards of CCR remained.

Even prior to initiating closure of Ash Pond A, Santee Cooper periodically removed CCR from Ash Pond A for various beneficial reuses, including cenospheres for various industrial applications and fly ash for local cement industry.

## 2.4 WATERSHED INFORMATION

*“The name and size in acres of the watershed within which the CCR unit is located.”*

- 40 CFR § 257.73(c)(1)(iv)

Ash Pond A is located within the upper portion of the West Branch Cooper River watershed, which has a 12-digit Hydrologic Unit Code of 030502010701. The watershed encompasses 34,732 acres and is located within the greater Santee River Basin (EPA, 2025).

Ash Pond A, prior to a stormwater diversion project being completed and as-built drawing of said work being finalized on September 16, 2016, was impacted by run-on from an upstream drainage area. The drainage area is approximately 305 acres in size, where stormwater had the potential to, and on occasion did, overtop a lower section of the Ash Pond A perimeter dike and the access road along its eastern side during or following storm events. The improvements made primarily consisted of installing dike extensions and channels, installing a reinforced concrete pipe (RCP), and enlarging and regrading the exterior perimeter channel to direct stormwater to reroute around and not through the ash pond system (WorleyParsons, 2011b).

Ash Pond A currently receives the JGS permitted industrial stormwater and stormwater that precipitates directly into the footprint of the unit. Stormwater captured between the eastern perimeter dike, the western spoil bank, and the interior cross dike dividing Ash Pond A and the Decant Pond flows toward the southeastern end of Ash Pond A, where it pools before being discharged via a pumping system (SCHEC, 2015) into a control structure and culvert that discharges into the Decant Pond. The Decant Pond then discharges through a box structure and pipes at NPDES Outfall 003, which penetrates through the southwestern dike. The exterior perimeter channel intercepts the flow and redirects it into the Tailrace Canal (Geosyntec, 2016).

## 2.5 FOUNDATION PROPERTIES

*“A description of the physical and engineering properties of the foundation and abutment materials on which the CCR unit is constructed.”*

- 40 CFR § 257.73(c)(1)(v)

Based on geotechnical field investigations within and surrounding the base and foundation of Ash Pond A, there exists a shallow, several-foot-thick-layer of alluvial deposits comprised of silts and clays with minor sand, sandy clay and gravelly sections. This formation is underlain by Cooper Marl, which is the marl of the Ashley and Cooper beds and is characterized by its dark grey or white color and granular texture and inclusion of fossils. It also can consist of a very stiff to hard brownish-green calcareous silty clay with sand. This stratum ranges from 25 to 35 feet thick and has a relatively low permeability, as indicated by a site-specific sample with an ASTM International (ASTM) D5084 test result of  $1.28 \times 10^{-6}$  centimeters per second, hindering vertical migration of groundwater. The unit wet weight of this sample collected was 122.20 pounds per cubic foot (pcf) with a moisture content of 17.80 percent (WorleyParsons, 2011a). The average corrected “N” value was 42 for the Cooper Marl, a stiffness that made fully undisturbed samples during the various field investigations difficult to obtain. This formation is generally sloping, around 0.5 percent, from elevation 8 feet at the east to elevation -3 feet North American Vertical Datum of 1988 (NAVD88), at the west along Tailrace Canal across Ash Pond A.

The Cooper Marl is further underlain by Santee Limestone, an impure limestone containing sand, clay and detritus and ranges from 30 to 70 feet thick, followed by Black Mingo sands that transition to soft clay shale and ranges from 100 to 125 feet thick.

The abutment and groin materials were not appreciably different in constitution or in the way they were constructed from what is listed as foundational in this section or from what is listed as fill in Section 2.6.

## 2.6 CCR LEGACY UNIT STAGES

*“A statement of the type, size, range, and physical and engineering properties of the materials used in constructing each zone or stage of the CCR unit; the method of site preparation and construction of each zone of the CCR unit; and the approximate dates of construction of each successive stage of construction of the CCR unit.”*

- 40 CFR § 257.73(c)(1)(vi)

From September 2015 to September 2016, eastern stormwater channels and the northeastern dike of Ash Pond A were substantially constructed in accordance with Construction Permit No. 19913-IW

(Santee Cooper, 2016) to re-route stormwater flow around the pond. CCR was removed from the outer most extents of the pond, where it was previously identified, and was replaced with this dike and stormwater channel system along a topographically relieved area up until where two 48-inch diameter RCPs were installed and it tied into the original perimeter dike system. In addition to shrinking the CCR footprint, the purpose of this project was to reduce the amount of run-on stormwater affecting Ash Pond A. The “interior pond diversion ditch” was constructed on the inboard side of the northeastern dike, within the revised Ash Pond A footprint, directing the run-off stormwater flow toward the Decant Pond (and eventually Outfall 003) while the “stormwater run-on diversion ditch” was constructed on the outboard side of the dike, directing non-contact stormwater around the perimeter of the site.

This northeastern dike (or “stormwater run-on berm”) fill material was derived from excess spoils in the widening, regrading, and realigning of the “stormwater run-on diversion ditch”. Per the Issued for Review “Stormwater Diversion” drawing set included in the substantial completion notification for Construction Permit No. 19913-IW sent to SCDES, the material was specified to consist of “engineer-approved excavated soil, with the maximum particle size not exceeding one-half the specified lift thickness, with between 20 and 50 percent (by weight) passing the number 200 sieve, and with a plasticity index of 35 or less. It shall not contain ash or gypsum, organic matter, rubbish, ice, frozen materials, debris, or other deleterious materials. Soil having a moisture content exceeding the limits specified herein shall not be accepted unless brought to within the specified limits.” The method for placement of material was stipulated to be in 10-inch-thick uniform, loose lifts, and compacted to at least 90 percent of the maximum dry density, per a modified proctor test (ASTM D 1557 [WorleyParsons, 2016]). The final survey defining this project can be found in **Appendix A**.

The dike bordering the southeastern portion of Ash Pond A, where the aforementioned construction was terminated and as indicated by the installed 48-inch diameter RCP, remains intact from its inception back in 1970 as well as the rest of the perimeter dikes. The original construction drawings, dated February 24, 1968, can be found in **Appendix B**. The materials within this section of the dike can reasonably be expected to contain the strata shown within B-103 boring (WorleyParsons, 2011a) as well as JAP-3 boring. From an approximate initial elevation of 18 to 20 feet NAVD88 these borings advanced through fill and encountered in-situ, native material, this upper fill zone had material with a corrected “N” value that varied between 13 to 16 with an average of 14 and was visually described as ranging from medium to stiff, fine to medium sand with silt to tan, inorganic, medium to high plastic clay with sand (WorleyParsons, 2011a and Santee Cooper, 2025).

The western dike or “spoil pile” that borders the Tailrace Canal and the B-104 boring, showcased its fill as having a corrected “N” value that varied between 1 to 25 with an average of 15 and was visually described as ranging from medium dense brown fine to medium sand with silt to stiff brownish-green calcareous silty clay with sand (reconstituted marl) to very soft inorganic gray inorganic clay with sand. An undisturbed sample was collected from the soft clay, identified just above the in-situ, native material, which had a dry density of 102.27 pcf, a water content of 24.89 percent, and a liquid and plastic limit of 45 and 15, respectively (Coastal Engineering and Testing, 1987).

The northwestern border to Ash Pond A is defined by a shear cut from predominantly natural, existing ground that has been modified and graded to form an access road. This access road is paralleled just to the northwest by a higher railbed and railroad operated by CSX Transportation (CDM Smith, 2014). The makeup of the subsurface within this area is relatively unknown.

The cross dike, which acts as the southern border of Ash Pond A and abuts the Decant Pond, was constructed following substantial completion of the pond in 1970 and prior to a subsurface

improvements project. The subsurface improvements project was in the form of a slurry wall, trenched and installed across the cross dike in 1987 after seepages and “boils” were discovered transferring through a sand layer below and within the dike system. An undated engineering sketch showcasing the proposed alignment of the cross dike is featured in **Appendix C**. The slurry wall running through the cross dike was comprised of cement, bentonite, and water with proposed dimensions varying around 2.5 feet wide, 20 feet deep, and 150 to 300 feet in length (Halbig, 1987). No as-built survey was discovered documenting the completion of this project. Santee Cooper contained JAP-2, a boring central along the cross dike, which identified the fill to be comprised of olive gray to tan, organic to inorganic, plastic clay with some silt and fine sand stringers and lenses throughout.

Although no reliable data from specimens tested for unconfined compressive strength (ASTM D 2166) occurred along the cross dike, northeastern dike, southeastern dike, western dike, or northwestern boundaries of site, there was one undisturbed sample taken from a gray mottled clayey sand formation of fill material along the southern dike, bordering the Decant Pond, which could be considered emblematic of that discovered within the bounding dikes. It had an undrained shear strength of 612 pounds per square foot.

Overall, the dike fill materials extended down to elevation 6.5 to 11 feet NAVD88 depending on location before transitioning to native soils.

For more information on the general dimensions of the perimeter and cross dikes not mentioned within this section, please refer to **Table 1**.

<b>Criteria</b>	<b>Northeastern Dike<sup>a</sup></b>	<b>Southeastern Dike</b>	<b>Western Dike</b>	<b>Cross Dike</b>
Approximate Elevations <sup>b,c</sup>	20 to 40 ft	19 to 20 ft	26 ft to 50 ft	17 ft
Crest Width <sup>c</sup>	7 to 25 ft	12 ft	20 ft to 80 ft	10 ft
Embankment Slopes (inside) <sup>c</sup>	2:1	3:1	1.5:1	4:1
Embankment Slopes (outside) <sup>c</sup>	2:1	2:1	2:1	6:1
Maximum Height <sup>c,d</sup>	12 ft	12 ft	40 ft	8 ft
Length <sup>c</sup>	2200 ft	1900 ft	2600 ft	1400 ft
<b>Notes:</b>				
<ul style="list-style-type: none"> <li>a) Northeastern dike section is synonymous with the “stormwater run-on diversion berm” as presented in miscellaneous drawings and reports, prior to transition to Southeastern Dike at double 48-in. dia. RCP crossing</li> <li>b) Vertical datum is NAVD88</li> <li>c) Estimated values are from aerial survey provided by Parker Land Surveying, LLC, dated 23 January 2012 in Autodesk Civil3D or “Ash Pond Stormwater Diversion” published as-built drawing, dated 23 August 2017</li> <li>d) Height is calculated as largest difference between crest of dike and toe of outside embankment</li> </ul>				

## **2.7 CCR LEGACY UNIT DRAWINGS AND HYDROLOGY**

*“At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation*

*improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection, in addition to the normal operating pool surface elevation and the maximum pool surface elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment, and any identifiable natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation.”*

- 40 CFR § 257.73(c)(1)(vii)

The engineering drawings providing relevant design, construction, operation, and maintenance of the CCR unit along with cross sections and drainage features can be found in **Appendix D**.

The normal operating pool of water was approximately elevation 14.4 feet NAVD88 when the facility was in operation. The maximum pool surface elevation following peak discharge was deemed the average interior dike elevation of approximately 17.0 feet NAVD88. The maximum depth of CCR within the unit prior to commencement of excavation for beneficial reuse in 2015 was not identified via records review. The average thickness across the pond; however, was calculated and estimated to be approximately 2 feet although there are regions within Ash Pond A where CCR has been removed.

Regarding hydrology, Ash Pond A was constructed to discharge directly to the Decant Pond through an outfall control structure within Ash Pond A that gravity feeds through a culvert at the southeast corner into the Decant Pond. To maintain Ash Pond A at a largely dewatered state not possible solely with the outfall structure and gravity drainage, a portable Godwin Dri Prime CD150M Pump with a diesel engine is used to pump the ponded water level down below the structure elevation. The pump is used to transfer Ash Pond A wastewater through the control structure and culvert into the Decant Pond. In turn, the Decant Pond discharges through the NPDES permitted outfall by an overflow structure that is operated by gravity. To maintain the Decant Pond in a largely dewatered state, a dual pipe siphon system was installed, primed via a pump, so water levels can be further reduced below that which the overflow structure would normally allow.

Additionally, liquid carbon dioxide tanks are available for pH adjustment of wastewater prior to discharge, if required.

## **2.8 INSTRUMENTATION**

*“A description of the type, purpose, and location of existing instrumentation.”*

- 40 CFR § 257.73(c)(1)(viii)

For Ash Pond A, there is currently no structural stability monitoring equipment or instrumentation. However, other instrumentation that exists belongs to the groundwater monitoring well network and wastewater treatment operations at Outfall 003, located at the southern dike of the Decant Pond. This includes a dual pipe siphon system, pump, and liquid carbon tanks.

## **2.9 AREA-CAPACITY CURVES**

*“Area-capacity curves for the CCR unit.”*

- 40 CFR § 257.73(c)(1)(ix)

No specific area-capacity curves are available for Ash Pond A; however, it was estimated that the surface area of the unit was 136 acres with 982 acre-feet of total storage capacity (Dewberry & Davis, LLC, 2011).

## 2.10 SPILLWAY DATA

*“A description of each spillway and diversion design features and capacities and calculations used in their determination.”*

*- 40 CFR § 257.73(c)(1)(x)*

Although there are no spillways constructed within Ash Pond A, the diversion design features and capacities have been evaluated through a series of hydrologic impact scenarios from a 50-year, 24-hour rainfall event to a half probable maximum flood for the area. More details can be found in **Appendix E**.

In addition, and prior to any construction elapsing on the stormwater diversion project, proposed conditions were reanalyzed and summarized as meeting 100-year, 24-hour rainfall event requirements. Further details can be found in **Appendix F**.

## 2.11 CONSTRUCTION SPECIFICATIONS, PROVISIONS FOR SURVEILLANCE, MAINTENANCE, AND REPAIR

*The construction specifications and provisions for surveillance, maintenance, and repair of the CCR unit.*

*- 40 CFR § 257.73(c)(1)(xi)*

Although there is no record of specifications for construction of dikes and channels pre-dating 2015, other than dimensions, during the stormwater diversion project, there exists sitework plans, cross sections, sections, details, profiles, and notes outlining constraints, requirements, and approval processes dictated by the design engineer (Santee Cooper, 2016). Surveillance, maintenance, and repair procedures for the CCR unit are currently framed within NPDES Permit Number SC0001091, primarily Part V.E.6.b. **Appendix G** is attached for any further information.

## 2.12 STRUCTURAL INSTABILITY RECORDS

*Any record or knowledge of structural instability of the CCR unit.*

*- 40 CFR § 257.73(c)(1)(xii)*

In accordance with the most recently received ePermitting submittal from Santee Cooper, mandated through Part V.E.6.b of the NPDES Permit Number SC0001091 for coal ash basins and issued to SCDES, during routine monthly inspections, conducted by qualified on-site personnel, and an annual inspection, conducted by a licensed dam safety engineer, for the 2022 to 2023 period, the embankment dikes (of Ash Pond A and the Decant Pond) and outlet structure (of the Decant Pond) appear structurally sound with no apparent unsafe condition or conditions warranting emergency remedial action (Richardson, 2023). Previous records provided and reviewed have not indicated any unstable condition.

### 3. Closing

For JGS, limited records were available for several reasons.

First, Santee Cooper has a corporate records retention policy. The policy includes retention timeframes for specific types of records even though construction drawings typically do not have retention timeframes. Environmental records typically have retention timeframes which aligns with state or federal regulatory requirements. Per Santee Cooper's policy, unless there is a specific reason to hold records beyond the regulatory driven timeframes in the policy, records are purged after the specific retention periods. Records with legal holds are not purged. JGS commenced initial operations of the hydro units located at the site in 1942 and the oil and coal units began operating in 1954. Thus, many records are no longer available as they have exceeded their retention timeframes.

Second, all four fossil fuel units are now retired with the coal-fired units going offline as of December 31, 2012, and the oil-fired units going offline as of October 1, 2015. These generating units were then fully demolished in 2018 (Berkley Observer, 2017). With the decommissioning process, many station records were deemed no longer necessary and thus were not saved.

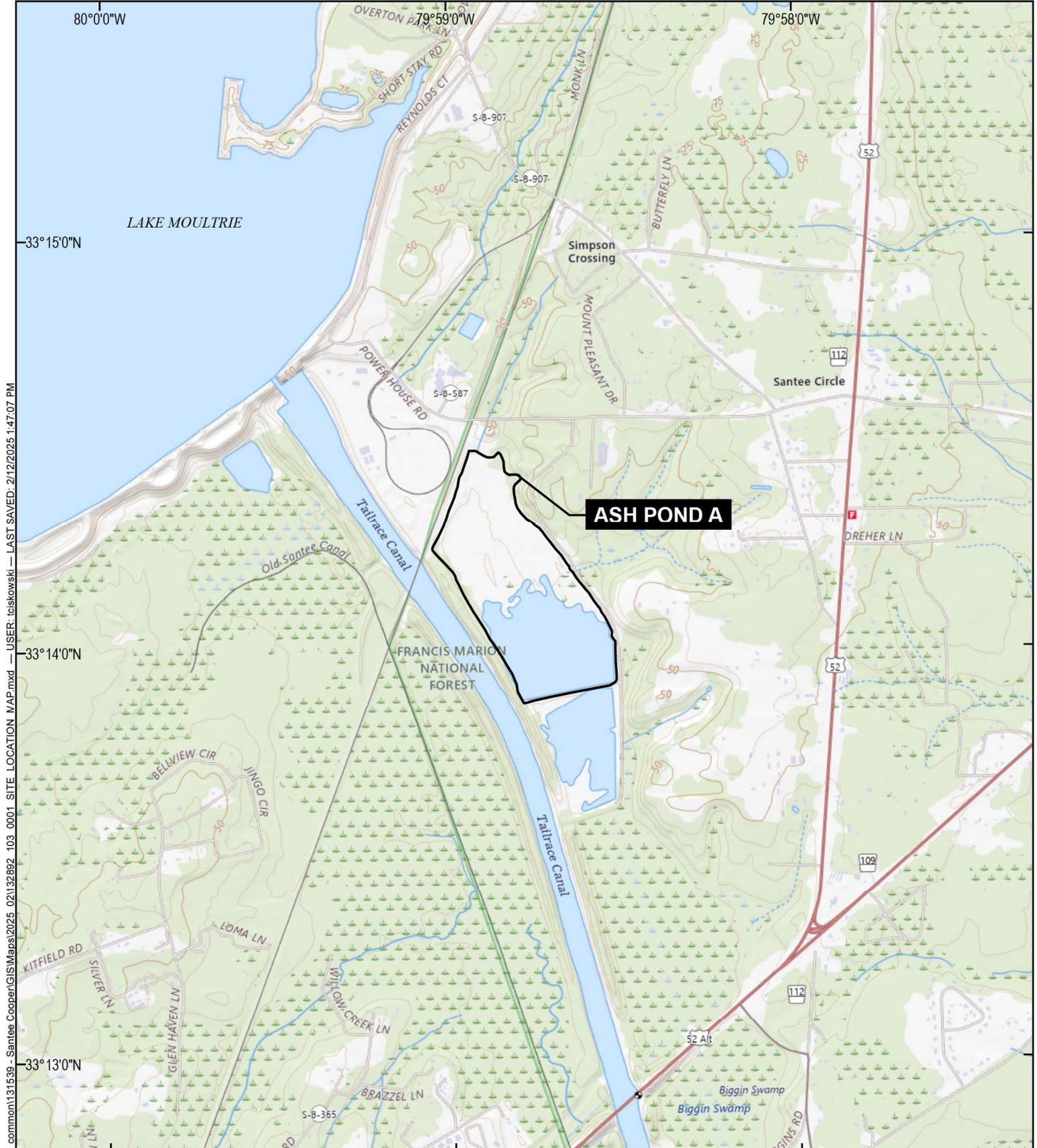
If any document(s) are recovered in the future indicating a significant change or deviation in past construction activities presented within section above, or construction that succeeds this report's issued date, Santee Cooper must update the information herein to be accurate and place it in the facility's operating record as required by 40 CFR § 257.73(c)(2) and § 257.105(f)(9).

## References

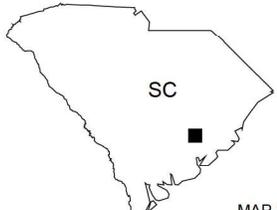
1. Berkeley Observer, 2017. *Demolition To Begin on Jefferies Generating Station*. 6 February. <https://www.berkeleyobserver.com/2017/02/06/demolition-begin-jefferies-generating-station/>
2. CDM Smith, 2014. *South Carolina Statewide Rail Plan*, Figure 2-1 – State Rail Map. August.
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16. WorleyParsons, 2016. *Ash Pond Stormwater Diversion Sitework Notes*. 4 March.

[https://haleyaldrich.sharepoint.com/sites/SanteeCooper2/Shared Documents/0132892.Santee Cooper CCR Consulting Service/0\\_Jefferies Generating Station/Deliverables/1\) X\\_2025\\_01\\_HistoryofConstructionReport/2025-0307\\_SC\\_History\\_of\\_Construction-F.docx](https://haleyaldrich.sharepoint.com/sites/SanteeCooper2/Shared Documents/0132892.Santee Cooper CCR Consulting Service/0_Jefferies Generating Station/Deliverables/1) X_2025_01_HistoryofConstructionReport/2025-0307_SC_History_of_Construction-F.docx)

## **FIGURES**



GIS FILE PATH: \\haleyvaldrich.com\share\grn\_common\131539 - Santee Cooper\GIS\Maps\2025\_02\132892\_103\_0001\_SITE\_LOCATION\_MAP.mxd — USER: tciskowski — LAST SAVED: 2/12/2025 1:47:07 PM



**HALEY  
ALDRICH**

SANTEE COOPER  
JEFFERIES GENERATING STATION  
MONCK'S CORNER, SOUTH CAROLINA

**SITE LOCATION MAP**

MAP SOURCE: UNITED STATES GEOLOGICAL SURVEY  
SITE COORDINATES: 33°14'07"N 79°58'48"W

APPROXIMATE SCALE: 1 IN = 2,000 FT  
FEBRUARY 2025

**FIGURE 1**

**APPENDIX A**  
**Ash Pond Stormwater Diversion Berm As-Built Drawing**

DESIGNED: FJM  
 CHECKED: MCV  
 APPROVED: ACC  
 SCALE: 1" = 50'  
 DATE: 9/13/2016  
 PROJECT NO.: 11032  
 SHEET 1 OF 1

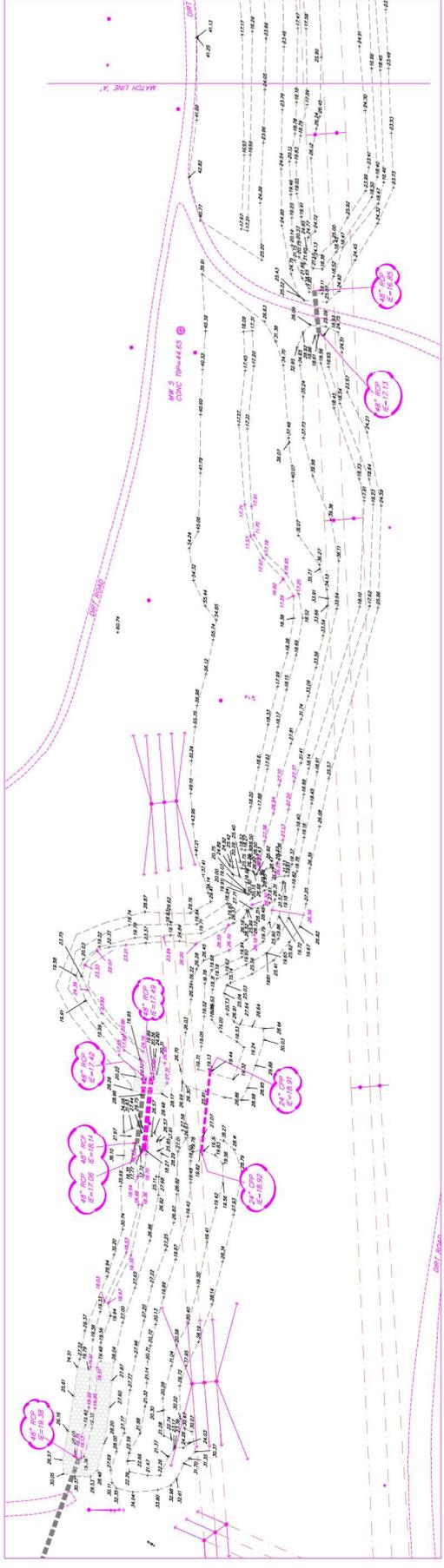
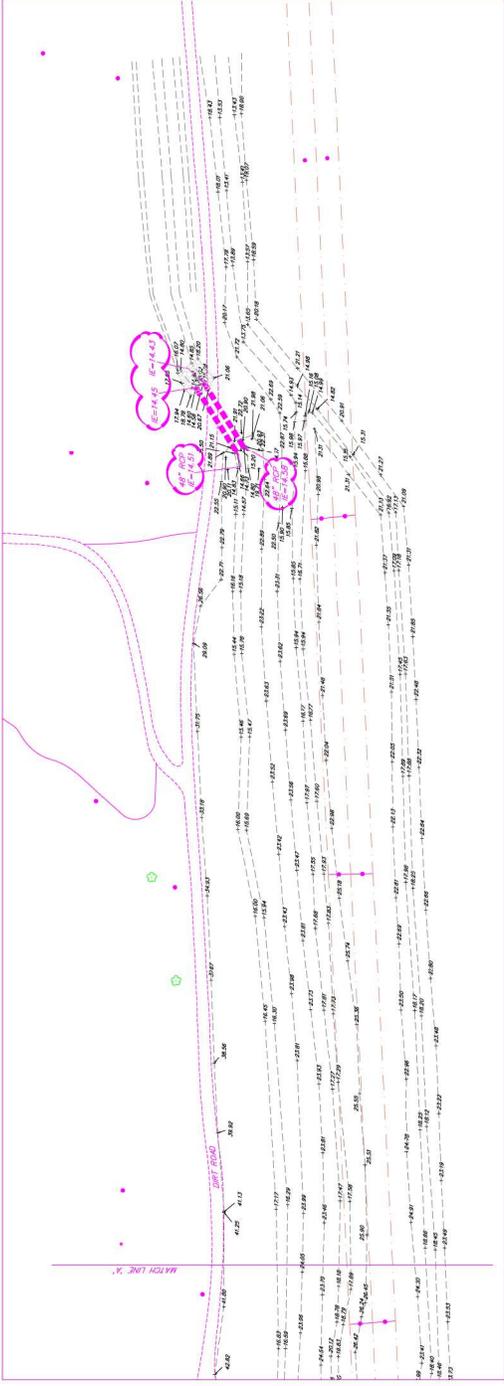


Proker Land Surveying, LLC  
 1220 Tammam Road  
 Raleigh, NC 27615  
 Phone: (919) 554-7777  
 Fax: (919) 554-7779

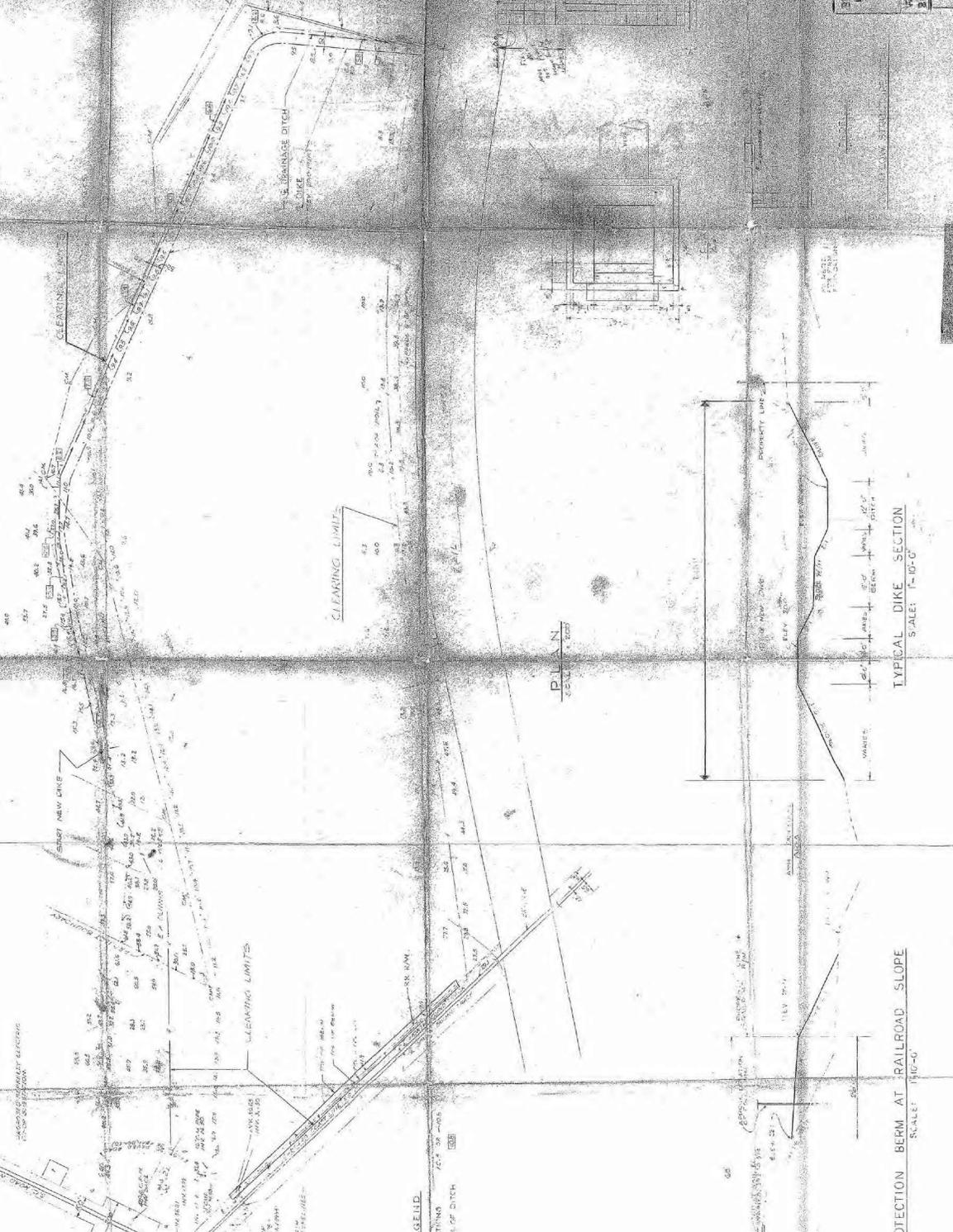


**TITLE**  
 Ash Pond Stormwater Diversion  
 JEFFRIES GENERATING STATION  
 ASH PONDS  
 LOCATED NEAR MONCK'S CORNER  
 BERKELEY COUNTY, SOUTH CAROLINA

NO.	DATE	REVISIONS
1	9/23/2017	UP-DATE ON DITCH SHOTS & PVE INVERTS



**APPENDIX B**  
**Ash Disposal Plan Revision**



**LEGEND**

EXISTING ELEVATIONS  
FIN. L.V. STA. OF DITCH

PROTECTION BERM AT RAILROAD SLOPE  
SCALE: 1/8"=1'-0"

TYPICAL DIKE SECTION  
SCALE: 1"=10'-0"

PLAN  
SCALE: 1/8"=1'-0"

**302818 PROJE INC.**  
**INTEGRATED ARCHITECTURE**  
 CIVIL & MECHANICAL ENGINEERS  
 1000 W. 10TH ST. SUITE 200  
 DENVER, CO 80202  
 TEL: 303.733.1111  
 FAX: 303.733.1112  
 WWW: 302818PROJ.COM

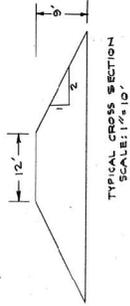
**LOCKWOOD GREENE ENGINEERS, INC.**  
 PROFESSIONAL ENGINEERS  
 1000 W. 10TH ST. SUITE 200  
 DENVER, CO 80202  
 TEL: 303.733.1111  
 FAX: 303.733.1112  
 WWW: 302818PROJ.COM

PROJECT NO. 31468  
 SHEET NO. 10 OF 10  
 DATE 10/15/10  
 DRAWING NO. 4007-10

95-466 P&S 42

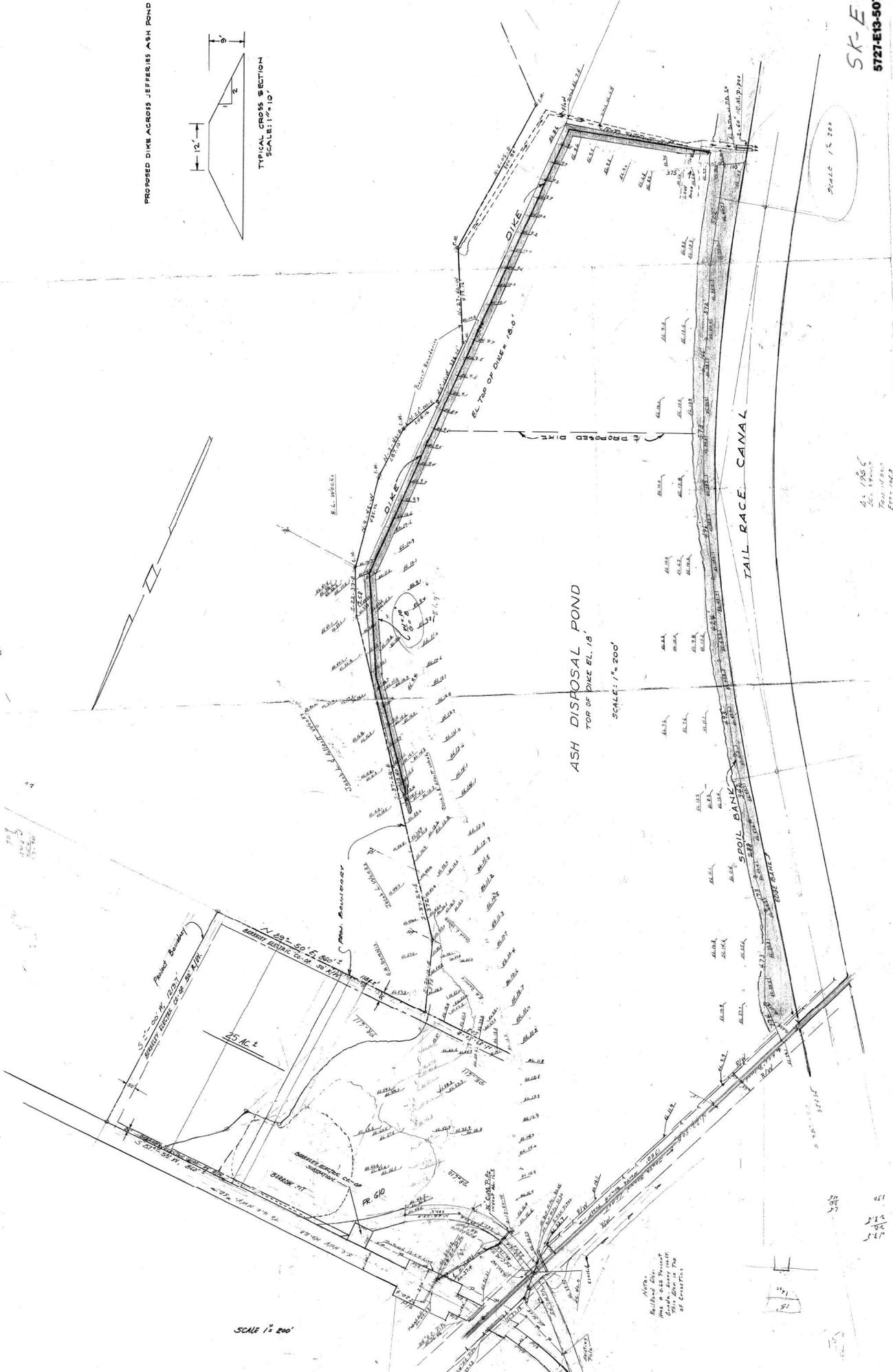
**APPENDIX C**  
**Proposed Cross Dike Sketch (SK-E15)**

PROPOSED DIKE ACROSS JEFFERIES ASH POND



SK-E 15

5727-E13-5071



ASH DISPOSAL POND  
TOP OF DIKE EL. 18'

SCALE: 1" = 200'

TAIL RACE CANAL

SPOIL BANK

SCALE 1" = 200'

Circle 1/2 200'

As 1/2 200'  
See sketch  
Total 1/2 200'  
Elev. 18.0'

Notes:  
Railroad Box  
Area in Ash Pond  
to be removed  
and used in the  
of construction.

20  
27  
58  
58  
58

21

**APPENDIX D**  
**Conceptual Closure Plan Dated September 2016**

# CONCEPTUAL CLOSURE PLAN

## JEFFERIES STATION

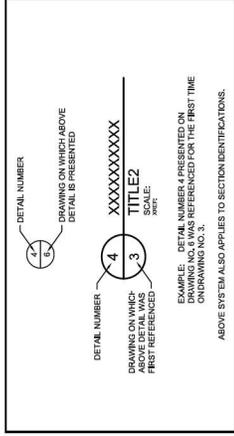
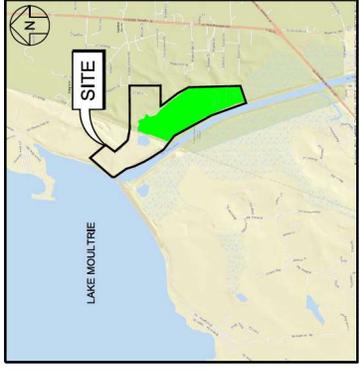
### MONCKS CORNER, SOUTH CAROLINA

#### PROJECT NO. GSC5493

#### SEPTEMBER 2016

### LIST OF DRAWINGS

DRAWING NO.	DRAWING TITLE
1	COVER
2	EXISTING CONDITIONS
3	PROPOSED FINAL CONDITION
4	SECTIONS



PREPARED FOR:

ONE RIVERWOOD DRIVE  
MONCKS CORNER, SOUTH CAROLINA 29461



PREPARED BY:

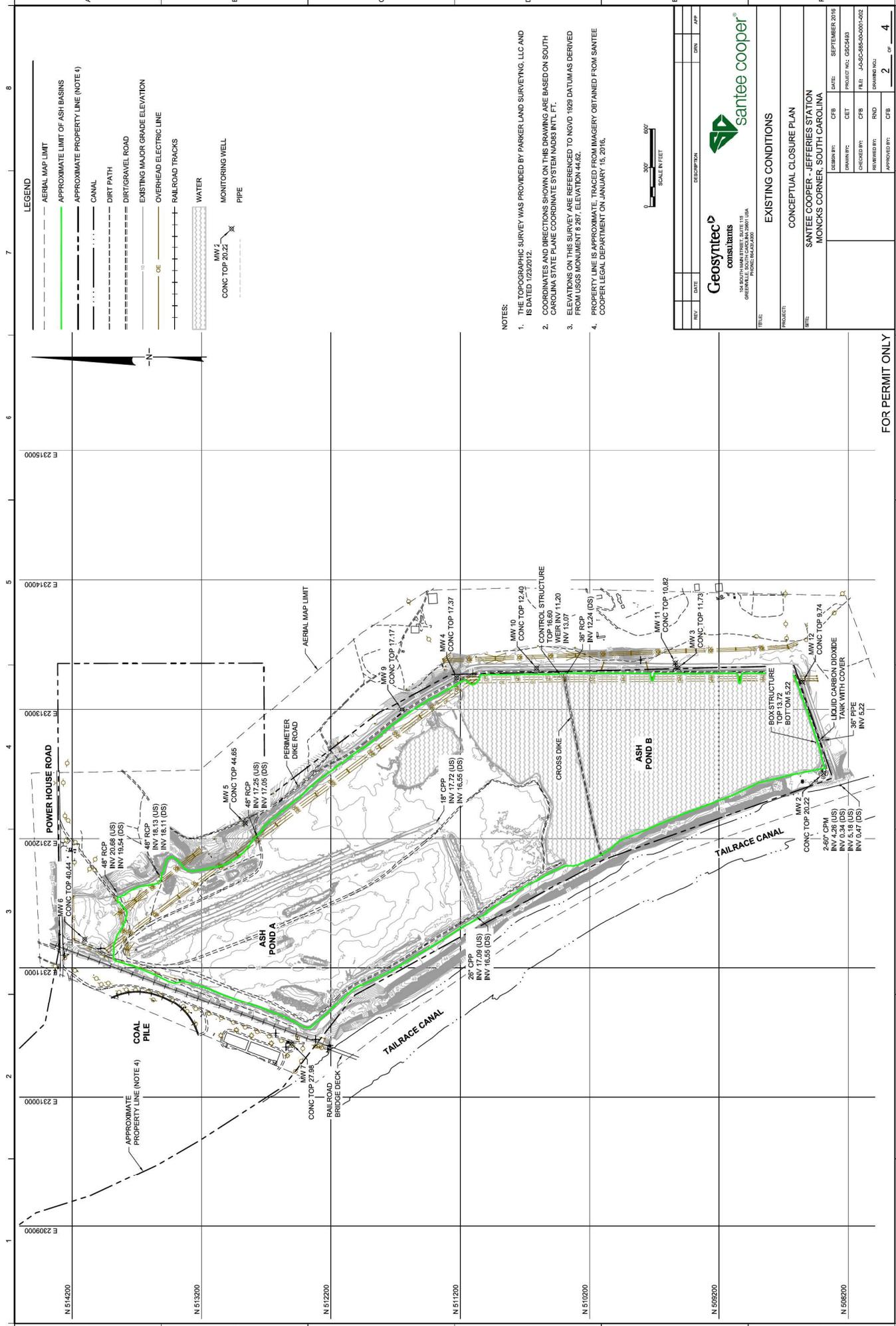
Geosyntec  
consultants  
104 SOUTH MAIN STREET, SUITE 115  
GREENVILLE, SOUTH CAROLINA 29601  
PHONE: 864.438.4900



REV	DATE	DESCRIPTION	DN	APP

TITLE	COVER			
PROJECT	CONCEPTUAL CLOSURE PLAN			
SITE	SANTÉE COOPER - JEFFERIES STATION MONCKS CORNER, SOUTH CAROLINA			
DRAWN BY:	CFB	DATE:	SEPTEMBER 2016	
CHECKED BY:	CFB	PROJECT NO.:	GSC5493	
REVIEWED BY:	RND	FILE:	JA-SC-285A-001-001	
APPROVED BY:	CFB	DRAWING NO.:	1 of 4	

FOR PERMIT ONLY



**LEGEND**

	AERIAL MAP LIMIT
	APPROXIMATE LIMIT OF ASH BASINS
	APPROXIMATE PROPERTY LINE (NOTE 4)
	CANAL
	DIRT PATH
	DIRT/GRAVEL ROAD
	EXISTING MAJOR GRADE ELEVATION
	OVERHEAD ELECTRIC LINE
	RAILROAD TRACKS
	WATER
	MONITORING WELL
	PIPE

- NOTES:**
1. THE TOPOGRAPHIC SURVEY WAS PROVIDED BY PARKER LAND SURVEYING, LLC AND IS DATED 11/23/2012.
  2. COORDINATES AND DIRECTIONS SHOWN ON THIS DRAWING ARE BASED ON SOUTH CAROLINA STATE PLANE COORDINATE SYSTEM NAD83 INTL. FT.
  3. ELEVATIONS ON THIS SURVEY ARE REFERENCED TO NGVD 1989 DATUMS DERIVED FROM USGS MONUMENT 9 267. ELEVATION 44.62.
  4. PROPERTY LINE IS APPROXIMATE, TRACED FROM IMAGERY OBTAINED FROM SANTEE COOPER LEGAL DEPARTMENT ON JANUARY 15, 2016.



100 SOUTH MAIN STREET, SUITE 1100  
GREENWICH, SOUTH CAROLINA 29615 USA  
PHONE: 803.543.2000

---

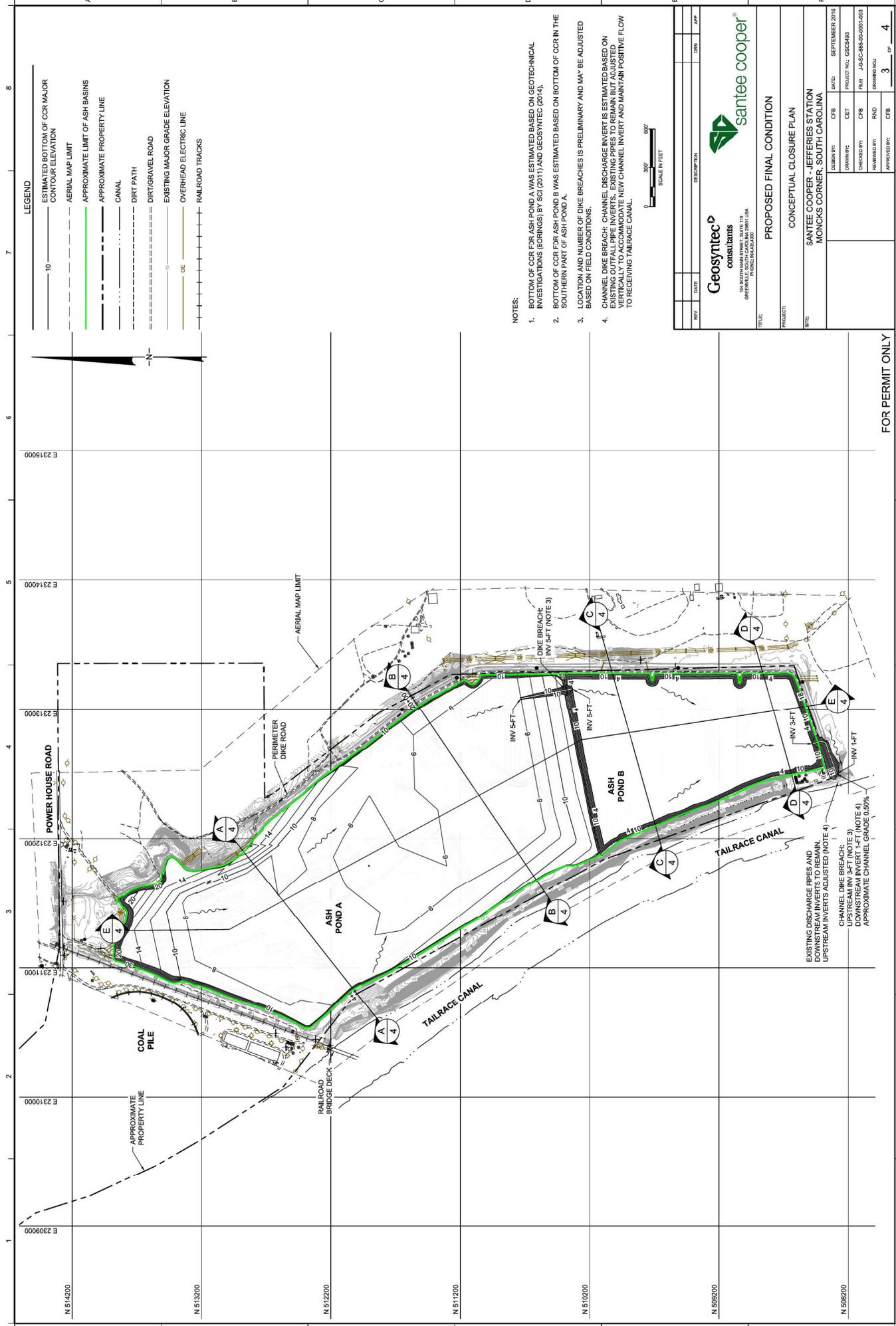
**EXISTING CONDITIONS**

PROJECT: CONCEPTUAL CLOSURE PLAN

SITE: MONTEE COOPER - JEFFERIES STATION  
MONCK'S CORNER, SOUTH CAROLINA

DATE:	SEPTEMBER 2016
DESIGNED BY:	CFB
CHECKED BY:	CET
PROJECT NO.:	GC6565
FILE:	JAC-SC-000-001-002
REVIEWED BY:	RND
DRAWING NO.:	2
APPROVED BY:	CFB
OF	4

FOR PERMIT ONLY



- NOTES:**
1. BOTTOM OF CCR FOR ASH POND A WAS ESTIMATED BASED ON GEOTECHNICAL INVESTIGATIONS (BORINGS) BY SCI (2011) AND GEOSYNTEC (2014).
  2. BOTTOM OF CCR FOR ASH POND B WAS ESTIMATED BASED ON BOTTOM OF CCR IN THE SOUTHERN PART OF ASH POND A.
  3. LOCATION AND NUMBER OF DIKE BREACHES IS PRELIMINARY AND MAY BE ADJUSTED BASED ON FIELD CONDITIONS.
  4. CHANNEL DIKE BREACH: CHANNEL DISCHARGE INVERT IS ESTIMATED BASED ON EXISTING CHANNEL DISCHARGE INVERT. CHANNEL DISCHARGE INVERT IS ESTIMATED VERTICALLY TO ACCOMMODATE NEW CHANNEL INVERT AND MAINTAIN POSITIVE FLOW TO RECEIVING TAILRACE CANAL.



REV	DATE	DESCRIPTION	DESIGN	APP

**Geosyntec**  
 consultants  
 100 SOUTH MAIN STREET, SUITE 1100  
 GREENVILLE, SOUTH CAROLINA 29601 USA  
 PHONE: 864.241.0000

**santee cooper**

**PROPOSED FINAL CONDITION**

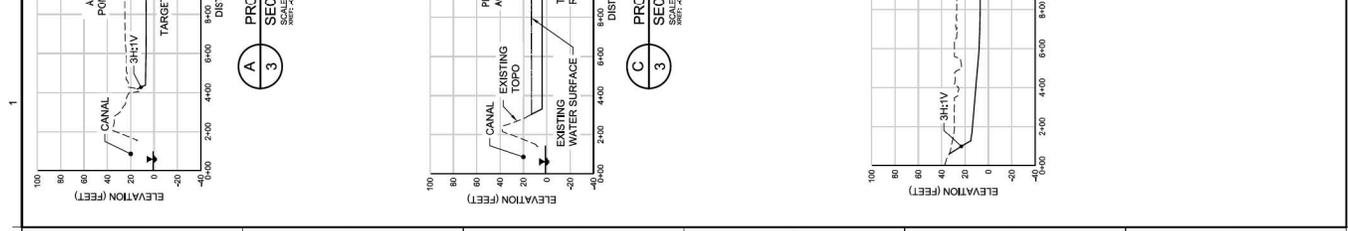
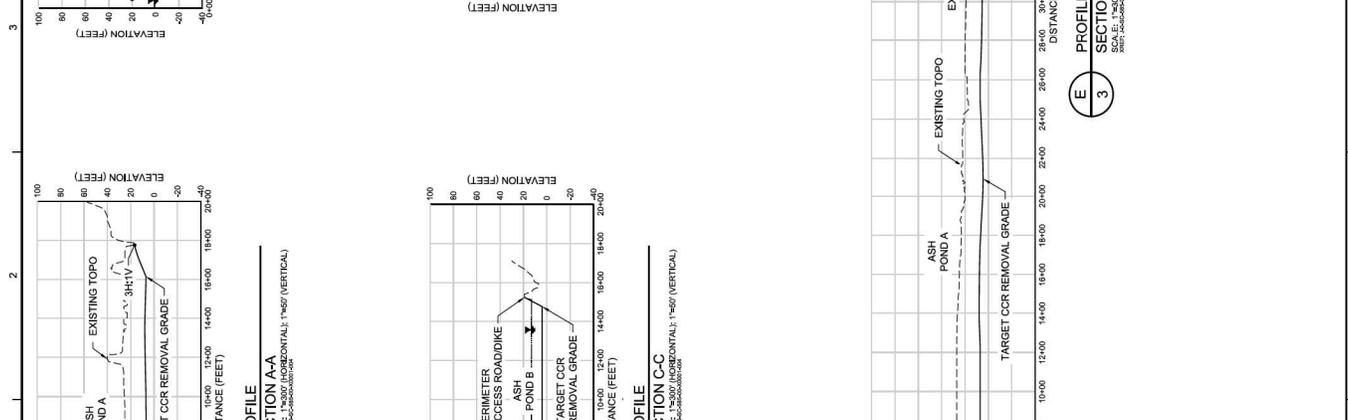
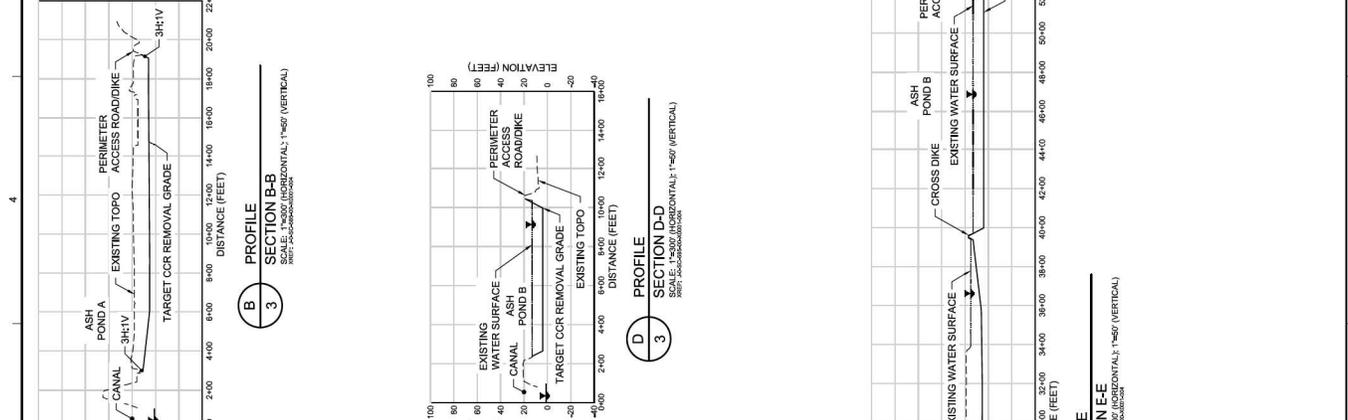
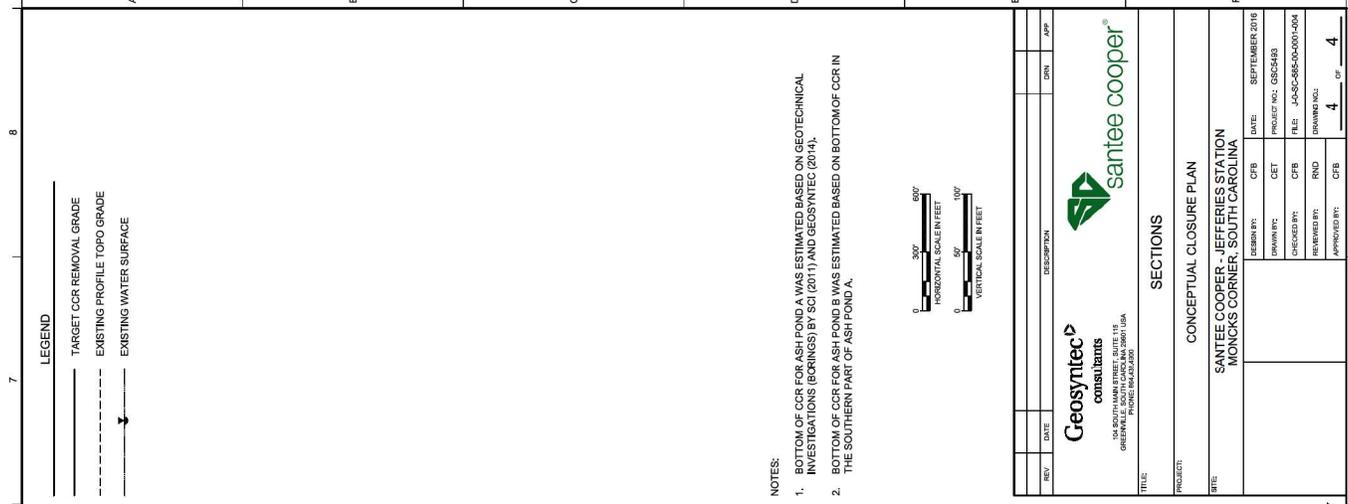
PROJECT: CONCEPTUAL CLOSURE PLAN  
 SITE: SANTEE COOPER - JEFFERIES STATION  
 MONCK'S CORNER, SOUTH CAROLINA

DATE:	SEPTEMBER 2016
DRAWN BY:	CFB
CHECKED BY:	CET
PROJECT NO.:	GC0684
FILE:	JAC-SC-000-001-003
REVIEWED BY:	RND
APPROVED BY:	CFB
DRAWING NO.:	3 OF 4

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EXISTING DISCHARGE PIPES AND DOWNSTREAM INVERTS TO REMAIN. UPSTREAM INVERTS ADJUSTED (NOTE 4)

CHANNEL DIKE BREACH: UPSTREAM INV 5-FT (NOTE 3) DOWNSTREAM INVERT 1-FT (NOTE 4) APPROXIMATE CHANNEL GRADE 1.05%

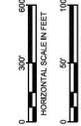


**LEGEND**

	TARGET CCR REMOVAL GRADE
	EXISTING PROFILE TOPO GRADE
	EXISTING WATER SURFACE

**NOTES:**

- BOTTOM OF CCR FOR ASH POND A WAS ESTIMATED BASED ON GEOTECHNICAL INVESTIGATIONS (BORINGS) BY SGI (2011) AND GEOSYNTEC (2014).
- BOTTOM OF CCR FOR ASH POND B WAS ESTIMATED BASED ON BOTTOM OF CCR IN THE SOUTHERN PART OF ASH POND A.



REV	DATE	DESCRIPTION	BY	APP

16100 W. STATE ST. SUITE 100 GREENWELL SOUTH CAROLINA 29615 USA PHONE: 803.424.0000			
<b>SECTIONS</b>			
CONCEPTUAL CLOSURE PLAN			
SITE: Santee Cooper - JEFFERIES STATION MONCK'S CORNER, SOUTH CAROLINA			
DATE:	SEPTEMBER 2016	DESIGNED BY:	CFB
DRAWN BY:	CFB	CHECKED BY:	CFB
FILE:	JAS-CR-000-000-000	REVIEWED BY:	RND
DRAWING NO.:	4	APPROVED BY:	CFB

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**APPENDIX E**  
**Impoundments A and B – Design Flood Analysis**



**WorleyParsons**

resources & energy

**EcoNomics**

**SANTEE COOPER**

# **Jefferies Generating Station**

## **Impoundments A and B - Design Flood Analysis**

108008-01330 – JEFF-0-LI-AP-0003

28 March 2012

Chicago (Westchester)  
Two Westbrook Corporate Center, Suite 200  
Chicago (Westchester) IL 60154  
Tel: +1 708 449-4080  
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Eastern Operations

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**SANTEE COOPER  
JEFFERIES GENERATING STATION  
IMPOUNDMENTS A AND B - DESIGN FLOOD ANALYSIS**

---

**SYNOPSIS**

This report documents the *Design Flood Analysis* undertaken as part of the *Jefferies Generating Station Site Assessment* project.

---

**PROJECT 108008-01330 - JEFFERIES GENERATING STATION**

REV	DESCRIPTION	ORIG	REVIEW	WORLEY- PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
0	Issued for Use	 L. Catalano	 G. Houck	 F. Wood	28-Mar-12	N/A	
						N/A	



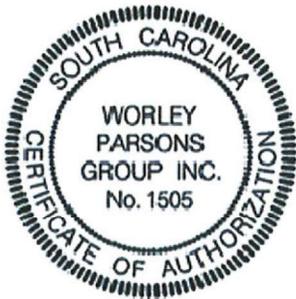
**SANTEE COOPER  
JEFFERIES GENERATING STATION  
IMPOUNDMENTS A AND B - DESIGN FLOOD ANALYSIS**

---

**CONTENTS**

1.	INTRODUCTION.....	4
2.	DISCUSSION.....	5
3.	CONCLUSIONS.....	7
4.	REFERENCES.....	8

APPENDIX 1 - CALCULATION JEFF-0-DC-AP-CE-002:  
DESIGN FLOOD ANALYSIS FOR ASH PONDS A AND B





**SANTEE COOPER  
JEFFERIES GENERATING STATION  
IMPOUNDMENTS A AND B - DESIGN FLOOD ANALYSIS**

---

## **1. INTRODUCTION**

The EPA's engineering contractor, Dewberry & Davis, LLC, performed a site assessment at Jefferies Generating Station on June 29<sup>th</sup>, 2010. Their findings were published in their final report: *Coal Combustion Waste Impoundment Dam Assessment Report at Santee Cooper Jefferies Generating Station* dated January, 2011. The final report included a recommendation for technical analysis related to the continued hydraulic integrity of Impoundments A and B.

In a letter correspondence dated May 18, 2011 from Santee Cooper to the EPA, Santee Cooper summarized this recommendation and agreed to address it as follows:

### **1.2.2 & 1.2.3 Hydrologic/Hydraulic Stability and Supporting Technical Documentation**

Recommendation –

*Santee Cooper should review and document how the apparent off-site drainage toward Ash Pond A is handled and perform hydrologic/hydraulic analysis as may be required to document that the basins can safely store and pass the appropriate design flood.*

Response –

*Santee Cooper will review and document how the off-site drainage toward Ash Pond A is handled and perform hydrologic/hydraulic analyses as may be required to document the basins can safely store and/or pass the appropriate design flood. Santee Cooper will provide the necessary supporting technical documentation by March 29, 2012.*

The purpose of this report is to summarize and document the results of the above analysis.



**SANTEE COOPER  
JEFFERIES GENERATING STATION  
IMPOUNDMENTS A AND B - DESIGN FLOOD ANALYSIS**

---

## **2. DISCUSSION**

The Jefferies Generating Station is located on the southeast side of Lake Moultrie, near Moncks Corner, South Carolina. The station has two ash pond impoundments in series that are used for managing coal combustion residuals. The ponds are sited south of the main plant on the east bank of the Tailrace Canal, and are formed by a perimeter dike along the impoundment's east and south sides. There is an internal cross dike that divides the impoundment into Ash Pond A and Ash Pond B.

A total offsite area of approximately 297 acres currently contributes stormwater run-on to the ponds, in addition to the onsite contributory areas of the ponds themselves (Pond A: 134 acres; Pond B: 46 acres). The purpose of the design flood analysis is to assess how the off-site drainage is handled, and to analyze the hydrologic impacts of several design storm events on the existing ponds and corresponding channels and culverts.

### **2.1 Methodology**

To perform the design flood analysis, a Bentley PondPack model was created to simulate several storm events developing on the existing site conditions. The model utilized a series of existing channels and pipes located within Pond A, as well as off-site drainage area considerations, to simulate the existing conditions of contributory rainfall runoff to Ash Ponds A and B.

Bentley FlowMaster was used to analyze the effects the simulated storm events have on the existing channel located along the perimeter dike within Pond A.

### **2.2 Design Input Data**

The model input for the geometry of the ponds, channels, and drainage areas, as well as pipe and outlet information, were acquired from the topographic survey, dated January 23, 2012 by Parker Land Surveying, LLC. Bathymetric survey, performed by Santee Cooper and dated January 18, 2012, also was used to determine basin geometry.

Design input for the pond size and hazard potential classifications and the pond water levels were taken from the Dam Assessment Report. Based on the size and hazard potential classification, the spillway design flood criterion is 100-year frequency to ½ probable maximum flood (PMF) for Ash Pond A, and a 50 to 100-year frequency for Ash Pond B.

### **2.3 Results**

The model was analyzed under several rainfall frequency intervals to understand the behavior of the system under a variety of conditions. The 50-year, 100-year, 200-year, and 500-year storm frequencies were evaluated, as well as the ½ PMF storm event. Several other storm events were



**SANTEE COOPER  
JEFFERIES GENERATING STATION  
IMPOUNDMENTS A AND B - DESIGN FLOOD ANALYSIS**

---

also considered in order to identify key transition points in the system behavior at higher rainfall return periods. Table 2-1, below, summarizes these key rainfall events:

Table 2-1: Summary of Results

<b>24-hour Rainfall Frequency</b>	<b>Rainfall (inches)</b>	<b>Hydrologic Impact</b>
50-year	8.6	No flooding
100-year	9.8	No flooding
N/A	10.0	Interior dike (between Ponds A and B) floods
200-year	11.1	No additional impact
500-year	12.9	Channel within Pond A floods dike
N/A	15.5	Power House Road floods
N/A	20.2	Pond B exterior dike floods
N/A	21.5	Pond A exterior dike floods
½ PMF	22.0	No additional impact

Detailed results are given in Appendix 1: Calculation JEFF-0-DC-AP-CE-002: Design Flood Analysis for Ash Ponds A and B.



**SANTEE COOPER  
JEFFERIES GENERATING STATION  
IMPOUNDMENTS A AND B - DESIGN FLOOD ANALYSIS**

---

### **3. CONCLUSIONS**

Both Ash Ponds A and B can safely convey their respective design floods, which are between the 100-year frequency and the  $\frac{1}{2}$  probable maximum flood (PMF) for Ash Pond A, and between the 50-year and 100-year frequency for Ash Pond B.

No additional ash should be placed within the open-water basin areas at the south end of Ash Pond A or within Ash Pond B, as this will reduce the stormwater runoff storage capacity. Ash placement may continue consistent with current operations. The channel within Pond A must be maintained regularly to ensure it can safely pass the design flood event without overtopping the perimeter dike.



**SANTEE COOPER  
JEFFERIES GENERATING STATION  
IMPOUNDMENTS A AND B - DESIGN FLOOD ANALYSIS**

---

## **4. REFERENCES**

1. The Jefferies Generating Station Dam Assessment Report, prepared by Dewberry & Davis, LLC for the United States Environmental Protection Agency, dated January 2011.
2. Topographic Survey by Parker Land Surveying, LLC dated January 23, 2012.
3. Bathymetric Survey by Santee Cooper, dated January 18, 2012.



**WorleyParsons**

resources & energy

**EcoNomics**

SANTEE COOPER  
JEFFERIES GENERATING STATION  
IMPOUNDMENTS A AND B - DESIGN FLOOD ANALYSIS

---

## **Appendix 1 - Calculation JEFF-0-DC-AP-CE-002: Design Flood Analysis For Ash Ponds A and B**



## Calculation Template

<b>Customer</b>	Santee Cooper	<b>Project No.</b>	108008-01330		
<b>Project Title</b>	Jefferies Generating Station	<b>Calc No.</b>	JEFF-0-DC-AP-CE-002		
<b>Calculation Title</b>	Design Flood Analysis for Ash Ponds A and B	<b>Phase/CTR</b>	N/A		
<b>Elec File Location</b>	R:\SanteeCooper\CR34\Doc\Civil\Jefferies Generating Station\EPA CCR Impoundment Site Assessment\Design Flood Analysis\JEFF-0-DC-AP-CE-002-R0.doc				
<b>Project File Location</b>	See Encompass	<b>Page</b>	1	<b>of</b>	71

<b>Calculation Objective</b>		
<p>The purpose of this calculation is to assess and document how the apparent off-site drainage toward Ash Pond A is handled, and to analyze the hydrologic impacts of several design storm events on the existing basins, outlet structures, channels, and culverts in order to document that the basins can safely store and pass the appropriate design flood.</p>		
<b>Calculation Method</b>		
Bentley PondPack was used for the storm system analysis.		
<b>Software Used</b>		
<b>Title</b>	<b>Version</b>	<b>Validated (Yes/No/NA)</b>
Bentley PondPack	8.11/8i	Yes - 03/28/2012
Bentley FlowMaster	8.11/8i	Yes - 03/28/2012
<b>Assumptions</b>		<b>Professional Engineer Seal</b>  See Page 3
None that require further verification.		
<b>References</b>		
<ol style="list-style-type: none"> <li>1. The Jefferies Generating Station Dam Assessment Report, prepared by Dewberry &amp; Davis, LLC for the United States Environmental Protection Agency, dated January 2011.</li> <li>2. Site Topographic Survey information from Parker Land Surveying, LLC, dated January 23, 2012.</li> <li>3. Rainfall Data from National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 2, Version 3</li> </ol>		
<b>Conclusions</b>		
<p>Both onsite ash ponds A and B fall within the recommended design flood criteria margins as determined in the Dam Assessment Report. The overall system will convey the onsite and offsite runoff for a 100-year storm event without flooding. Portions of the system will flood during storm events between the 100-year storm and ½ the probable maximum flood as described herein.</p> <p>It is recommended that no additional ash be placed within the open-water basin areas within Ash Ponds A and B, specifically the areas currently used for water quality management. It also is recommended that Channel 3 be routinely maintained. Ash placement may continue consistent with current operations.</p>		

0	28-Mar-2012	Issued for Use	L. Catalano	G. Houck	F. Wood
<b>Rev</b>	<b>Date</b>	<b>Description</b>	<b>By</b>	<b>Checked</b>	<b>Approved</b>

# Calculation Template

<b>Customer</b>	Santee Cooper	<b>Project No.</b>	108008-01330		
<b>Project Title</b>	Jefferies Generating Station	<b>Calc No.</b>	JEFF-0-DC-AP-CE-002		
<b>Calculation Title</b>	Design Flood Analysis for Ash Ponds A and B	<b>Phase/CTR</b>	N/A		
<b>Elec File Location</b>	R:\SanteeCooper\CR34\Doc\Civil\Jefferies Generating Station\EPA CCR Impoundment Site Assessment\Design Flood Analysis\JEFF-0-DC-AP-CE-002-R0.doc				
<b>Project File Location</b>	See Encompass	<b>Page</b>	2	<b>of</b>	71

**Please check boxes for all applicable items checked or delete if not appropriate:**

**Calculations:**

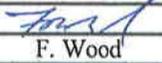
- Calculation number assigned and registered (refer to project numbering system or Document Numbering System EPP-0040 for format).
- Project title shown.
- Calculation title shown.
- Revision history box complete and signed.
- Calculation objectives (aims) stated.
- Calculation method defined or described (including formulae if relevant).
- Reference made to text, standard or code. Check version/edition with that required for project.
- Source of input data stated (with revision number and date if relevant).
- Assumptions stated.
- Summary of results or conclusions.
- For software based calculations, reference to software validation if available.
- Approach used is appropriate for problem being solved.
- Method clear and easy to follow.
- Input data correct.
- Calculation is arithmetically correct OR software previously verified and reference to verification checked.
- Calculation result within expected limits.
- Abbreviations correct.
- Appropriate cross-references.
- Sketches included and clearly labeled, where required.
- Attachments included and referenced, as required.

**Checking records:**

- Checked and annotated copy of calculation filed (use "Check Print" stamp).
- Corrections made as required and calculation dated and signed on cover sheet by checker.

**Revisions:**

- Changes clouded.
- Revision history block updated.
- Calculation re-checked if required.

0	28-Mar-2012	Issued for Use	 L. Catalano	 G. Houck	 F. Wood
<b>Rev</b>	<b>Date</b>	<b>Description</b>	<b>By</b>	<b>Checked</b>	<b>Approved</b>

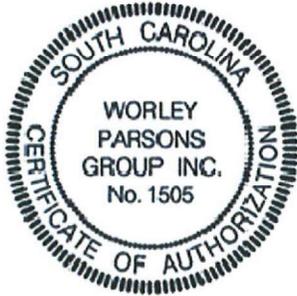


# Calculation Template

<b>Customer</b>	Santee Cooper	<b>Project No.</b>	108008-01330								
<b>Project Title</b>	Jefferies Generating Station	<b>Calc No.</b>	JEFF-0-DC-AP-CE-002								
<b>Calculation Title</b>	Design Flood Analysis for Ash Ponds A and B	<b>Phase/CTR</b>	N/A								
<b>Elec File Location</b>	R:\SanteeCooper\CR34\Doc\Civil\Jefferies Generating Station\EPA CCR Impoundment Site Assessment\Design Flood Analysis\JEFF-0-DC-AP-CE-002-R0.doc										
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<b>Calculation Title</b>	Design Flood Analysis for Ash Ponds A and B	<b>Phase/CTR</b>	N/A				
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## Introduction

The Jefferies Generating Station is located on the southeast side of Lake Moultrie, near Moncks Corner, South Carolina. The station utilizes two ash pond impoundments in series to manage coal combustion residuals. Both ash ponds (Ash Pond A and Ash Pond B) are situated south of the main plant on the east bank of the Tailrace Canal. Approximately 180 acres of onsite area (the ash pond areas) and 297 acres of total offsite area (268 acres north of Power House Road and 29 acres north of Ash Pond A) contribute to the volume of stormwater managed by the Ash Ponds. The Existing Conditions Sketch and the Model Sketch in Appendix A illustrate the layout of the site and drainage areas.

Based on the size classification and hazard potential classification, as recommended in the Dam Assessment Report [Ref 1], the spillway design flood criterion is 100-year frequency to ½ probable maximum flood (PMF) for Ash Pond A, and 50 to 100-year frequency for Ash Pond B. The purpose of this analysis is to assess the hydrologic impacts of these (and other) storm events on the existing ponds, channels, and culverts and to document their capacity to safely store and pass the appropriate design flood.

## Methodology

The analysis was conducted using Bentley PondPack to create a hydrologic model of the site and offsite area, and to analyze the effects of different storm events on the facility. The model consists of Ash Ponds A and B, a series of three channel sections and three 48" pipe culverts within Ash Pond A, three onsite contributory drainage areas (the pond areas), and three offsite contributory drainage areas. The Model Sketch in Appendix A illustrates the layout that was used.

The 268 acres of offsite area north of Power House Road drain into the system by way of a 520 foot long 48" reinforced concrete pipe (RCP) culvert that runs under the road. The rainfall from a significant storm on an area of this size will produce a substantial amount of runoff, creating a headwater condition at the upstream end of the 48" RCP culvert. Thus, a pond was modeled directly upstream of this culvert pipe to account for this condition, and this 268 acre offsite contributory area was modeled to drain to this pond (Pond 10).

From the above 48" RCP culvert (RCP1) outlet, the stormwater flows through Channel 1, a 325' long trapezoidal channel that conveys runoff from the offsite contributory area north of Power House Road as well as runoff from an offsite area north of Pond A (Drainage Area 1). The runoff in Channel 1 drains through another 48" RCP culvert (RCP2) that is 43 feet in length, to Channel 2. Channel 2 is a 930' long trapezoidal channel that conveys the upstream runoff, as well as the runoff from a second offsite area north of Pond A (Drainage Area 2). The runoff in Channel 2 then drains through a 48" corrugated metal pipe culvert (CMP) that is 43 feet in length to Channel 3. Channel 3 is a 1,920' long trapezoidal channel that conveys the upstream runoff, as well as the runoff from onsite Drainage Area 3, to the open-water basin in Ash Pond A. A portion of channel 3 runs along the inside of the perimeter dike within Ash Pond A and therefore is a critical component of this analysis to ensure any flow restriction does not cause water to back up and overtop the perimeter dike before reaching open water. The open-water basin in Ash Pond A conveys all upstream runoff, as well as the runoff from the 107 onsite acre area directly to the north (Drainage Area 4), to Ash Pond B under a concrete skimmer box and through an outlet structure located at the southeast corner of the pond, at the intersection of the perimeter dike and the interior dike separating Ash Ponds A and B. Ash Pond B conveys all upstream runoff from Pond A, as well as the

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rainfall from the 46 acre pond area. The Pond B outfall is located near the south corner of the pond within a man-made dike along the pond's southern perimeter.

The model was analyzed under several rainfall frequency intervals to predict the behavior of the system under a variety of conditions. The 50-yr, 100-yr, and 500-yr frequencies were evaluated, as well as the ½ PMP storm event (22 inches), and several storm events in between that identify when critical changes occur within the model. It was observed that during larger storm events, the interior dike separating Ash Ponds A and B (several feet lower than the perimeter dike) and Power House Road would flood. In order to account for the fact that this stormwater volume remains within the limits of Ash Ponds A and B, both the interior dike and Power House Road were modeled as stepped overflow weir structures based on the topographic survey, with the associated overflow volume entering the downstream receiving body.

The data that was input in the model is as follows:

## Channels

The channel dimensions that were used were a general indication of the channel geometry as shown on the Topographic Survey dated January 23, 2012. Manning's coefficient was assumed based on the existing conditions as a rough flooded channel.

	Channel C1	Channel C2	Channel C3
Bottom Width	8.75 ft	11.0 ft	8.75 ft
Depth to Dike	10.1 ft	7.35 ft	6.7 ft
Sideslopes	1.5:1	1.5:1	1.5:1
Manning's n	0.065	0.065	0.065

## Ponds

The pond size and berm elevations that were input into the model were taken from the Topographic Survey, and the normal water elevations that were used were given in the EPA Dam Assessment Report.

	Pond A	Pond B
Normal Water Level	14.4	13.0
Top of Exterior Berm	19.3	18.6

## Outflow Structures

The outflow structure information that was used was given in the Topographic Survey.

	Pond 10 Outflow Pipe	Pond A Outfall	Pond B Outfall
Structure Type(s)	RCP Culvert, Weir model	RCP Culvert, Orifice, Inlet Box Riser, Weirs (2)	RCP Culvert, Orifice, Inlet Box Riser
Culvert Size	48" RCP	36" RCP	36" RCP
Culvert Pipe Invert	20.68	13.07	6.00

# Calculation Template

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<b>Calculation Title</b>	Design Flood Analysis for Ash Ponds A and B	<b>Phase/CTR</b>	N/A				
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Orifice Size (ft <sup>2</sup> )	--	3.7	0.8
Orifice Invert	--	11.20	12.00
Weir Length	400 ft	500 ft, 500 ft	--
Weir Elevation	42.50	16.60, 17.20	--
Riser Orifice Area (ft <sup>2</sup> )	--	54.0	64.0
Riser Elevation	--	16.60	13.72

## Results

The PondPack model was analyzed under several rainfall frequency intervals to understand the behavior of the system under a variety of conditions. The 50-yr, 100-yr, and 500-yr frequencies were evaluated, as well as the ½ PMF storm event (22 inches), and several storm events in between. The data and results from each rainfall scenario are in Appendix B.

Several key events were considered as the system became flooded under higher rainfall frequencies: The interior berm between Pond A and Pond B flooding, the “channel dike” (Pond A exterior dike adjacent to Channel 3) flooding (based on its current geometry), Power House Road flooding, the exterior dike at Pond B flooding, and the exterior dike at Pond A flooding. The table below summarizes the rainfall depths at which each of these events occur:

Event	50-yr	100-yr	Interior Dike Floods	200-yr	Channel Dike Floods	500-yr	Power House Rd Floods	Pond B Exterior Dike Floods	Pond A Exterior Dike Floods	½ PMF
24-hr Rainfall Frequency	50-yr	100-yr	--	200-yr	500-yr	--	--	--	--	½ PMF
Rainfall (inches) <sup>1</sup>	8.6	9.8	10.0	11.1	12.9	15.5	20.2	21.5	22.0	
Freeboard in Pond A – Interior Dike <sup>2</sup>	0.1 ft	0.02 ft	0	--	--	--	--	--	--	--
Freeboard in Channel <sup>3</sup>	1.7 ft	1.1 ft	1.0 ft	0.6 ft	0	--	--	--	--	--
Freeboard to Power House Rd <sup>4</sup>	9.8 ft	7.6 ft	7.3 ft	5.6 ft	3.0 ft	0	--	--	--	--
Freeboard in Pond B – Exterior Dike <sup>5</sup>	3.3 ft	2.7 ft	2.6 ft	2.0 ft	1.2 ft	0.6 ft	0	--	--	--
Freeboard in Pond A – Exterior Dike <sup>6</sup>	2.4 ft	2.3 ft	2.3 ft	2.2 ft	1.8 ft	1.3 ft	0.7 ft	0	--	--

# Calculation Template

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**Notes:**

1. Rainfall data for the 50-year, 100-year, 200-year, and 500-year storm events is from the NOAA Atlas 14.
2. Average interior dike elevation is approximately 17.0.
3. Channel dike elevation is approximately 19.2, the channel's average minimum depth is approximately 6.7 ft deep.
4. Power House Road elevation is approximately 42.5.
5. Pond B exterior dike elevation is approximately 18.6.
6. Pond A exterior dike elevation is approximately 19.3.

Additionally, Bentley FlowMaster program was used to determine the bottom width required in Channel C3 to convey the flow during each storm event without flooding the perimeter dike. The FlowMaster data for each rainfall scenario is in Appendix C. The table below summarizes the results:

Event			Interior Dike Floods		Channel Dike Floods	Power House Rd Floods	Pond B Exterior Dike Floods	Pond A Exterior Dike Floods	
Rainfall Frequency	50-yr	100-yr	--	200-yr	500-yr	--	--	--	½ PMF
Rainfall (inches)	8.6	9.8	10.0	11.1	12.9	15.5	20.2	21.5	22.0
Minimum Channel Width Required (feet)	NA – existing width is 8.75				9.5	13.0	34.0	41.0	43.5

According to the recommendations in the Dam Assessment Report, the design flood criterion for the existing ash ponds at Jefferies Generating Station is 100-year frequency to ½ PMF for Pond A, and 50-year to 100-year frequency for Pond B. The PondPack model results show that the Pond A exterior dike adjacent to the wet basin area will flood during a storm event of 21.5 inches of rainfall in a 24 hour period. This storm event is at the very high end of the range between the 100-year frequency and ½ PMF in magnitude, and therefore satisfies the recommended criterion. The results show that the Pond B exterior dike will flood during a storm event of 20.2 inches of rainfall in a 24 hour period. This storm event well exceeds the design flood criterion recommended for Pond B.

Although the system will convey the runoff from a 100-year storm event without any flooding, there are areas that will become jeopardized before the ash pond exterior dike floods, including the interior pond dike separating Ash Ponds A and B, Power House Road, and most importantly the "channel dike" adjacent to Channel 3. At present, it appears that the east perimeter dike could overtop due to flow restriction within Channel 3 during rainfall events greater than the 200-year storm. Although the 200-year storm event falls within the recommended criterion for Pond A, the channel may be widened to accommodate larger rainfall events based on the above table. Because the current design satisfies the recommended criterion for Pond A, it is not mandatory for the channel to be widened. However, Channel 3 must be maintained regularly to ensure that it does not restrict flow to the point where stormwater could overtop the perimeter dike.

# Calculation Template

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<b>Calculation Title</b>	Design Flood Analysis for Ash Ponds A and B	<b>Phase/CTR</b>	N/A				
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It is important to note that the calculations contained in this report are based on the current size of the open-water basin areas within Ash Ponds A and B, including the smaller 3.5 acre "surge" basin within Ash Pond A (just north of the main basin). This analysis will no longer be valid if additional ash is placed within these open-water areas due to loss of water storage capacity. Ash ponds may remain operational at this time, and ash may still be placed in primarily dry areas north of the open-water basins.

## Conclusion

Based on the size classification and hazard potential classification, both Ash Pond A and Ash Pond B can safely store and pass their respective design floods, which are between the 100-year frequency and ½ probable maximum flood (PMF) for Ash Pond A, and between the 50 and 100-year frequency storm for Ash Pond B.

It is important that no more ash be placed (except through natural settling) within the open-water basin areas within the Ash Ponds, as this will reduce their storage capacity. Ash may continue to be placed, however, in primarily dry areas north of the open-water basins. At present, all components within the system appear to be capable of safely storing and passing at least the 100-year storm event.

It is critical that Channel 3 within Pond A be maintained regularly to ensure it can safely pass the design flood event without overtopping the perimeter dike.

# Calculation Template

<b>Customer</b>	Santee Cooper	<b>Project No.</b>	108008-01330								
<b>Project Title</b>	Jefferies Generating Station	<b>Calc No.</b>	JEFF-0-DC-AP-CE-002								
<b>Calculation Title</b>	Design Flood Analysis for Ash Ponds A and B	<b>Phase/CTR</b>	N/A								
<b>Elec File Location</b>	R:\SanteeCooper\CR34\Doc\Civil\Jefferies Generating Station\EPA CCR Impoundment Site Assessment\Design Flood Analysis\JEFF-0-DC-AP-CE-002-R0.doc										
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## Appendix A – Site Sketches

(3 total pages)





# Calculation Template

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<b>Project Title</b>	Jefferies Generating Station	<b>Calc No.</b>	JEFF-0-DC-AP-CE-002								
<b>Calculation Title</b>	Design Flood Analysis for Ash Ponds A and B	<b>Phase/CTR</b>	N/A								
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## Appendix B – PondPack Model Results

(49 total pages)

## Scenario Calculation Summary

Scenario Summary	
ID	113
Label	Moncks Corner, SC - Synthetic Curve, 50 yrs
Notes	
Active Topology	<I> Base Active Topology
Hydrology	<I> Base Hydrology
Rainfall Runoff	Moncks Corner, SC - Synthetic Curve, 50 yrs
Physical	<I> Base Physical
Initial Condition	<I> Base Initial Condition
Boundary Condition	<I> Base Boundary Condition
Infiltration and Inflow	<I> Base Infiltration and Inflow
Output	<I> Base Output
User Data Extensions	<I> Base User Data Extensions
PondPack Engine Calculation Options	Moncks Corner, SC - Synthetic Curve

Output Summary			
Output Increment	0.050 hours	Duration	35.000 hours

Rainfall Summary			
Return Event Tag	50	Rainfall Type	Time-Depth Curve
Total Depth	8.6 in	Storm Event	TypeIII 24hr (8.6 in)

ICPM Output Summary			
Target Convergence	0.00 ft <sup>3</sup> /s	ICPM Time Step	0.010 hours
Maximum Iterations	35		

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-1	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	4.136	12.350	32.46	(N/A)	(N/A)
DA-2	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	2.890	12.400	21.76	(N/A)	(N/A)
DA-3	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	16.814	12.400	114.19	(N/A)	(N/A)

# Scenario Calculation Summary

## Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-4	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	68.525	12.350	475.27	(N/A)	(N/A)
DA-5	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	33.015	12.100	338.32	(N/A)	(N/A)
Junc 10	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	88.512	14.100	163.89	(N/A)	(N/A)
Junc 20	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	88.508	14.100	163.88	(N/A)	(N/A)
Junc 30	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	91.398	14.050	166.97	(N/A)	(N/A)
Junc 40	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	91.362	14.200	166.78	(N/A)	(N/A)
Junc 50	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	108.176	12.550	205.87	(N/A)	(N/A)
Junc 60	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	176.643	12.450	603.63	(N/A)	(N/A)
Offsite DA	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	85.326	13.000	371.32	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Out 50	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	144.649	19.000	106.75	(N/A)	(N/A)
Pond 10 (IN)	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	85.326	13.000	371.32	(N/A)	(N/A)
Pond 10 (OUT)	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	84.376	14.200	158.94	32.75	27.239
Pond A (IN)	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	176.643	12.450	603.63	(N/A)	(N/A)
Pond A (OUT)	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	144.428	13.400	263.77	16.89	113.505
Pond B (IN)	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	177.443	12.100	351.70	(N/A)	(N/A)
Pond B (OUT)	Moncks Corner, SC - Synthetic Curve, 50 yrs	50	None	144.649	19.000	106.75	15.28	246.070

### Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
48" RCP1	Pond Outlet	Upstream	85.326	13.000	371.32	Pond 10	Pond Inflow
48" RCP1	Pond Outlet	Outflow	84.376	14.200	158.94	Pond 10	Pond Outflow
48" RCP1	Pond Outlet	Link	84.376	14.200	158.94		
48" RCP1	Pond Outlet	Downstream	88.512	14.100	163.89	Junc 10	
C1	Channel	Upstream	88.512	14.100	163.89	Junc 10	
C1	Channel	Link	88.508	14.100	163.88		

# Scenario Calculation Summary

## Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
C1	Channel	Downstream	88.508	14.100	163.88	Junc 20	
C2	Channel	Upstream	91.398	14.050	166.97	Junc 30	
C2	Channel	Link	91.362	14.200	166.78		
C2	Channel	Downstream	91.362	14.200	166.78	Junc 40	
C3	Channel	Upstream	108.176	12.550	205.87	Junc 50	
C3	Channel	Link	108.118	12.800	192.49		
C3	Channel	Downstream	176.643	12.450	603.63	Junc 60	
Route 10	Pond Outlet	Upstream	176.643	12.450	603.63	Pond A	Pond Inflow
Route 10	Pond Outlet	Outflow	144.428	13.400	263.77	Pond A	Pond Outflow
Route 10	Pond Outlet	Link	144.428	13.400	263.77		
Route 10	Pond Outlet	Downstream	177.443	12.100	351.70	Pond B	
Route 20	Pond Outlet	Upstream	177.443	12.100	351.70	Pond B	Pond Inflow
Route 20	Pond Outlet	Outflow	144.649	19.000	106.75	Pond B	Pond Outflow
Route 20	Pond Outlet	Link	144.649	19.000	106.75		
Route 20	Pond Outlet	Downstream	144.649	19.000	106.75	Out 50	

## Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 50 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	39
Scenario	Moncks Corner, SC - Synthetic Curve, 50 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Reverse flow conditions encountered for one or more headwater elevations. Calculated reverse flows may be approximate.
Source	Warning

## Scenario Calculation Summary

### Messages

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Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 50 yrs
Element Type	Composite Outlet Structure
Element Id	72
Label	Outlet 3
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning

---

Message Id	2
Scenario	Moncks Corner, SC - Synthetic Curve, 50 yrs
Element Type	Junction
Element Id	60
Label	Junc 10
Time	(N/A)
Message	Junction node Junc 10 is a confluence node. For possible alternatives, see help topic 'Network Configuration for Tailwater Analyses'.
Source	Warning

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Message Id	41
Scenario	Moncks Corner, SC - Synthetic Curve, 50 yrs
Element Type	Conduit
Element Id	84
Label	C1
Time	(N/A)
Message	For weighted average inflow = 115.21 ft <sup>3</sup> /s, travel time is shorter than the output increment in calculation options = 0.036 hours. Consider reducing output increment.
Source	Warning

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## Scenario Calculation Summary

Scenario Summary			
ID	27		
Label	Moncks Corner, SC - Synthetic Curve, 100 yrs		
Notes			
Active Topology	Base Active Topology		
Hydrology	Base Hydrology		
Rainfall Runoff	Moncks Corner, SC - Synthetic Curve, 100 yrs		
Physical	Base Physical		
Initial Condition	Base Initial Condition		
Boundary Condition	Base Boundary Condition		
Infiltration and Inflow	Base Infiltration and Inflow		
Output	Base Output		
User Data Extensions	Base User Data Extensions		
PondPack Engine Calculation Options	Moncks Corner, SC - Synthetic Curve		
Output Summary			
Output Increment	0.050 hours	Duration	35.000 hours
Rainfall Summary			
Return Event Tag	100	Rainfall Type	Time-Depth Curve
Total Depth	9.8 in	Storm Event	TypeIII 24hr (9.8 in)
ICPM Output Summary			
Target Convergence	0.00 ft <sup>3</sup> /s	ICPM Time Step	0.010 hours
Maximum Iterations	35		

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-1	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	5.424	12.300	43.91	(N/A)	(N/A)
DA-2	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	3.567	12.400	26.94	(N/A)	(N/A)
DA-3	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	19.436	12.350	131.05	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-4	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	79.065	12.350	544.49	(N/A)	(N/A)
DA-5	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	37.626	12.100	384.96	(N/A)	(N/A)
Junc 10	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	110.798	14.200	181.92	(N/A)	(N/A)
Junc 20	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	110.793	14.200	181.92	(N/A)	(N/A)
Junc 30	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	114.360	14.100	185.49	(N/A)	(N/A)
Junc 40	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	114.323	14.250	185.35	(N/A)	(N/A)
Junc 50	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	133.759	12.500	259.68	(N/A)	(N/A)
Junc 60	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	212.765	12.450	722.24	(N/A)	(N/A)
Offsite DA	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	106.328	13.000	466.41	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Out 50	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	179.647	20.050	111.28	(N/A)	(N/A)
Pond 10 (IN)	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	106.328	13.000	466.41	(N/A)	(N/A)
Pond 10 (OUT)	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	105.374	14.300	175.97	34.91	37.162
Pond A (IN)	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	212.765	12.450	722.24	(N/A)	(N/A)
Pond A (OUT)	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	179.903	13.000	393.43	16.98	115.663
Pond B (IN)	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	217.529	13.000	429.87	(N/A)	(N/A)
Pond B (OUT)	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	179.646	20.050	111.28	15.91	272.432

### Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
48" RCP1	Pond Outlet	Upstream	106.328	13.000	466.41	Pond 10	Pond Inflow
48" RCP1	Pond Outlet	Outflow	105.374	14.300	175.97	Pond 10	Pond Outflow
48" RCP1	Pond Outlet	Link	105.374	14.300	175.97		
48" RCP1	Pond Outlet	Downstream	110.798	14.200	181.92	Junc 10	
C1	Channel	Upstream	110.798	14.200	181.92	Junc 10	
C1	Channel	Link	110.793	14.200	181.92		

# Scenario Calculation Summary

## Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
C1	Channel	Downstream	110.793	14.200	181.92	Junc 20	
C2	Channel	Upstream	114.360	14.100	185.49	Junc 30	
C2	Channel	Link	114.323	14.250	185.35		
C2	Channel	Downstream	114.323	14.250	185.35	Junc 40	
C3	Channel	Upstream	133.759	12.500	259.68	Junc 50	
C3	Channel	Link	133.700	12.700	240.43		
C3	Channel	Downstream	212.765	12.450	722.24	Junc 60	
Route 10	Pond Outlet	Upstream	212.765	12.450	722.24	Pond A	Pond Inflow
Route 10	Pond Outlet	Outflow	179.903	13.000	393.43	Pond A	Pond Outflow
Route 10	Pond Outlet	Link	179.903	13.000	393.43		
Route 10	Pond Outlet	Downstream	217.529	13.000	429.87	Pond B	
Route 20	Pond Outlet	Upstream	217.529	13.000	429.87	Pond B	Pond Inflow
Route 20	Pond Outlet	Outflow	179.646	20.050	111.28	Pond B	Pond Outflow
Route 20	Pond Outlet	Link	179.647	20.050	111.28		
Route 20	Pond Outlet	Downstream	179.647	20.050	111.28	Out 50	

## Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 100 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	39
Scenario	Moncks Corner, SC - Synthetic Curve, 100 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Reverse flow conditions encountered for one or more headwater elevations. Calculated reverse flows may be approximate.
Source	Warning

## Scenario Calculation Summary

### Messages

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Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 100 yrs
Element Type	Composite Outlet Structure
Element Id	72
Label	Outlet 3
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning

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Message Id	2
Scenario	Moncks Corner, SC - Synthetic Curve, 100 yrs
Element Type	Junction
Element Id	60
Label	Junc 10
Time	(N/A)
Message	Junction node Junc 10 is a confluence node. For possible alternatives, see help topic 'Network Configuration for Tailwater Analyses'.
Source	Warning

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Message Id	41
Scenario	Moncks Corner, SC - Synthetic Curve, 100 yrs
Element Type	Conduit
Element Id	84
Label	C1
Time	(N/A)
Message	For weighted average inflow = 133.56 ft <sup>3</sup> /s, travel time is shorter than the output increment in calculation options = 0.034 hours. Consider reducing output increment.
Source	Warning

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## Scenario Calculation Summary

Scenario Summary	
ID	143
Label	Moncks Corner, SC - Synthetic Curve, 120 yrs
Notes	
Active Topology	<I> Base Active Topology
Hydrology	<I> Base Hydrology
Rainfall Runoff	Moncks Corner, SC - Synthetic Curve, 120 yrs
Physical	<I> Base Physical
Initial Condition	<I> Base Initial Condition
Boundary Condition	<I> Base Boundary Condition
Infiltration and Inflow	<I> Base Infiltration and Inflow
Output	<I> Base Output
User Data Extensions	<I> Base User Data Extensions
PondPack Engine Calculation Options	<I> Moncks Corner, SC - Synthetic Curve

Output Summary			
Output Increment	0.050 hours	Duration	35.000 hours

Rainfall Summary			
Return Event Tag	120	Rainfall Type	Time-Depth Curve
Total Depth	10.0 in	Storm Event	TypeIII 24hr (10 in)

ICPM Output Summary			
Target Convergence	0.00 ft <sup>3</sup> /s	ICPM Time Step	0.010 hours
Maximum Iterations	35		

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-1	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	5.615	12.300	45.63	(N/A)	(N/A)
DA-2	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	3.665	12.400	27.69	(N/A)	(N/A)
DA-3	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	19.811	12.350	133.46	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-4	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	80.572	12.350	554.36	(N/A)	(N/A)
DA-5	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	38.284	12.100	391.63	(N/A)	(N/A)
Junc 10	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	114.060	14.200	184.21	(N/A)	(N/A)
Junc 20	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	114.055	14.200	184.20	(N/A)	(N/A)
Junc 30	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	117.720	14.100	187.84	(N/A)	(N/A)
Junc 40	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	117.683	14.250	187.71	(N/A)	(N/A)
Junc 50	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	137.495	12.500	267.04	(N/A)	(N/A)
Junc 60	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	218.007	12.450	739.29	(N/A)	(N/A)
Offsite DA	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	109.399	13.000	480.25	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Out 50	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	184.168	20.200	111.95	(N/A)	(N/A)
Pond 10 (IN)	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	109.399	13.000	480.25	(N/A)	(N/A)
Pond 10 (OUT)	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	108.444	14.350	178.12	35.19	38.680
Pond A (IN)	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	218.007	12.450	739.29	(N/A)	(N/A)
Pond A (OUT)	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	184.971	13.000	414.70	17.00	115.998
Pond B (IN)	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	223.255	12.950	452.82	(N/A)	(N/A)
Pond B (OUT)	Moncks Corner, SC - Synthetic Curve, 120 yrs	120	None	184.167	20.200	111.95	16.00	276.445

### Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
48" RCP1	Pond Outlet	Upstream	109.399	13.000	480.25	Pond 10	Pond Inflow
48" RCP1	Pond Outlet	Outflow	108.444	14.350	178.12	Pond 10	Pond Outflow
48" RCP1	Pond Outlet	Link	108.444	14.350	178.12		
48" RCP1	Pond Outlet	Downstream	114.060	14.200	184.21	Junc 10	
C1	Channel	Upstream	114.060	14.200	184.21	Junc 10	
C1	Channel	Link	114.055	14.200	184.20		

# Scenario Calculation Summary

## Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
C1	Channel	Downstream	114.055	14.200	184.20	Junc 20	
C2	Channel	Upstream	117.720	14.100	187.84	Junc 30	
C2	Channel	Link	117.683	14.250	187.71		
C2	Channel	Downstream	117.683	14.250	187.71	Junc 40	
C3	Channel	Upstream	137.495	12.500	267.04	Junc 50	
C3	Channel	Link	137.436	12.700	247.17		
C3	Channel	Downstream	218.007	12.450	739.29	Junc 60	
Route 10	Pond Outlet	Upstream	218.007	12.450	739.29	Pond A	Pond Inflow
Route 10	Pond Outlet	Outflow	184.971	13.000	414.70	Pond A	Pond Outflow
Route 10	Pond Outlet	Link	184.971	13.000	414.70		
Route 10	Pond Outlet	Downstream	223.255	12.950	452.82	Pond B	
Route 20	Pond Outlet	Upstream	223.255	12.950	452.82	Pond B	Pond Inflow
Route 20	Pond Outlet	Outflow	184.167	20.200	111.95	Pond B	Pond Outflow
Route 20	Pond Outlet	Link	184.168	20.200	111.95		
Route 20	Pond Outlet	Downstream	184.168	20.200	111.95	Out 50	

## Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 120 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	39
Scenario	Moncks Corner, SC - Synthetic Curve, 120 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Reverse flow conditions encountered for one or more headwater elevations. Calculated reverse flows may be approximate.
Source	Warning

## Scenario Calculation Summary

### Messages

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Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 120 yrs
Element Type	Composite Outlet Structure
Element Id	72
Label	Outlet 3
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning

---

Message Id	2
Scenario	Moncks Corner, SC - Synthetic Curve, 120 yrs
Element Type	Junction
Element Id	60
Label	Junc 10
Time	(N/A)
Message	Junction node Junc 10 is a confluence node. For possible alternatives, see help topic 'Network Configuration for Tailwater Analyses'.
Source	Warning

---

Message Id	41
Scenario	Moncks Corner, SC - Synthetic Curve, 120 yrs
Element Type	Conduit
Element Id	84
Label	C1
Time	(N/A)
Message	For weighted average inflow = 135.96 ft <sup>3</sup> /s, travel time is shorter than the output increment in calculation options = 0.034 hours. Consider reducing output increment.
Source	Warning

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## Scenario Calculation Summary

Scenario Summary			
ID	126		
Label	Moncks Corner, SC - Synthetic Curve, 200 yrs		
Notes			
Active Topology	<I> Base Active Topology		
Hydrology	<I> Base Hydrology		
Rainfall Runoff	Moncks Corner, SC - Synthetic Curve, 200 yrs		
Physical	<I> Base Physical		
Initial Condition	<I> Base Initial Condition		
Boundary Condition	<I> Base Boundary Condition		
Infiltration and Inflow	<I> Base Infiltration and Inflow		
Output	<I> Base Output		
User Data Extensions	<I> Base User Data Extensions		
PondPack Engine Calculation Options	<I> Moncks Corner, SC - Synthetic Curve		
Output Summary			
Output Increment	0.050 hours	Duration	35.000 hours
Rainfall Summary			
Return Event Tag	200	Rainfall Type	Time-Depth Curve
Total Depth	11.1 in	Storm Event	TypeIII 24hr (11.1 in)
ICPM Output Summary			
Target Convergence	0.00 ft <sup>3</sup> /s	ICPM Time Step	0.010 hours
Maximum Iterations	35		

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-1	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	6.897	12.300	57.11	(N/A)	(N/A)
DA-2	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	4.313	12.400	32.59	(N/A)	(N/A)
DA-3	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	22.240	12.350	148.98	(N/A)	(N/A)

# Scenario Calculation Summary

## Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-4	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	90.331	12.350	618.12	(N/A)	(N/A)
DA-5	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	42.546	12.100	434.73	(N/A)	(N/A)
Junc 10	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	135.571	14.300	197.76	(N/A)	(N/A)
Junc 20	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	135.566	14.300	197.76	(N/A)	(N/A)
Junc 30	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	139.879	14.150	201.82	(N/A)	(N/A)
Junc 40	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	139.842	14.300	201.72	(N/A)	(N/A)
Junc 50	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	162.082	12.500	311.59	(N/A)	(N/A)
Junc 60	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	252.353	12.450	848.16	(N/A)	(N/A)
Offsite DA	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	129.632	12.900	571.89	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Out 50	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	206.945	21.050	116.23	(N/A)	(N/A)
Pond 10 (IN)	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	129.632	12.900	571.89	(N/A)	(N/A)
Pond 10 (OUT)	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	128.675	14.450	190.75	36.94	49.001
Pond A (IN)	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	252.353	12.450	848.16	(N/A)	(N/A)
Pond A (OUT)	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	217.331	12.850	561.14	17.09	118.157
Pond B (IN)	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	259.878	12.850	609.46	(N/A)	(N/A)
Pond B (OUT)	Moncks Corner, SC - Synthetic Curve, 200 yrs	200	None	206.943	21.050	116.23	16.62	302.943

### Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
48" RCP1	Pond Outlet	Upstream	129.632	12.900	571.89	Pond 10	Pond Inflow
48" RCP1	Pond Outlet	Outflow	128.675	14.450	190.75	Pond 10	Pond Outflow
48" RCP1	Pond Outlet	Link	128.675	14.450	190.75		
48" RCP1	Pond Outlet	Downstream	135.571	14.300	197.76	Junc 10	
C1	Channel	Upstream	135.571	14.300	197.76	Junc 10	
C1	Channel	Link	135.566	14.300	197.76		

# Scenario Calculation Summary

## Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
C1	Channel	Downstream	135.566	14.300	197.76	Junc 20	
C2	Channel	Upstream	139.879	14.150	201.82	Junc 30	
C2	Channel	Link	139.842	14.300	201.72		
C2	Channel	Downstream	139.842	14.300	201.72	Junc 40	
C3	Channel	Upstream	162.082	12.500	311.59	Junc 50	
C3	Channel	Link	162.022	12.650	289.79		
C3	Channel	Downstream	252.353	12.450	848.16	Junc 60	
Route 10	Pond Outlet	Upstream	252.353	12.450	848.16	Pond A	Pond Inflow
Route 10	Pond Outlet	Outflow	217.331	12.850	561.14	Pond A	Pond Outflow
Route 10	Pond Outlet	Link	217.331	12.850	561.14		
Route 10	Pond Outlet	Downstream	259.878	12.850	609.46	Pond B	
Route 20	Pond Outlet	Upstream	259.878	12.850	609.46	Pond B	Pond Inflow
Route 20	Pond Outlet	Outflow	206.943	21.050	116.23	Pond B	Pond Outflow
Route 20	Pond Outlet	Link	206.945	21.050	116.23		
Route 20	Pond Outlet	Downstream	206.945	21.050	116.23	Out 50	

## Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 200 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	39
Scenario	Moncks Corner, SC - Synthetic Curve, 200 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Reverse flow conditions encountered for one or more headwater elevations. Calculated reverse flows may be approximate.
Source	Warning

## Scenario Calculation Summary

### Messages

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Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 200 yrs
Element Type	Composite Outlet Structure
Element Id	72
Label	Outlet 3
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning

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Message Id	2
Scenario	Moncks Corner, SC - Synthetic Curve, 200 yrs
Element Type	Junction
Element Id	60
Label	Junc 10
Time	(N/A)
Message	Junction node Junc 10 is a confluence node. For possible alternatives, see help topic 'Network Configuration for Tailwater Analyses'.
Source	Warning

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Message Id	41
Scenario	Moncks Corner, SC - Synthetic Curve, 200 yrs
Element Type	Conduit
Element Id	84
Label	C1
Time	(N/A)
Message	For weighted average inflow = 150.31 ft <sup>3</sup> /s, travel time is shorter than the output increment in calculation options = 0.033 hours. Consider reducing output increment.
Source	Warning

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## Scenario Calculation Summary

Scenario Summary	
ID	122
Label	Moncks Corner, SC - Synthetic Curve, 500 yrs
Notes	
Active Topology	<I> Base Active Topology
Hydrology	<I> Base Hydrology
Rainfall Runoff	Moncks Corner, SC - Synthetic Curve, 500 yrs
Physical	<I> Base Physical
Initial Condition	<I> Base Initial Condition
Boundary Condition	<I> Base Boundary Condition
Infiltration and Inflow	<I> Base Infiltration and Inflow
Output	<I> Base Output
User Data Extensions	<I> Base User Data Extensions
PondPack Engine Calculation Options	<I> Moncks Corner, SC - Synthetic Curve

Output Summary			
Output Increment	0.050 hours	Duration	35.000 hours

Rainfall Summary			
Return Event Tag	500	Rainfall Type	Time-Depth Curve
Total Depth	12.9 in	Storm Event	TypeIII 24hr (12.9 in)

ICPM Output Summary			
Target Convergence	0.00 ft <sup>3</sup> /s	ICPM Time Step	0.010 hours
Maximum Iterations	35		

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-1	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	9.125	12.300	76.94	(N/A)	(N/A)
DA-2	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	5.404	12.350	40.78	(N/A)	(N/A)
DA-3	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	26.221	12.350	174.30	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-4	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	106.321	12.350	722.14	(N/A)	(N/A)
DA-5	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	49.521	12.100	505.27	(N/A)	(N/A)
Junc 10	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	172.031	14.400	216.27	(N/A)	(N/A)
Junc 20	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	172.026	14.450	216.27	(N/A)	(N/A)
Junc 30	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	177.430	12.450	225.56	(N/A)	(N/A)
Junc 40	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	177.392	14.350	220.97	(N/A)	(N/A)
Junc 50	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	203.613	12.450	381.50	(N/A)	(N/A)
Junc 60	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	309.872	12.450	1,019.53	(N/A)	(N/A)
Offsite DA	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	163.869	12.900	726.52	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Out 50	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	221.510	22.600	121.29	(N/A)	(N/A)
Pond 10 (IN)	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	163.869	12.900	726.52	(N/A)	(N/A)
Pond 10 (OUT)	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	162.906	14.650	207.79	39.47	67.551
Pond A (IN)	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	309.872	12.450	1,019.53	(N/A)	(N/A)
Pond A (OUT)	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	272.551	12.700	810.71	17.46	126.723
Pond B (IN)	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	322.072	12.700	875.38	(N/A)	(N/A)
Pond B (OUT)	Moncks Corner, SC - Synthetic Curve, 500 yrs	500	None	221.510	22.600	121.29	17.38	335.558

### Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
48" RCP1	Pond Outlet	Upstream	163.869	12.900	726.52	Pond 10	Pond Inflow
48" RCP1	Pond Outlet	Outflow	162.906	14.650	207.79	Pond 10	Pond Outflow
48" RCP1	Pond Outlet	Link	162.906	14.650	207.79		
48" RCP1	Pond Outlet	Downstream	172.031	14.400	216.27	Junc 10	
C1	Channel	Upstream	172.031	14.400	216.27	Junc 10	
C1	Channel	Link	172.026	14.450	216.27		

# Scenario Calculation Summary

## Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
C1	Channel	Downstream	172.026	14.450	216.27	Junc 20	
C2	Channel	Upstream	177.430	12.450	225.56	Junc 30	
C2	Channel	Link	177.392	14.350	220.97		
C2	Channel	Downstream	177.392	14.350	220.97	Junc 40	
C3	Channel	Upstream	203.613	12.450	381.50	Junc 50	
C3	Channel	Link	203.551	12.600	356.31		
C3	Channel	Downstream	309.872	12.450	1,019.53	Junc 60	
Route 10	Pond Outlet	Upstream	309.872	12.450	1,019.53	Pond A	Pond Inflow
Route 10	Pond Outlet	Outflow	272.551	12.700	810.71	Pond A	Pond Outflow
Route 10	Pond Outlet	Link	272.551	12.700	810.71		
Route 10	Pond Outlet	Downstream	322.072	12.700	875.38	Pond B	
Route 20	Pond Outlet	Upstream	322.072	12.700	875.38	Pond B	Pond Inflow
Route 20	Pond Outlet	Outflow	221.510	22.600	121.29	Pond B	Pond Outflow
Route 20	Pond Outlet	Link	221.510	22.600	121.29		
Route 20	Pond Outlet	Downstream	221.510	22.600	121.29	Out 50	

## Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 500 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	39
Scenario	Moncks Corner, SC - Synthetic Curve, 500 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Reverse flow conditions encountered for one or more headwater elevations. Calculated reverse flows may be approximate.
Source	Warning

## Scenario Calculation Summary

### Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 500 yrs
Element Type	Composite Outlet Structure
Element Id	72
Label	Outlet 3
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	2
Scenario	Moncks Corner, SC - Synthetic Curve, 500 yrs
Element Type	Junction
Element Id	60
Label	Junc 10
Time	(N/A)
Message	Junction node Junc 10 is a confluence node. For possible alternatives, see help topic 'Network Configuration for Tailwater Analyses'.
Source	Warning
Message Id	41
Scenario	Moncks Corner, SC - Synthetic Curve, 500 yrs
Element Type	Conduit
Element Id	84
Label	C1
Time	(N/A)
Message	For weighted average inflow = 170.39 ft <sup>3</sup> /s, travel time is shorter than the output increment in calculation options = 0.032 hours. Consider reducing output increment.
Source	Warning
Message Id	58
Scenario	Moncks Corner, SC - Synthetic Curve, 500 yrs
Element Type	Conduit Catalog
Element Id	30
Label	C-3
Time	(N/A)
Message	Top of channel exceeded during reach routing.
Source	Warning
Message Id	40
Scenario	Moncks Corner, SC - Synthetic Curve, 500 yrs
Element Type	Pond
Element Id	68
Label	Pond A
Time	(N/A)
Message	Mass balance for routing volumes vary by more than 0.5 %. (1.5 % of Inflow Volume)
Source	Warning

## Scenario Calculation Summary

Scenario Summary	
ID	139
Label	Moncks Corner, SC - Synthetic Curve, 1200 yrs
Notes	
Active Topology	<I> Base Active Topology
Hydrology	<I> Base Hydrology
Rainfall Runoff	Moncks Corner, SC - Synthetic Curve, 1200 yrs
Physical	<I> Base Physical
Initial Condition	<I> Base Initial Condition
Boundary Condition	<I> Base Boundary Condition
Infiltration and Inflow	<I> Base Infiltration and Inflow
Output	<I> Base Output
User Data Extensions	<I> Base User Data Extensions
PondPack Engine Calculation Options	<I> Moncks Corner, SC - Synthetic Curve

Output Summary			
Output Increment	0.050 hours	Duration	35.000 hours

Rainfall Summary			
Return Event Tag	200	Rainfall Type	Time-Depth Curve
Total Depth	15.5 in	Storm Event	TypeIII 24hr (15.5 in)

ICPM Output Summary			
Target Convergence	0.00 ft <sup>3</sup> /s	ICPM Time Step	0.010 hours
Maximum Iterations	35		

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-1	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	12.566	12.300	107.24	(N/A)	(N/A)
DA-2	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	7.027	12.350	52.89	(N/A)	(N/A)
DA-3	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	31.981	12.350	210.72	(N/A)	(N/A)

# Scenario Calculation Summary

## Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-4	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	129.447	12.350	871.90	(N/A)	(N/A)
DA-5	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	59.595	12.100	607.15	(N/A)	(N/A)
Junc 10	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	226.726	14.800	258.67	(N/A)	(N/A)
Junc 20	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	226.720	14.800	258.67	(N/A)	(N/A)
Junc 30	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	233.748	12.400	286.20	(N/A)	(N/A)
Junc 40	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	233.706	12.550	276.42	(N/A)	(N/A)
Junc 50	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	265.687	12.450	479.09	(N/A)	(N/A)
Junc 60	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	395.066	12.400	1,258.91	(N/A)	(N/A)
Offsite DA	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	215.141	12.900	955.47	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Out 50	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	230.081	20.550	125.42	(N/A)	(N/A)
Pond 10 (IN)	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	215.141	12.900	955.47	(N/A)	(N/A)
Pond 10 (OUT)	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	214.160	14.800	248.24	42.57	96.783
Pond A (IN)	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	395.066	12.400	1,258.91	(N/A)	(N/A)
Pond A (OUT)	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	322.895	12.600	1,148.84	18.03	139.895
Pond B (IN)	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	382.491	12.550	1,255.61	(N/A)	(N/A)
Pond B (OUT)	Moncks Corner, SC - Synthetic Curve, 1200 yrs	1,200	None	230.081	20.550	125.42	18.03	363.235

### Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
48" RCP1	Pond Outlet	Upstream	215.141	12.900	955.47	Pond 10	Pond Inflow
48" RCP1	Pond Outlet	Outflow	214.160	14.800	248.24	Pond 10	Pond Outflow
48" RCP1	Pond Outlet	Link	214.160	14.800	248.24		
48" RCP1	Pond Outlet	Downstream	226.726	14.800	258.67	Junc 10	
C1	Channel	Upstream	226.726	14.800	258.67	Junc 10	
C1	Channel	Link	226.720	14.800	258.67		

# Scenario Calculation Summary

## Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
C1	Channel	Downstream	226.720	14.800	258.67	Junc 20	
C2	Channel	Upstream	233.748	12.400	286.20	Junc 30	
C2	Channel	Link	233.706	12.550	276.42		
C2	Channel	Downstream	233.706	12.550	276.42	Junc 40	
C3	Channel	Upstream	265.687	12.450	479.09	Junc 50	
C3	Channel	Link	265.619	12.600	448.30		
C3	Channel	Downstream	395.066	12.400	1,258.91	Junc 60	
Route 10	Pond Outlet	Upstream	395.066	12.400	1,258.91	Pond A	Pond Inflow
Route 10	Pond Outlet	Outflow	322.895	12.600	1,148.84	Pond A	Pond Outflow
Route 10	Pond Outlet	Link	322.895	12.600	1,148.84		
Route 10	Pond Outlet	Downstream	382.491	12.550	1,255.61	Pond B	
Route 20	Pond Outlet	Upstream	382.491	12.550	1,255.61	Pond B	Pond Inflow
Route 20	Pond Outlet	Outflow	230.081	20.550	125.42	Pond B	Pond Outflow
Route 20	Pond Outlet	Link	230.081	20.550	125.42		
Route 20	Pond Outlet	Downstream	230.081	20.550	125.42	Out 50	

## Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 1200 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	39
Scenario	Moncks Corner, SC - Synthetic Curve, 1200 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Reverse flow conditions encountered for one or more headwater elevations. Calculated reverse flows may be approximate.
Source	Warning

## Scenario Calculation Summary

### Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 1200 yrs
Element Type	Composite Outlet Structure
Element Id	72
Label	Outlet 3
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	2
Scenario	Moncks Corner, SC - Synthetic Curve, 1200 yrs
Element Type	Junction
Element Id	60
Label	Junc 10
Time	(N/A)
Message	Junction node Junc 10 is a confluence node. For possible alternatives, see help topic 'Network Configuration for Tailwater Analyses'.
Source	Warning
Message Id	41
Scenario	Moncks Corner, SC - Synthetic Curve, 1200 yrs
Element Type	Conduit
Element Id	84
Label	C1
Time	(N/A)
Message	For weighted average inflow = 194.42 ft <sup>3</sup> /s, travel time is shorter than the output increment in calculation options = 0.031 hours. Consider reducing output increment.
Source	Warning
Message Id	58
Scenario	Moncks Corner, SC - Synthetic Curve, 1200 yrs
Element Type	Conduit Catalog
Element Id	30
Label	C-3
Time	(N/A)
Message	Top of channel exceeded during reach routing.
Source	Warning
Message Id	40
Scenario	Moncks Corner, SC - Synthetic Curve, 1200 yrs
Element Type	Pond
Element Id	68
Label	Pond A
Time	(N/A)
Message	Mass balance for routing volumes vary by more than 0.5 %. (6.3 % of Inflow Volume)
Source	Warning

## Scenario Calculation Summary

Scenario Summary			
ID	145		
Label	Moncks Corner, SC - Synthetic Curve, 1300 yrs		
Notes			
Active Topology	<I> Base Active Topology		
Hydrology	<I> Base Hydrology		
Rainfall Runoff	Moncks Corner, SC - Synthetic Curve, 1300 yrs		
Physical	<I> Base Physical		
Initial Condition	<I> Base Initial Condition		
Boundary Condition	<I> Base Boundary Condition		
Infiltration and Inflow	<I> Base Infiltration and Inflow		
Output	<I> Base Output		
User Data Extensions	<I> Base User Data Extensions		
PondPack Engine Calculation Options	<I> Moncks Corner, SC - Synthetic Curve		
Output Summary			
Output Increment	0.050 hours	Duration	35.000 hours
Rainfall Summary			
Return Event Tag	300	Rainfall Type	Time-Depth Curve
Total Depth	20.2 in	Storm Event	TypeIII 24hr (20.2 in)
ICPM Output Summary			
Target Convergence	0.00 ft <sup>3</sup> /s	ICPM Time Step	0.010 hours
Maximum Iterations	35		

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-1	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	19.243	12.300	165.04	(N/A)	(N/A)
DA-2	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	10.055	12.350	75.00	(N/A)	(N/A)
DA-3	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	42.409	12.350	276.29	(N/A)	(N/A)

# Scenario Calculation Summary

## Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-4	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	171.303	12.350	1,141.67	(N/A)	(N/A)
DA-5	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	77.807	12.100	791.30	(N/A)	(N/A)
Junc 10	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	329.572	13.450	1,057.52	(N/A)	(N/A)
Junc 20	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	329.565	13.450	1,057.43	(N/A)	(N/A)
Junc 30	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	339.620	13.450	1,070.40	(N/A)	(N/A)
Junc 40	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	339.574	13.600	1,001.63	(N/A)	(N/A)
Junc 50	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	381.982	13.600	1,044.35	(N/A)	(N/A)
Junc 60	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	553.207	12.400	1,680.01	(N/A)	(N/A)
Offsite DA	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	311.336	12.850	1,378.81	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Out 50	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	241.955	14.650	128.75	(N/A)	(N/A)
Pond 10 (IN)	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	311.336	12.850	1,378.81	(N/A)	(N/A)
Pond 10 (OUT)	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	310.329	13.450	1,033.38	43.26	104.534
Pond A (IN)	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	553.207	12.400	1,680.01	(N/A)	(N/A)
Pond A (OUT)	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	328.185	12.500	1,609.04	18.57	152.602
Pond B (IN)	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	405.992	12.450	1,786.14	(N/A)	(N/A)
Pond B (OUT)	Moncks Corner, SC - Synthetic Curve, 1300 yrs	1,300	None	241.955	14.650	128.75	18.57	386.415

### Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
48" RCP1	Pond Outlet	Upstream	311.336	12.850	1,378.81	Pond 10	Pond Inflow
48" RCP1	Pond Outlet	Outflow	310.329	13.450	1,033.38	Pond 10	Pond Outflow
48" RCP1	Pond Outlet	Link	310.329	13.450	1,033.38		
48" RCP1	Pond Outlet	Downstream	329.572	13.450	1,057.52	Junc 10	
C1	Channel	Upstream	329.572	13.450	1,057.52	Junc 10	
C1	Channel	Link	329.565	13.450	1,057.43		

# Scenario Calculation Summary

## Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
C1	Channel	Downstream	329.565	13.450	1,057.43	Junc 20	
C2	Channel	Upstream	339.620	13.450	1,070.40	Junc 30	
C2	Channel	Link	339.574	13.600	1,001.63		
C2	Channel	Downstream	339.574	13.600	1,001.63	Junc 40	
C3	Channel	Upstream	381.982	13.600	1,044.35	Junc 50	
C3	Channel	Link	381.905	13.750	972.33		
C3	Channel	Downstream	553.207	12.400	1,680.01	Junc 60	
Route 10	Pond Outlet	Upstream	553.207	12.400	1,680.01	Pond A	Pond Inflow
Route 10	Pond Outlet	Outflow	328.185	12.500	1,609.04	Pond A	Pond Outflow
Route 10	Pond Outlet	Link	328.185	12.500	1,609.04		
Route 10	Pond Outlet	Downstream	405.992	12.450	1,786.14	Pond B	
Route 20	Pond Outlet	Upstream	405.992	12.450	1,786.14	Pond B	Pond Inflow
Route 20	Pond Outlet	Outflow	241.955	14.650	128.75	Pond B	Pond Outflow
Route 20	Pond Outlet	Link	241.955	14.650	128.75		
Route 20	Pond Outlet	Downstream	241.955	14.650	128.75	Out 50	

## Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 1300 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	39
Scenario	Moncks Corner, SC - Synthetic Curve, 1300 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Reverse flow conditions encountered for one or more headwater elevations. Calculated reverse flows may be approximate.
Source	Warning

## Scenario Calculation Summary

### Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 1300 yrs
Element Type	Composite Outlet Structure
Element Id	72
Label	Outlet 3
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	2
Scenario	Moncks Corner, SC - Synthetic Curve, 1300 yrs
Element Type	Junction
Element Id	60
Label	Junc 10
Time	(N/A)
Message	Junction node Junc 10 is a confluence node. For possible alternatives, see help topic 'Network Configuration for Tailwater Analyses'.
Source	Warning
Message Id	41
Scenario	Moncks Corner, SC - Synthetic Curve, 1300 yrs
Element Type	Conduit
Element Id	84
Label	C1
Time	(N/A)
Message	For weighted average inflow = 360.68 ft <sup>3</sup> /s, travel time is shorter than the output increment in calculation options = 0.026 hours. Consider reducing output increment.
Source	Warning
Message Id	58
Scenario	Moncks Corner, SC - Synthetic Curve, 1300 yrs
Element Type	Conduit Catalog
Element Id	29
Label	C-2
Time	(N/A)
Message	Top of channel exceeded during reach routing.
Source	Warning
Message Id	58
Scenario	Moncks Corner, SC - Synthetic Curve, 1300 yrs
Element Type	Conduit Catalog
Element Id	30
Label	C-3
Time	(N/A)
Message	Top of channel exceeded during reach routing.
Source	Warning

## Scenario Calculation Summary

### Messages

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Message Id	40
Scenario	Moncks Corner, SC - Synthetic Curve, 1300 yrs
Element Type	Pond
Element Id	68
Label	Pond A
Time	(N/A)
Message	Mass balance for routing volumes vary by more than 0.5 %. (30.2 % of Inflow Volume))
Source	Warning

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Message Id	40
Scenario	Moncks Corner, SC - Synthetic Curve, 1300 yrs
Element Type	Pond
Element Id	69
Label	Pond B
Time	(N/A)
Message	Mass balance for routing volumes vary by more than 0.5 %. (2.7 % of Inflow Volume))
Source	Warning

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## Scenario Calculation Summary

Scenario Summary	
ID	147
Label	Moncks Corner, SC - Synthetic Curve, 1800 yrs
Notes	
Active Topology	<I> Base Active Topology
Hydrology	<I> Base Hydrology
Rainfall Runoff	Moncks Corner, SC - Synthetic Curve, 1800 yrs
Physical	<I> Base Physical
Initial Condition	<I> Base Initial Condition
Boundary Condition	<I> Base Boundary Condition
Infiltration and Inflow	<I> Base Infiltration and Inflow
Output	<I> Base Output
User Data Extensions	<I> Base User Data Extensions
PondPack Engine Calculation Options	<I> Moncks Corner, SC - Synthetic Curve

Output Summary			
Output Increment	0.050 hours	Duration	35.000 hours

Rainfall Summary			
Return Event Tag	800	Rainfall Type	Time-Depth Curve
Total Depth	21.5 in	Storm Event	TypeIII 24hr (21.5 in)

ICPM Output Summary			
Target Convergence	0.00 ft <sup>3</sup> /s	ICPM Time Step	0.010 hours
Maximum Iterations	35		

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-1	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	21.164	12.300	181.45	(N/A)	(N/A)
DA-2	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	10.907	12.350	81.13	(N/A)	(N/A)
DA-3	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	45.295	12.350	294.39	(N/A)	(N/A)

# Scenario Calculation Summary

## Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-4	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	182.887	12.350	1,216.15	(N/A)	(N/A)
DA-5	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	82.845	12.100	842.23	(N/A)	(N/A)
Junc 10	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	358.635	13.300	1,256.19	(N/A)	(N/A)
Junc 20	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	358.628	13.350	1,255.62	(N/A)	(N/A)
Junc 30	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	369.535	13.350	1,271.05	(N/A)	(N/A)
Junc 40	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	369.486	13.500	1,188.24	(N/A)	(N/A)
Junc 50	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	414.782	13.500	1,237.94	(N/A)	(N/A)
Junc 60	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	597.587	12.400	1,794.82	(N/A)	(N/A)
Offsite DA	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	338.485	12.850	1,497.01	(N/A)	(N/A)

# Scenario Calculation Summary

## Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Out 50	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	251.146	14.850	133.13	(N/A)	(N/A)
Pond 10 (IN)	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	338.485	12.850	1,497.01	(N/A)	(N/A)
Pond 10 (OUT)	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	337.471	13.350	1,227.09	43.38	105.890
Pond A (IN)	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	597.587	12.400	1,794.82	(N/A)	(N/A)
Pond A (OUT)	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	373.645	12.500	1,723.60	19.30	169.861
Pond B (IN)	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	456.490	12.450	1,916.27	(N/A)	(N/A)
Pond B (OUT)	Moncks Corner, SC - Synthetic Curve, 1800 yrs	1,800	None	251.146	14.850	133.13	19.30	417.737

## Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
48" RCP1	Pond Outlet	Upstream	338.485	12.850	1,497.01	Pond 10	Pond Inflow
48" RCP1	Pond Outlet	Outflow	337.471	13.350	1,227.09	Pond 10	Pond Outflow
48" RCP1	Pond Outlet	Link	337.471	13.350	1,227.09		
48" RCP1	Pond Outlet	Downstream	358.635	13.300	1,256.19	Junc 10	
C1	Channel	Upstream	358.635	13.300	1,256.19	Junc 10	
C1	Channel	Link	358.628	13.350	1,255.62		

## Scenario Calculation Summary

### Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
C1	Channel	Downstream	358.628	13.350	1,255.62	Junc 20	
C2	Channel	Upstream	369.535	13.350	1,271.05	Junc 30	
C2	Channel	Link	369.486	13.500	1,188.24		
C2	Channel	Downstream	369.486	13.500	1,188.24	Junc 40	
C3	Channel	Upstream	414.782	13.500	1,237.94	Junc 50	
C3	Channel	Link	414.701	13.650	1,151.66		
C3	Channel	Downstream	597.587	12.400	1,794.82	Junc 60	
Route 10	Pond Outlet	Upstream	597.587	12.400	1,794.82	Pond A	Pond Inflow
Route 10	Pond Outlet	Outflow	373.645	12.500	1,723.60	Pond A	Pond Outflow
Route 10	Pond Outlet	Link	373.645	12.500	1,723.60		
Route 10	Pond Outlet	Downstream	456.490	12.450	1,916.27	Pond B	
Route 20	Pond Outlet	Upstream	456.490	12.450	1,916.27	Pond B	Pond Inflow
Route 20	Pond Outlet	Outflow	251.146	14.850	133.13	Pond B	Pond Outflow
Route 20	Pond Outlet	Link	251.146	14.850	133.13		
Route 20	Pond Outlet	Downstream	251.146	14.850	133.13	Out 50	

### Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 1800 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	39
Scenario	Moncks Corner, SC - Synthetic Curve, 1800 yrs
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Reverse flow conditions encountered for one or more headwater elevations. Calculated reverse flows may be approximate.
Source	Warning

## Scenario Calculation Summary

### Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 1800 yrs
Element Type	Composite Outlet Structure
Element Id	72
Label	Outlet 3
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	2
Scenario	Moncks Corner, SC - Synthetic Curve, 1800 yrs
Element Type	Junction
Element Id	60
Label	Junc 10
Time	(N/A)
Message	Junction node Junc 10 is a confluence node. For possible alternatives, see help topic 'Network Configuration for Tailwater Analyses'.
Source	Warning
Message Id	41
Scenario	Moncks Corner, SC - Synthetic Curve, 1800 yrs
Element Type	Conduit
Element Id	84
Label	C1
Time	(N/A)
Message	For weighted average inflow = 420.96 ft <sup>3</sup> /s, travel time is shorter than the output increment in calculation options = 0.025 hours. Consider reducing output increment.
Source	Warning
Message Id	58
Scenario	Moncks Corner, SC - Synthetic Curve, 1800 yrs
Element Type	Conduit Catalog
Element Id	28
Label	C-1
Time	(N/A)
Message	Top of channel exceeded during reach routing.
Source	Warning
Message Id	58
Scenario	Moncks Corner, SC - Synthetic Curve, 1800 yrs
Element Type	Conduit Catalog
Element Id	29
Label	C-2
Time	(N/A)
Message	Top of channel exceeded during reach routing.
Source	Warning

## Scenario Calculation Summary

### Messages

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Message Id	58
Scenario	Moncks Corner, SC - Synthetic Curve, 1800 yrs
Element Type	Conduit Catalog
Element Id	30
Label	C-3
Time	(N/A)
Message	Top of channel exceeded during reach routing.
Source	Warning

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Message Id	40
Scenario	Moncks Corner, SC - Synthetic Curve, 1800 yrs
Element Type	Pond
Element Id	68
Label	Pond A
Time	(N/A)
Message	Mass balance for routing volumes vary by more than 0.5 %. (24.9 % of Inflow Volume))
Source	Warning

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## Scenario Calculation Summary

Scenario Summary			
ID	117		
Label	Moncks Corner, SC - Synthetic Curve, 1/2 PMP		
Notes			
Active Topology	<I> Base Active Topology		
Hydrology	<I> Base Hydrology		
Rainfall Runoff	Moncks Corner, SC - Synthetic Curve, 1/2 PMP		
Physical	<I> Base Physical		
Initial Condition	<I> Base Initial Condition		
Boundary Condition	<I> Base Boundary Condition		
Infiltration and Inflow	<I> Base Infiltration and Inflow		
Output	<I> Base Output		
User Data Extensions	<I> Base User Data Extensions		
PondPack Engine Calculation Options	<I> Moncks Corner, SC - Synthetic Curve		
Output Summary			
Output Increment	0.050 hours	Duration	35.000 hours
Rainfall Summary			
Return Event Tag	000	Rainfall Type	Time-Depth Curve
Total Depth	22.0 in	Storm Event	TypeIII 24hr (22.0 in)
ICPM Output Summary			
Target Convergence	0.00 ft <sup>3</sup> /s	ICPM Time Step	0.010 hours
Maximum Iterations	35		

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-1	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	21.910	12.300	187.79	(N/A)	(N/A)
DA-2	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	11.236	12.350	83.48	(N/A)	(N/A)
DA-3	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	46.406	12.350	301.34	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-4	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	187.343	12.350	1,244.78	(N/A)	(N/A)
DA-5	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	84.782	12.100	861.82	(N/A)	(N/A)
Junc 10	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	369.867	13.300	1,332.23	(N/A)	(N/A)
Junc 20	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	369.860	13.300	1,325.34	(N/A)	(N/A)
Junc 30	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	381.096	13.300	1,342.13	(N/A)	(N/A)
Junc 40	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	381.047	13.450	1,257.69	(N/A)	(N/A)
Junc 50	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	427.452	13.450	1,311.07	(N/A)	(N/A)
Junc 60	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	614.713	12.400	1,838.80	(N/A)	(N/A)
Offsite DA	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	348.975	12.850	1,542.52	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Out 50	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	251.744	14.500	133.13	(N/A)	(N/A)
Pond 10 (IN)	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	348.975	12.850	1,542.52	(N/A)	(N/A)
Pond 10 (OUT)	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	347.957	13.300	1,302.20	43.43	106.395
Pond A (IN)	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	614.713	12.400	1,838.80	(N/A)	(N/A)
Pond A (OUT)	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	369.135	12.500	1,767.37	19.30	169.861
Pond B (IN)	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	453.917	12.450	1,965.21	(N/A)	(N/A)
Pond B (OUT)	Moncks Corner, SC - Synthetic Curve, 1/2 PMP	2,000	None	251.744	14.500	133.13	19.30	417.750

### Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
48" RCP1	Pond Outlet	Upstream	348.975	12.850	1,542.52	Pond 10	Pond Inflow
48" RCP1	Pond Outlet	Outflow	347.957	13.300	1,302.20	Pond 10	Pond Outflow
48" RCP1	Pond Outlet	Link	347.957	13.300	1,302.20		
48" RCP1	Pond Outlet	Downstream	369.867	13.300	1,332.23	Junc 10	
C1	Channel	Upstream	369.867	13.300	1,332.23	Junc 10	
C1	Channel	Link	369.860	13.300	1,325.34		

# Scenario Calculation Summary

## Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
C1	Channel	Downstream	369.860	13.300	1,325.34	Junc 20	
C2	Channel	Upstream	381.096	13.300	1,342.13	Junc 30	
C2	Channel	Link	381.047	13.450	1,257.69		
C2	Channel	Downstream	381.047	13.450	1,257.69	Junc 40	
C3	Channel	Upstream	427.452	13.450	1,311.07	Junc 50	
C3	Channel	Link	427.370	13.650	1,218.62		
C3	Channel	Downstream	614.713	12.400	1,838.80	Junc 60	
Route 10	Pond Outlet	Upstream	614.713	12.400	1,838.80	Pond A	Pond Inflow
Route 10	Pond Outlet	Outflow	369.135	12.500	1,767.37	Pond A	Pond Outflow
Route 10	Pond Outlet	Link	369.135	12.500	1,767.37		
Route 10	Pond Outlet	Downstream	453.917	12.450	1,965.21	Pond B	
Route 20	Pond Outlet	Upstream	453.917	12.450	1,965.21	Pond B	Pond Inflow
Route 20	Pond Outlet	Outflow	251.744	14.500	133.13	Pond B	Pond Outflow
Route 20	Pond Outlet	Link	251.744	14.500	133.13		
Route 20	Pond Outlet	Downstream	251.744	14.500	133.13	Out 50	

## Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 1/2 PMP
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	39
Scenario	Moncks Corner, SC - Synthetic Curve, 1/2 PMP
Element Type	Composite Outlet Structure
Element Id	71
Label	Outlet 2
Time	(N/A)
Message	Reverse flow conditions encountered for one or more headwater elevations. Calculated reverse flows may be approximate.
Source	Warning

## Scenario Calculation Summary

### Messages

Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 1/2 PMP
Element Type	Composite Outlet Structure
Element Id	72
Label	Outlet 3
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning
Message Id	2
Scenario	Moncks Corner, SC - Synthetic Curve, 1/2 PMP
Element Type	Junction
Element Id	60
Label	Junc 10
Time	(N/A)
Message	Junction node Junc 10 is a confluence node. For possible alternatives, see help topic 'Network Configuration for Tailwater Analyses'.
Source	Warning
Message Id	41
Scenario	Moncks Corner, SC - Synthetic Curve, 1/2 PMP
Element Type	Conduit
Element Id	84
Label	C1
Time	(N/A)
Message	For weighted average inflow = 444.93 ft <sup>3</sup> /s, travel time is shorter than the output increment in calculation options = 0.025 hours. Consider reducing output increment.
Source	Warning
Message Id	58
Scenario	Moncks Corner, SC - Synthetic Curve, 1/2 PMP
Element Type	Conduit Catalog
Element Id	28
Label	C-1
Time	(N/A)
Message	Top of channel exceeded during reach routing.
Source	Warning
Message Id	58
Scenario	Moncks Corner, SC - Synthetic Curve, 1/2 PMP
Element Type	Conduit Catalog
Element Id	29
Label	C-2
Time	(N/A)
Message	Top of channel exceeded during reach routing.
Source	Warning

## Scenario Calculation Summary

### Messages

---

Message Id	58
Scenario	Moncks Corner, SC - Synthetic Curve, 1/2 PMP
Element Type	Conduit Catalog
Element Id	30
Label	C-3
Time	(N/A)
Message	Top of channel exceeded during reach routing.
Source	Warning

---

Message Id	40
Scenario	Moncks Corner, SC - Synthetic Curve, 1/2 PMP
Element Type	Pond
Element Id	68
Label	Pond A
Time	(N/A)
Message	Mass balance for routing volumes vary by more than 0.5 %. (27.7 % of Inflow Volume))
Source	Warning

---

<b>Customer</b>	Santee Cooper	<b>Project No.</b>	108008-01330				
<b>Project Title</b>	Jefferies Generating Station	<b>Calc No.</b>	JEFF-0-DC-AP-CE-002				
<b>Calculation Title</b>	Design Flood Analysis for Ash Ponds A and B	<b>Phase/CTR</b>	N/A				
<b>Elec File Location</b>	R:\SanteeCooper\CR34\Doc\Civil\Jefferies Generating Station\EPA CCR Impoundment Site Assessment\Design Flood Analysis\JEFF-0-DC-AP-CE-002-R0.doc						
<b>Project File Location</b>	See Encompass			<b>Page</b>	61	<b>of</b>	71
<b>Rev</b>	<b>Date</b>	<b>By</b>	<b>Checked</b>	<b>Rev</b>	<b>Date</b>	<b>By</b>	<b>Checked</b>
0	28-Mar-2012	L. Catalano	G. Houck				

## Appendix C – FlowMaster Results

(11 total pages)

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## Cross Section for Channel C3 - 50 yr

---

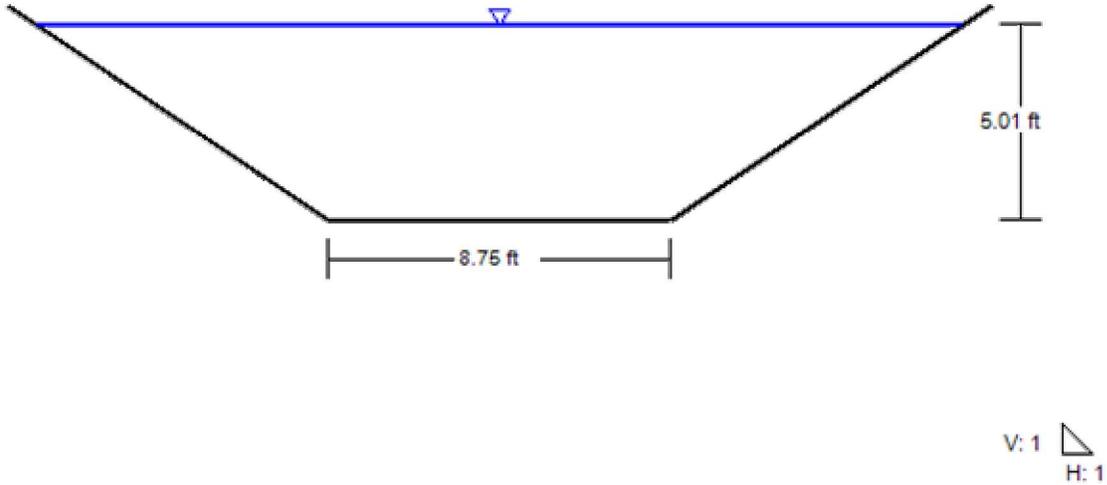
### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.065
Channel Slope	0.00243 ft/ft
Normal Depth	5.01 ft
Left Side Slope	1.50 ft/ft (H:V)
Right Side Slope	1.50 ft/ft (H:V)
Bottom Width	8.75 ft
Discharge	192.49 ft <sup>3</sup> /s

### Cross Section Image



---

## Cross Section for Channel C3 - 100 yr

---

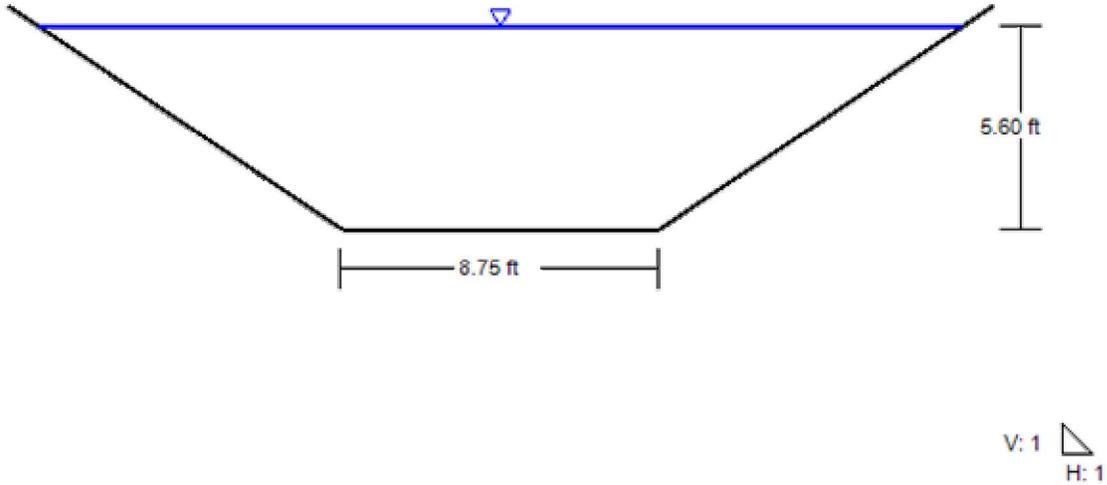
### Project Description

Friction Method                      Manning Formula  
Solve For                                Normal Depth

### Input Data

Roughness Coefficient	0.065	
Channel Slope	0.00243	ft/ft
Normal Depth	5.60	ft
Left Side Slope	1.50	ft/ft (H:V)
Right Side Slope	1.50	ft/ft (H:V)
Bottom Width	8.75	ft
Discharge	240.43	ft <sup>3</sup> /s

### Cross Section Image



---

## Cross Section for Channel C3 - 10.0 in

---

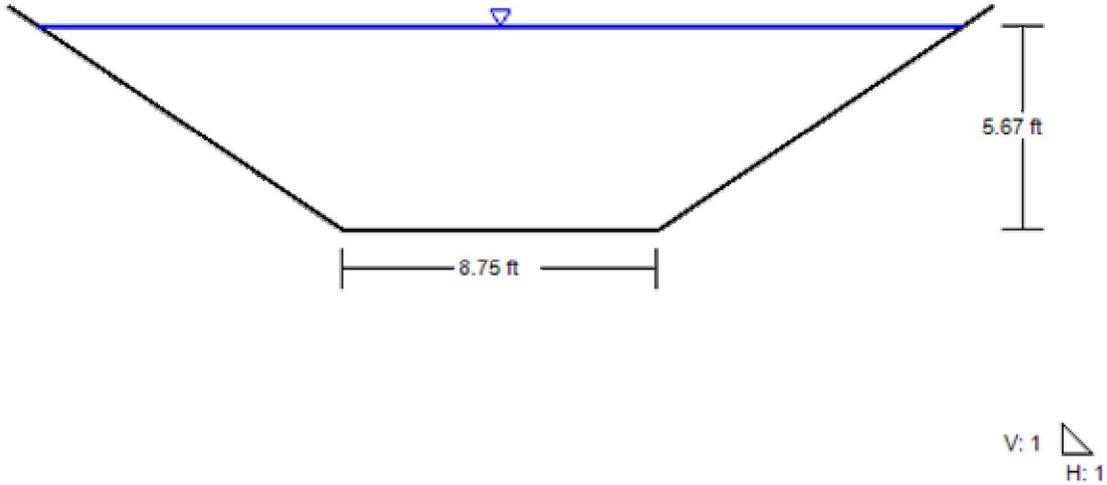
### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.065
Channel Slope	0.00243 ft/ft
Normal Depth	5.67 ft
Left Side Slope	1.50 ft/ft (H:V)
Right Side Slope	1.50 ft/ft (H:V)
Bottom Width	8.75 ft
Discharge	247.17 ft <sup>3</sup> /s

### Cross Section Image



---

## Cross Section for Channel C3 - 200 yr

---

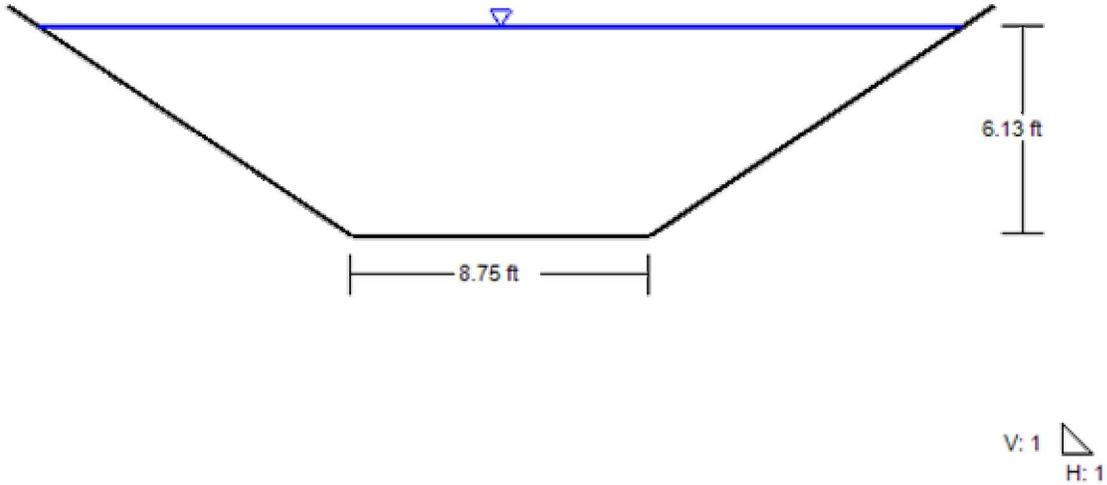
### Project Description

Friction Method                      Manning Formula  
Solve For                                Normal Depth

### Input Data

Roughness Coefficient	0.065	
Channel Slope	0.00243	ft/ft
Normal Depth	6.13	ft
Left Side Slope	1.50	ft/ft (H:V)
Right Side Slope	1.50	ft/ft (H:V)
Bottom Width	8.75	ft
Discharge	289.79	ft <sup>3</sup> /s

### Cross Section Image



---

## Cross Section for Channel C3 - 500 yr - Existing

---

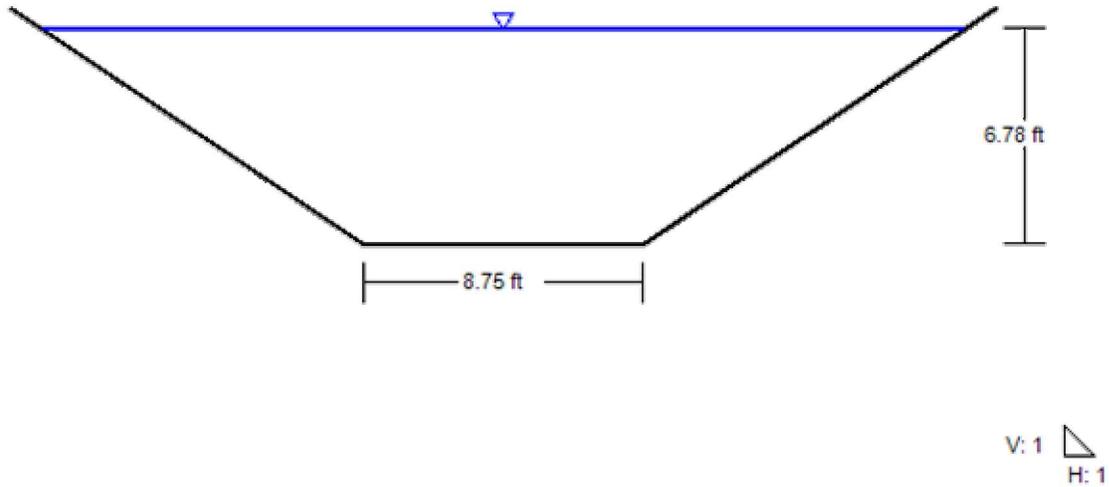
### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.065
Channel Slope	0.00243 ft/ft
Normal Depth	6.78 ft
Left Side Slope	1.50 ft/ft (H:V)
Right Side Slope	1.50 ft/ft (H:V)
Bottom Width	8.75 ft
Discharge	356.31 ft <sup>3</sup> /s

### Cross Section Image



---

## Cross Section for Channel C3 - 500 yr - Revised Width

---

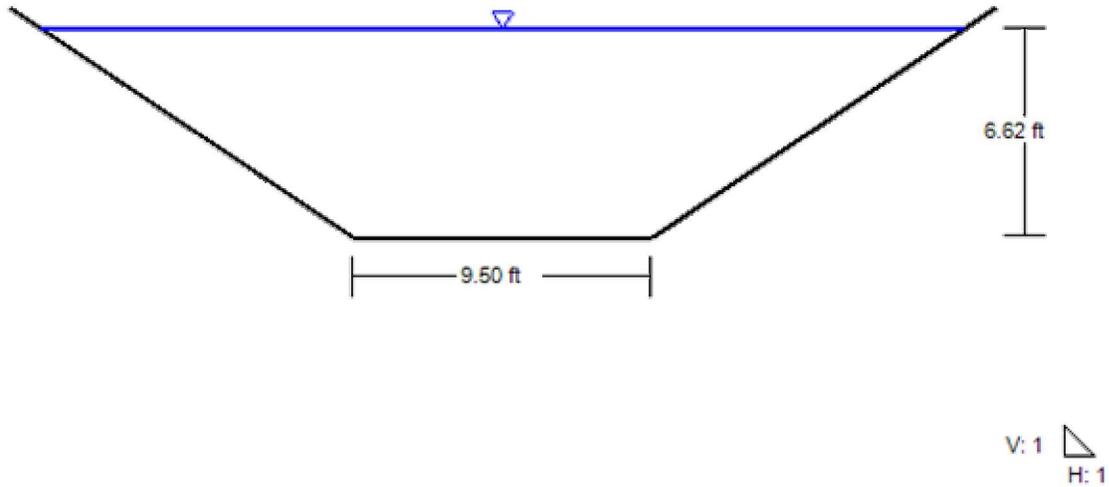
### Project Description

Friction Method                      Manning Formula  
Solve For                                Normal Depth

### Input Data

Roughness Coefficient	0.065
Channel Slope	0.00243 ft/ft
Normal Depth	6.62 ft
Left Side Slope	1.50 ft/ft (H:V)
Right Side Slope	1.50 ft/ft (H:V)
Bottom Width	9.50 ft
Discharge	356.31 ft <sup>3</sup> /s

### Cross Section Image



---

## Cross Section for Channel C3 - 15.5 in

---

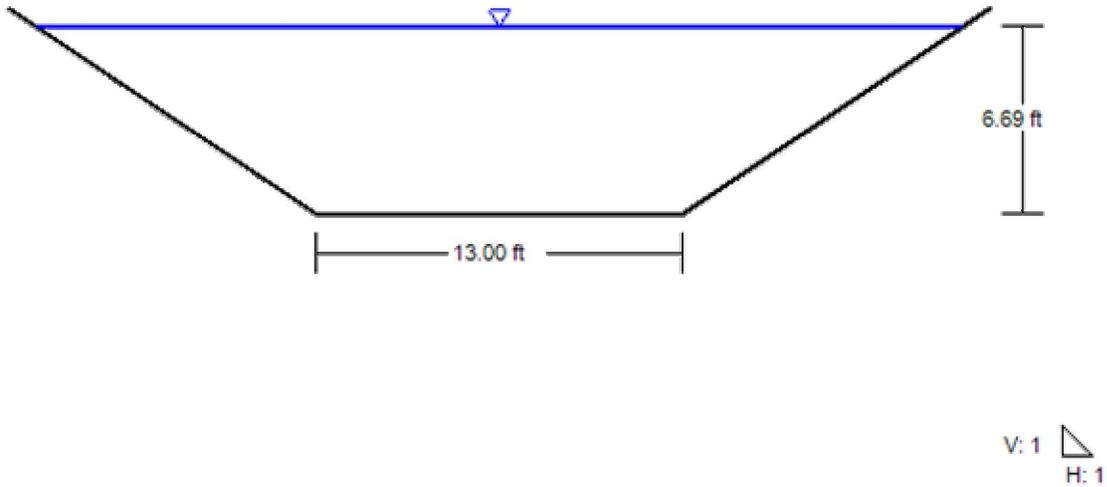
### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.065
Channel Slope	0.00243 ft/ft
Normal Depth	6.69 ft
Left Side Slope	1.50 ft/ft (H:V)
Right Side Slope	1.50 ft/ft (H:V)
Bottom Width	13.00 ft
Discharge	448.30 ft <sup>3</sup> /s

### Cross Section Image



---

## Cross Section for Channel C3 - 20.2 in

---

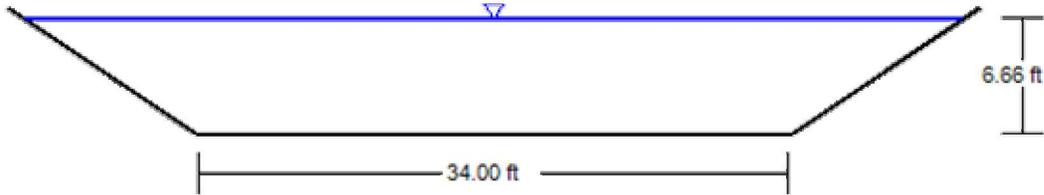
### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.065
Channel Slope	0.00243 ft/ft
Normal Depth	6.66 ft
Left Side Slope	1.50 ft/ft (H:V)
Right Side Slope	1.50 ft/ft (H:V)
Bottom Width	34.00 ft
Discharge	972.33 ft <sup>3</sup> /s

### Cross Section Image



V: 1  
H: 1

---

## Cross Section for Channel C3 - 21.5 in

---

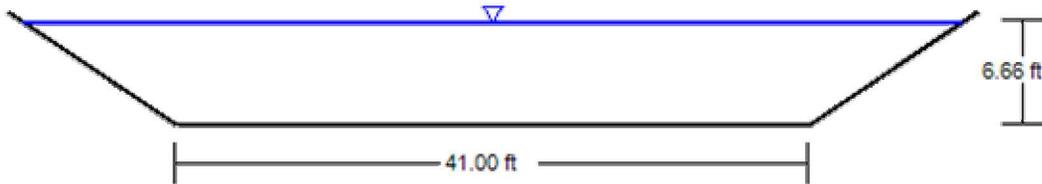
### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.065
Channel Slope	0.00243 ft/ft
Normal Depth	6.66 ft
Left Side Slope	1.50 ft/ft (H:V)
Right Side Slope	1.50 ft/ft (H:V)
Bottom Width	41.00 ft
Discharge	1151.66 ft <sup>3</sup> /s

### Cross Section Image



V: 1  
H: 1

---

## Cross Section for Channel C3 - 1/2PMF

---

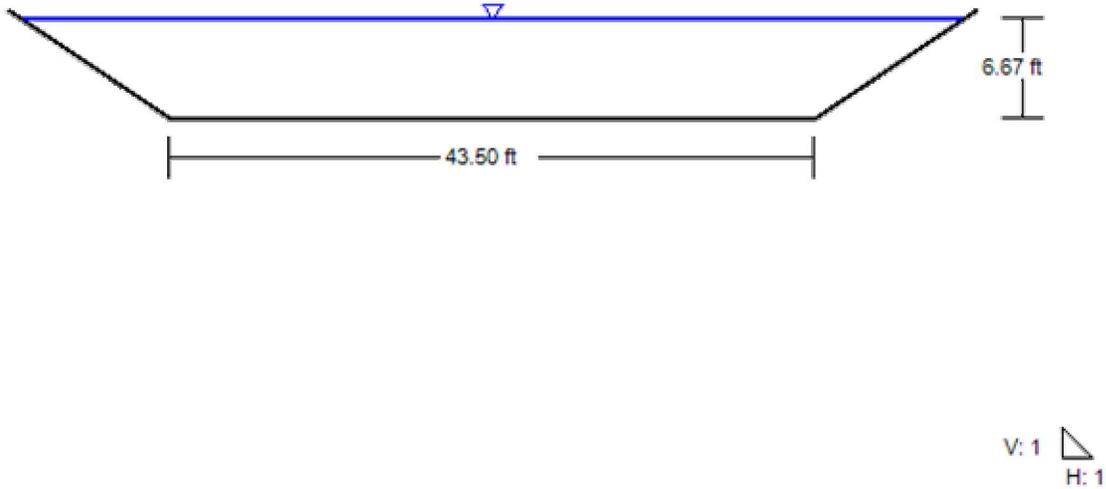
### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.065
Channel Slope	0.00243 ft/ft
Normal Depth	6.67 ft
Left Side Slope	1.50 ft/ft (H:V)
Right Side Slope	1.50 ft/ft (H:V)
Bottom Width	43.50 ft
Discharge	1218.62 ft <sup>3</sup> /s

### Cross Section Image



**APPENDIX F**  
**Work Plan (Divert Stormwater Run-On Around Existing**  
**Ash Pond)**

# Jefferies Generating Station

## Work Plan

(Divert Stormwater Run-On around Existing Ash Ponds)



Santee Cooper  
Civil Projects

Santee Cooper  
Air & Water Quality

May 4, 2015

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3. Water Quality ..... 4  
4. Conclusion ..... 5  
5. Appendix ..... 6

**Santee Cooper  
Jefferies Generating Station  
Stormwater Run-On Diversion**

**Introduction**

Jefferies Generating Station utilizes two impoundments in series (Ash Ponds A and B) to manage coal combustion residuals consisting of fly ash, bottom ash, and boiler slag (see the Work Plan Sketch in the Appendix to this Work Plan for more information). In general, both ash ponds are situated south of the main plant site on the east bank of the Tailrace Canal. The canal spoil bank constitutes the west embankment for both Ash Ponds A and B. A manmade dike serves as the south and east embankments of Ash Pond B, as well as the partial east embankment of Ash Pond A. The dike terminates approximately 1200 feet north of Pond B, where the topography surrounding the pond becomes naturally higher than the pond dike itself. The remainder of Ash Pond A is surrounded by naturally higher topography. A man-made interior dike separates Ash Ponds A and B.

A recent Site Assessment report completed by WorleyParsons concluded that stormwater run-on from approximately 305 acres of offsite area located north of Ash Pond A drains into Pond A through an existing 48-inch reinforced concrete pipe (RCP) culvert under Powerhouse Road. Upon entering Ash Pond A, the stormwater enters a channel located just inside the east perimeter of the pond, eventually reaching open water within Pond A. This channel generally consists of ash on its western side and a combination of Cooper Marl and clay on its eastern side and along its invert. Pond A then drains into Pond B through an outlet structure located at the east end of an interior dike that divides the basin into two ponds. The Pond B outfall (and overall outfall for the Jefferies Generating Station wastewater system) is located near the southwest corner of Pond B. This outfall drains into an existing perimeter channel running along the exterior toe of the Pond B perimeter dike, which empties into the Tailrace Canal through two corrugated metal pipes within the Canal spoil bank. This exterior perimeter channel also intercepts run-on from additional offsite areas and conveys it to the Tailrace Canal.

Santee Cooper has devised a work plan to divert the stormwater run-on through Ash Pond A into the existing outer man-made dike perimeter drainage ditch. By reducing the stormwater run-on within Ash Pond A and B, Santee Cooper will be able to better manage the ash removal from the ponds for beneficial use.

**Work Plan**

As previously stated, the objective of the proposed work is to divert the stormwater run-on from the 305-acre offsite contributory area around the outside perimeter of the existing ash ponds, eventually discharging it directly into the Tailrace Canal. Plan and detail sketches depicting the proposed remediation plan are included in the Appendix to this Work Plan.

As briefly described above, the existing channel in Ash Pond A consists of a combination of ash, Cooper Marl, and clay. Santee Cooper intends to remove all ash and contaminated soil from this channel by excavating to clean soil and/or Cooper Marl. To divert the stormwater after cleanup is complete, a dike extension is proposed along the eastern edge of Ash Pond A to replace those portions of the channel which currently consist of ash (see the Work Plan Sections Sketch in the Appendix for additional details). The new compacted soil dike will be constructed just inside (and parallel to) the existing interior channel to prevent stormwater runoff from inside Ash Pond A from entering the rebuilt ditch. Offsite runoff will also be prevented from entering the ash pond. The new dike section will rejoin the existing dike just south of where the existing dike terminates upon reaching higher ground (see Proposed Work Plan Sketch in the Appendix for additional details). A reinforced concrete pipe (RCP) culvert will be installed to convey the offsite runoff under the perimeter road to an existing channel that runs along the exterior toe of the man-made dike. Once in the existing exterior channel, the diverted clean stormwater will be combined with additional run-on from areas east of the ash ponds and will be conveyed directly to the Tailrace Canal. The proposed channel clean-up, diversion dike, and culvert will ensure that all run-on from the 305-acre offsite drainage basin will remain clean stormwater, reducing contact water and treatment requirements in the Jefferies Generating Station wastewater ponds.

The rebuilt diversion channel, proposed culvert, and outside perimeter channel will be designed to convey all stormwater from the 305 acre drainage basin off-site during the 100-year, 24-hour storm event. A scenario calculation summary for a 100-year event, 24-hour event is included the Appendix to this Work Plan.

The general sequence of work will be:

1. The invert of the exterior perimeter channel downstream of the proposed culvert will be lowered to allow the culvert to match proposed grades in the diverted ditch upstream. This work will also expand the capacity of the channel to ensure its ability to convey the design storm event from all run-on areas, both north and east of the ash ponds.
2. All ash and any associated contaminated soil will be excavated from the vicinity of the proposed diversion dike in Ash Pond A and placed within the confines of the pond. The area will then be certified as clean, and the compacted soil dike extension will be built. No ash will be left stockpiled against the proposed diversion dike to limit the risk of ash exiting the pond.
3. The proposed RCP culvert will be installed under the access road/existing dike to hydraulically connect the new Pond A clean stormwater channel with the existing exterior channel draining directly to the Tailrace Canal.

### **Water Quality**

Groundwater and wastewater quality improvements are anticipated as a result of the segregation and diversion of the offsite stormwater run-on around the exterior perimeter of Ash Ponds A and B as described in this work plan.

By reducing the flow rate through the existing ash ponds, the average water level in each pond will decrease, particularly in the time period during and after rainfall events. This will reduce the overall hydraulic loading in each pond, thereby reducing any localized hydraulic gradients that may be present in the groundwater in the vicinity of the ponds. The results of a preliminary geotechnical investigation indicated that the relatively impervious Cooper Marl underlying the ash ponds appears to have a general westerly slope towards the Tailrace Canal, which suggests that even a small reduction in the hydraulic gradient may re-direct some of the groundwater seepage away from neighboring areas to the east, resulting in an overall improvement to groundwater quality.

Another benefit is expected due to the decreased flow rate through the existing ash ponds. This lower flow rate will improve water quality by increasing the wastewater retention times within the ponds, while at the same time reducing the overall flow rate through the Pond B outfall. Furthermore, the Pond B outfall will mix with a larger quantity of clean stormwater upon exiting the pond because the additional offsite run-on that will be diverted will pass by the Pond B outfall location prior to their combined discharge into the Tailrace canal. Therefore, Pond B outfall flow rate will reduce, its quality will improve, and it will be mixed with a larger quantity of clean stormwater upon exiting Pond B.

It is recognized that these stated benefits are qualitative in nature, however each individual component should work in favor of improving overall groundwater and wastewater quality, meaning that even though the overall magnitude of the stated benefits are difficult to quantify in advance, a net improvement in water quality as a result of the proposed work plan is a reasonable expectation.

### **Conclusion**

The work plan described herein will successfully divert clean stormwater flow from offsite around the perimeter of the existing ash ponds and discharge it directly into the Tailrace Canal. By segregating this stormwater, the quantity of contact water will be reduced, and the risk of overtopping the existing manmade dike with contact water from within the ash ponds will be reduced. Additionally, the overall groundwater and wastewater quality will be improved during the remaining operating life of Ponds A and B, and the eventual pond closure process will be facilitated as a result of implementing the proposed work plan.

## **Appendix**

- Proposed Work Plan Sketch
- Work Plan Sections Sketch
- Scenario Calculation Summary



XI. **Water Systems:** Project located within city limits? No  Yes .

Public water system providing water. Name: \_\_\_\_\_ System #: \_\_\_\_\_

New water system (including master meter)? No  Yes . If Yes, System name: \_\_\_\_\_

XII. **Type of Submittal:** Complete **Section A (Standard)** or **Section B (Delegated Review Program - DRP)**.

A) Standard Submittal *must* include the following:

- 1. A transmittal letter outlining the submittal package.
- 2. The **original** construction permit application, properly completed, with one (1) copy.
- 3. Three (3) sets of signed and sealed plans and one (1) set of construction specifications. Specifications may be omitted if approved standard specifications are on file with DHEC. Four (4) sets of plans are required for a combined submittal, if the project includes a wastewater treatment facility.
- 4. One (1) set of the appropriate design calculations. WASTEWATER: Design flow (based on R.61-67, Appendix A), pump station calc's. and pump curve. WATER: Recent flow test from a location near the tie-on site, design calc's. indicating pressure maintained in the distribution system during max. instantaneous demand, fire flow and flushing velocities achieved. Number/types of service connections, well record form, pumping test results, etc.
- 5. Three (3) copies of a detailed 8½" x 11" location map, separate from the plans.
- 6. Two (2) copies of construction easements unless the project owner has the right of eminent domain.
- 7. A letter(s) from the entity supplying water and/or providing wastewater treatment stating their willingness and ability to serve the project. (state the flow, number of lots, etc.), including pretreatment permits, if applicable.
- 8. A letter(s) from the entity agreeing to be responsible for the operation and maintenance (O&M) of the systems.
- 9. Application fee enclosed \$ 550.00. (Refer to Instructions).
- 10. WATER SYSTEMS: a) A letter from the local government which has potable water planning authority over the area, if applicable, in which the project is located, stating project consistency with water supply service plan for area.  
b) For wells, four (4) copies of a wellhead protection area inventory.  
c) For new wells, a viability demonstration is required in accordance with Regulation 61-58.1.B.(4).

*Note:* Other approvals may include 208 (wastewater only) and OCRM certification, and navigable waterway permitting. To expedite the project review, the 208 and OCRM certification may be included with the project submittal.

B) DRP submittal *must* include the following:

- 1. A transmittal letter, signed by the professional engineer representing the DRP entity, noting this is a DRP submittal. The letter should state that the project has been reviewed and complies with R.61-58 and/or R.61-67.
- 2. The **original** construction permit application, properly completed, with one (1) copy.
- 3. Two (2) sets of the signed and sealed plans.
- 4. One (1) set of the appropriate design calculations. WASTEWATER: Same information as required under Section XII.A.4. above. WATER: Same information as required under Section XII.A.4. above.
- 5. One (1) copy of a detailed 8½" x 11" location map, separate from the plans.
- 6. Two (2) copies of construction easements, unless the project owner has the right of eminent domain.
- 7. DHEC's Ocean and Coastal Resource Management certification (for projects in applicable counties).
- 8. DHEC's Water Quality permit or conditions for placement in navigable waters, and other Agency approvals.
- 9. WASTEWATER SYSTEMS: a) A letter of acceptance from the entity providing the treatment of the wastewater that includes the specific flow and, when applicable, the specific number of lots being accepted.  
b) A letter from the organization agreeing to be responsible for the O&M of the wastewater system.  
c) The 208 Plan certification from the appropriate Council of Governments (designated 208 areas), or from DHEC on the non-designated 208 areas.
- 10. WATER SYSTEMS: A letter from the local government which has potable water planning authority over the area, if applicable, in which the project is located, stating project consistency with water supply service plan for area.
- 11. Fee of \$75 for water and \$75 for wastewater (\$150 if combined).

*Note:* The DRP entity should ensure that a copy of the final approved plans are returned to the design engineer.

XIII. Construction plans, material and construction specifications, the engineering report including supporting design data and calculations are herewith submitted and made a part of this application. I have placed my signature and seal on the engineering documents submitted, signifying that I accept responsibility for the design of this system, and that I have submitted a complete administrative package.

Engineer's Name (Printed): Joseph M. Melchers

Signature: Joseph M. Melchers

S.C. Registration Number: 32160

Registered Professional Engineer

XIV. Prior to final approval, I will submit a statement certifying that construction is complete and in accordance with the approved plans and specifications, to the best of my knowledge, information and belief. This certification will be based upon periodic observations of construction and a final inspection for design compliance by me or a representative of this office who is under my supervision.

Engineer's Name (Printed): Joseph M. Melchers

Signature: Joseph M. Melchers

S.C. Registration Number: 32160

Registered Professional Engineer

XV. I hereby make application for a permit to construct the project as described above. I have read this application and agree to the requirements and conditions and agree to the admission of properly authorized persons at all reasonable hours for the purpose of sampling and inspection.

Owner's Name (Printed): Julie Jordan Metts

Signature: Julie Jordan Metts

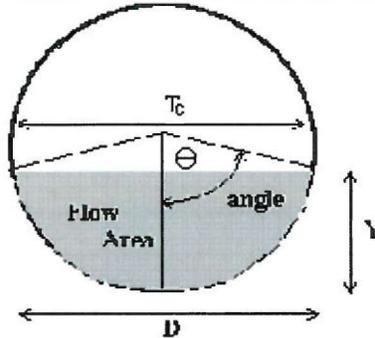
Owner's Title: Manager, Air & Water Quality

Date: 05-04-2015

## CIRCULAR CONDUIT FLOW (Normal & Critical Depth Computation)

Project: **Blue cells are for the user to enter data into**

Pipe ID: **Green cells are calculated values, filled from the VB macro code**



<b>Design Information (Input)</b>	
Pipe Invert Slope	So = <input style="width: 80px;" type="text" value="0.0160"/> ft/ft
Pipe Manning's n-value	n = <input style="width: 80px;" type="text" value="0.0130"/>
Pipe Diameter	D = <input style="width: 80px;" type="text" value="54.00"/> inches
Design discharge	Q = <input style="width: 80px;" type="text" value="240.43"/> cfs
<b>Full-flow Capacity (Calculated)</b>	
Full-flow area	Af = <input style="width: 80px;" type="text" value="15.90"/> sq ft
Full-flow wetted perimeter	Pf = <input style="width: 80px;" type="text" value="14.14"/> ft
Half Central Angle	Theta = <input style="width: 80px;" type="text" value="3.14"/> radians
Full-flow capacity	Qf = <input style="width: 80px;" type="text" value="249.41"/> cfs
<b>Calculation of Normal Flow Condition</b>	
Half Central Angle ( $0 < \theta < 3.14$ )	Theta = <input style="width: 80px;" type="text" value="2.19"/> radians
Flow area	An = <input style="width: 80px;" type="text" value="13.46"/> sq ft
Top width	Tn = <input style="width: 80px;" type="text" value="3.67"/> ft
Wetted perimeter	Pn = <input style="width: 80px;" type="text" value="9.84"/> ft
Flow depth	Yn = <input style="width: 80px;" type="text" value="3.55"/> ft
Flow velocity	Vn = <input style="width: 80px;" type="text" value="17.86"/> fps
Discharge	Qn = <input style="width: 80px;" type="text" value="240.44"/> cfs
Percent Full Flow	Flow = <input style="width: 80px;" type="text" value="96.40%"/> of full flow
Normal Depth Froude Number	Fr <sub>n</sub> = <input style="width: 80px;" type="text" value="1.64"/> supercritical
<b>Calculation of Critical Flow Condition</b>	
Half Central Angle ( $0 < \theta_c < 3.14$ )	Theta-c = <input style="width: 80px;" type="text" value="2.66"/> radians
Critical flow area	Ac = <input style="width: 80px;" type="text" value="15.54"/> sq ft
Critical top width	Tc = <input style="width: 80px;" type="text" value="2.09"/> ft
Critical flow depth	Yc = <input style="width: 80px;" type="text" value="4.24"/> ft
Critical flow velocity	Vc = <input style="width: 80px;" type="text" value="15.47"/> fps
Critical Depth Froude Number	Fr <sub>c</sub> = <input style="width: 80px;" type="text" value="1.00"/>

---

## Cross Section for Channel C3 - 100 yr

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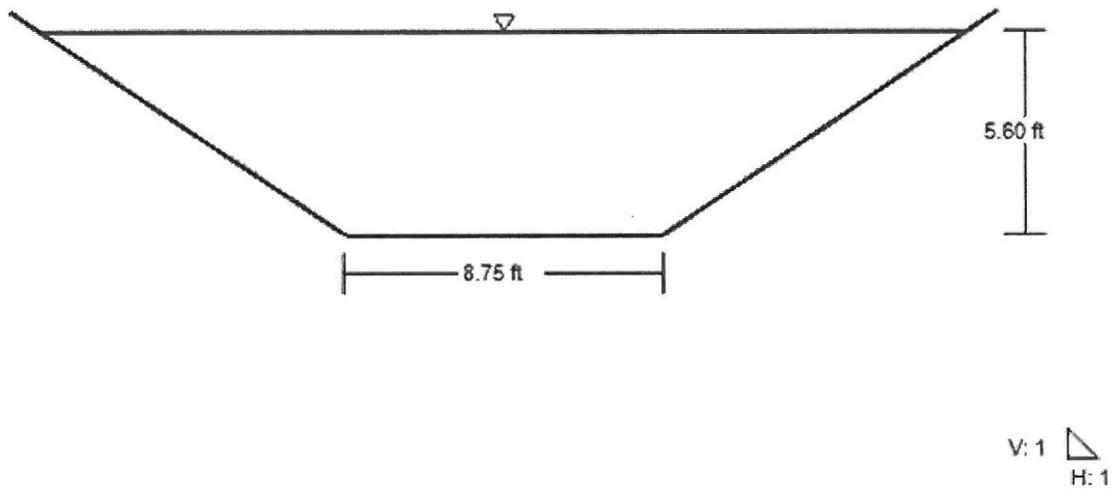
### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.065
Channel Slope	0.00243 ft/ft
Normal Depth	5.60 ft
Left Side Slope	1.50 ft/ft (H:V)
Right Side Slope	1.50 ft/ft (H:V)
Bottom Width	8.75 ft
Discharge	240.43 ft <sup>3</sup> /s

### Cross Section Image



## Scenario Calculation Summary

Scenario Summary			
ID	27		
Label	Moncks Corner, SC - Synthetic Curve, 100 yrs		
Notes			
Active Topology	Base Active Topology		
Hydrology	Base Hydrology		
Rainfall Runoff	Moncks Corner, SC - Synthetic Curve, 100 yrs		
Physical	Base Physical		
Initial Condition	Base Initial Condition		
Boundary Condition	Base Boundary Condition		
Infiltration and Inflow	Base Infiltration and Inflow		
Output	Base Output		
User Data Extensions	Base User Data Extensions		
PondPack Engine Calculation Options	Moncks Corner, SC - Synthetic Curve		
Output Summary			
Output Increment	0.050 hours	Duration	35.000 hours
Rainfall Summary			
Return Event Tag	100	Rainfall Type	Time-Depth Curve
Total Depth	9.8 in	Storm Event	TypeIII 24hr (9.8 in)
ICPM Output Summary			
Target Convergence	0.00 ft <sup>3</sup> /s	ICPM Time Step	0.010 hours
Maximum Iterations	35		

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
DA-1	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	5.424	12.300	43.91	(N/A)	(N/A)
DA-2	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	3.567	12.400	26.94	(N/A)	(N/A)
DA-3	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	19.436	12.350	131.05	(N/A)	(N/A)

## Scenario Calculation Summary

### Executive Summary (Nodes)

Label	Scenario	Return Event (years)	Truncation	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Out 50	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	179.647	20.050	111.28	(N/A)	(N/A)
Pond 10 (IN)	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	106.328	13.000	466.41	(N/A)	(N/A)
Pond 10 (OUT)	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	105.374	14.300	175.97	34.91	37.162
Pond A (IN)	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	212.765	12.450	722.24	(N/A)	(N/A)
Pond A (OUT)	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	179.903	13.000	393.43	16.98	115.663
Pond B (IN)	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	217.529	13.000	429.87	(N/A)	(N/A)
Pond B (OUT)	Moncks Corner, SC - Synthetic Curve, 100 yrs	100	None	179.646	20.050	111.28	15.91	272.432

### Executive Summary (Links)

Label	Type	Location	Hydrograph Volume (ac-ft)	Peak Time (hours)	Peak Flow (ft <sup>3</sup> /s)	End Point	Node Flow Direction
48" RCP1	Pond Outlet	Upstream	106.328	13.000	466.41	Pond 10	Pond Inflow
48" RCP1	Pond Outlet	Outflow	105.374	14.300	175.97	Pond 10	Pond Outflow
48" RCP1	Pond Outlet	Link	105.374	14.300	175.97		
48" RCP1	Pond Outlet	Downstream	110.798	14.200	181.92	Junc 10	
C1	Channel	Upstream	110.798	14.200	181.92	Junc 10	
C1	Channel	Link	110.793	14.200	181.92		

## Scenario Calculation Summary

### Messages

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Message Id	19
Scenario	Moncks Corner, SC - Synthetic Curve, 100 yrs
Element Type	Composite Outlet Structure
Element Id	72
Label	Outlet 3
Time	(N/A)
Message	Charged riser flow adjusted to weir flow rate to maintain convergence. If adjustments are desired, substitute a user defined outlet rating table for level pool routing. Or, store rating curve(s) in E-Q-TW table, edit, then route with ICPM option.
Source	Warning

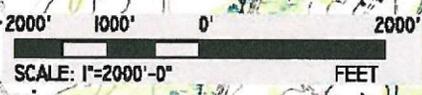
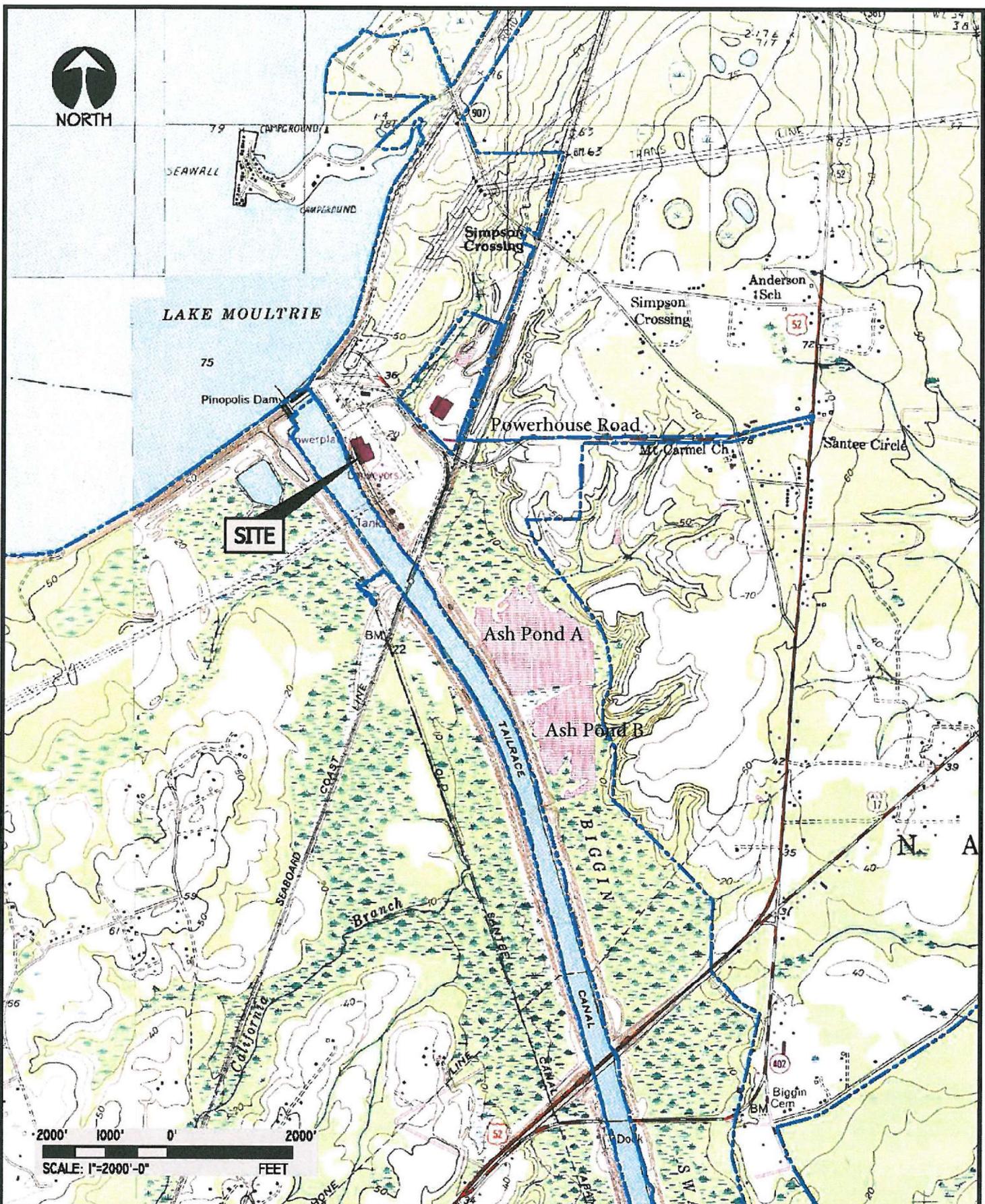
---

Message Id	2
Scenario	Moncks Corner, SC - Synthetic Curve, 100 yrs
Element Type	Junction
Element Id	60
Label	Junc 10
Time	(N/A)
Message	Junction node Junc 10 is a confluence node. For possible alternatives, see help topic 'Network Configuration for Tailwater Analyses'.
Source	Warning

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Message Id	41
Scenario	Moncks Corner, SC - Synthetic Curve, 100 yrs
Element Type	Conduit
Element Id	84
Label	C1
Time	(N/A)
Message	For weighted average inflow = 133.56 ft <sup>3</sup> /s, travel time is shorter than the output increment in calculation options = 0.034 hours. Consider reducing output increment.
Source	Warning

---



0	3/30/11	FOR RECORD	WFH	JGH	SWJ
REV.	DATE	DESCRIPTION	DTLR	ENGR.	SUPV.



Santee Cooper

SOUTH CAROLINA  
PUBLIC SERVICE  
AUTHORITY

**JEFFERIES GENERATING STATION  
BMP/STORMWATER POLLUTION PREVENTION PLAN  
VICINITY MAP**

ENVIRONMENTAL SERVICES		PROJ. NO:
DES. ENGR.: J.G.HENDERSON	DETAILER: W.F.HUBER	SCALE: 1"=2000'
DATE: 3/30/11	DRAWING NO.: J0-000-00-C0093	SHEET 1 OF 2





**APPENDIX G**  
**NPDES Permit Number SC0001091**



August 31, 2018

WILLIAM PERRY, OPERATION SUPERINTENDENT  
SANTEE COOPER  
PO BOX 2946101  
MONCK'S CORNER, SC 29461

RE: Minor Modification to NPDES Permit No. SC0001091  
SCPSA/JEFFERIES GEN STATION  
Berkeley County

Dear Mr. Perry:

The South Carolina Department of Health and Environmental Control has made a minor modification to the NPDES Permit issued to the above-referenced facility.

1. Outfalls 001, 002, 006 and 007 have been deleted because the source of wastewater has been eliminated.

The effective date of the modification is September 1, 2018.

Enclosed is the revised permit. If you have any questions, please contact Randall Thompson at 803-898-4314.

Sincerely,

A handwritten signature in cursive script that reads "Patty Barnes".

Patty Barnes  
NPDES Administration

Enclosure

e-mail: EPA

Wendy Boswell, LOW COUNTRY REGION BEHS CHARLESTON  
CHARLESTON EQC LAB  
Melanie Hindman, BOW/WPC Enforcement  
Randall Thompson, Industrial Section Permit Engineer



# *National Pollutant Discharge Elimination System Permit*

for Discharge to Surface Waters

This Permit Certifies That

*South Carolina Public Service Authority  
Jefferies Generating Station*

has been granted permission to discharge from a facility located at

*463 Powerhouse Road  
Moncks Corner, SC  
Berkeley County*

to receiving waters named

*Tailrace Canal*

in accordance with limitations, monitoring requirements and other conditions set forth herein. This permit is issued in accordance with the provisions of the Pollution Control Act of South Carolina (S.C. Code Sections 48-1-10 *et seq.*, 1976), Regulation 61-9 and with the provisions of the Federal Clean Water Act (PL 92-500), as amended, 33 U.S.C. 1251 *et seq.*, the "Act."

**Crystal D. Rippey, Manager  
Industrial Wastewater Permitting Section  
Water Facilities Permitting Division**

**Issue Date:** April 21, 2014  
**Modification issued:** August 31, 2018  
**Effective Date:** June 1, 2014  
**Modification effective:** September 1, 2018

**Expiration Date<sup>1</sup>:** May 31, 2019

**Permit No.:** SC0001091

<sup>1</sup> This permit will continue to be in effect beyond the expiration date if a complete timely re-application is received pursuant to Regulation 61-9.122.6 and signed per Regulation 61-9.122.22.

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## **PART I. Definitions**

Any term not defined in this Part has the definition stated in the Pollution Control Act or in “Water Pollution Control Permits”, R.61-9 or its normal meaning.

- A. The “Act”, or CWA, shall refer to the Clean Water Act (Formerly referred to as the Federal Water Pollution Control Act) Public Law 92-500, as amended.
- B. The “average” or “arithmetic mean” of any set of values is the summation of the individual values divided by the number of individual values.
- C. “Basin” (or “Lagoon”) means any in-ground or earthen structure designed to receive, treat, store, temporarily retain and/or allow for the infiltration/evaporation of wastewater.
- D. “Blowdown” means the minimum discharge of recirculating water for the purpose of discharging materials contained in the water, the further buildup of which would cause concentration in amounts exceeding limits established by best engineering practices.
- E. “Bottom ash” means the ash that drops out of the furnace gas stream in the furnace and in the economizer sections. Economizer ash is included when it is collected with bottom ash (40 CFR 423.11(f)).
- F. “Bypass” means the intentional diversion of waste streams from any portion of a treatment facility.
- G. “Chemical metal cleaning waste” means any wastewater resulting from the cleaning of any metal process equipment with chemical compounds, including, but not limited to, boiler tube cleaning (40 CFR 423.11(c)).
- H. “Coal pile runoff” means the rainfall runoff from or through any coal storage pile (40 CFR 423.11(m)).
- I. A “composite sample” shall be defined as one of the following four types:
  - 1. An influent or effluent portion collected continuously over a specified period of time at a rate proportional to the flow.
  - 2. A combination of not less than 8 influent or effluent grab samples collected at regular (equal) intervals over a specified period of time and composited by increasing the volume of each aliquot in proportion to flow. If continuous flow measurement is not used to composite in proportion to flow, the following method will be used: An instantaneous flow measurement should be taken each time a grab sample is collected. At the end of the sampling period, the instantaneous flow measurements should be summed to obtain a total flow. The instantaneous flow measurement can then be divided by the total flow to determine the percentage of each grab sample to be combined. These combined samples form the composite sample.
  - 3. A combination of not less than 8 influent or effluent grab samples of equal volume but at variable time intervals that are inversely proportional to the volume of the flow. In other words, the time interval between aliquots is reduced as the volume of flow increases.
  - 4. If the effluent flow varies by less than 15 percent, a combination of not less than 8 influent or effluent grab samples of constant (equal) volume collected at regular (equal) time intervals over a specified period of time.

All samples shall be properly preserved in accordance with Part II.J.4. Continuous flow or the sum of instantaneous flows measured and averaged for the specified compositing time period shall be used with composite results to calculate mass.

- J. "Daily discharge" means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the average measurement of the pollutant over the day.
- K. "Daily maximum" is the highest average value recorded of samples collected on any single day during the calendar month.
- L. "Daily minimum" is the lowest average value recorded of samples collected on any single day during the calendar month.
- M. The "Department" or "DHEC" shall refer to the South Carolina Department of Health and Environmental Control.
- N. "Fly ash" means the ash that is carried out of the furnace by the gas stream and collected by mechanical precipitators, electrostatic precipitators, and/or fabric filters. Economizer ash is included when it is collected with fly ash (40 CFR 423.11(e)).
- O. The "geometric mean" of any set of values is the Nth root of the product of the individual values where N is equal to the number of individual values. The geometric mean is equivalent to the antilog of the arithmetic mean of the logarithms of the individual values. For purposes of calculating the geometric mean, values of zero (0) shall be considered to be one (1).
- P. A "grab sample" is an individual, discrete or single influent or effluent portion of at least 100 milliliters collected at a time representative of the discharge and over a period not exceeding 15 minutes and retained separately for analysis.
- Q. "Groundwater" means the water below the land surface found in fractured rock or various soil strata.
- R. "Low volume waste sources" include, but are not limited to: wastewaters from wet scrubber air pollution control systems, ion exchange water treatment systems, water treatment evaporator blowdown, laboratory and sampling streams, boiler blowdown, floor drains, cooling tower basin cleaning wastes, and recirculating house service water systems. Sanitary and air conditioning wastes are not included (40 CFR 423.11(b)).
- S. The "maximum or minimum" is the highest or lowest value, respectively, recorded of all samples collected during the calendar month. These terms may also be known as the instantaneous maximum or minimum.
- T. "Metal cleaning waste" means any wastewater resulting from cleaning [with or without chemical cleaning compounds] any metal process equipment including, but not limited to, boiler tube cleaning, boiler fireside cleaning, and air preheater cleaning (40 CFR 423.11(d)).

- U. "Monitoring well" means any well used to sample groundwater for water quality analysis or to measure groundwater levels.
- V. The "monthly average", other than for fecal coliform, E. Coli and enterococci, is the arithmetic mean of all samples collected in a calendar month period. The monthly average for fecal coliform, E. Coli and enterococci bacteria is the geometric mean of all samples collected in a calendar month period. The monthly average loading is the arithmetic average of all daily discharges made during the month.
- W. "Once through cooling water" means water passed through the main cooling condensers in one or two passes for the purpose of removing waste heat (40 CFR 423.11(g)).
- X. The "PCA" shall refer to the Pollution Control Act (Chapter 1, Title 48, Code of Laws of South Carolina).
- Y. The "practical quantitation limit" (PQL) is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. It is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method-specific sample weights, volumes, and processing steps have been followed. It is also referred to as the reporting limit.
- Z. "Quarter" is defined as the first three calendar months beginning with the month that this permit becomes effective and each group of three calendar months thereafter.
- AA. "Quarterly average" is the arithmetic mean of all samples collected in a quarter.
- BB. "Recirculated cooling water" means water which is passed through the main condensers for the purpose of removing waste heat, passed through a cooling device for the purpose of removing such heat from the water then passed again, except for blowdown, through the main condenser (40 CFR 423.11(h)).
- CC. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
- DD. "Sludge" means industrial sludge. Industrial sludge is a solid, semi-solid, or liquid residue generated during the treatment of industrial wastewater in a treatment works. Industrial sludge includes, but is not limited to, industrial septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from industrial sludge. Industrial sludge does not include ash generated during the firing of industrial sludge in an industrial sludge incinerator or grit and screenings generated during preliminary treatment of industrial wastewater in a treatment works. Industrial sludge by definition does not include sludge covered under 40 CFR Part 503 or R.61-9.503.
- EE. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

FF. "Wastewater" means industrial wastewater. Industrial wastewater is wastewater generated from a federal facility, commercial or industrial process, including waste and wastewater from humans when generated at an industrial facility.

## **PART II. Standard Conditions**

### **A. Duty to comply**

The permittee must comply with all conditions of the permit. Any permit noncompliance constitutes a violation of the Clean Water Act and the Pollution Control Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. The Department's approval of wastewater facility plans and specifications does not relieve the permittee of responsibility to meet permit limits.

1. The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.
2. Failure to comply with permit conditions or the provisions of this permit may subject the permittee to civil penalties under S.C. Code Section 48-1-330 or criminal sanctions under S.C. Code Section 48-1-320. Sanctions for violations of the Federal Clean Water Act may be imposed in accordance with the provisions of 40 CFR Part 122.41(a)(2) and (3).
3. A person who violates any provision of this permit, a term, condition or schedule of compliance contained within this NPDES permit, or the State law is subject to the actions defined in the State law.

### **B. Duty to reapply**

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. A permittee with a currently effective permit shall submit a new application 180 days before the existing permit expires, unless permission for a later date has been granted by the Department. The Department shall not grant permission for applications to be submitted later than the expiration date of the existing permit.

### **C. Need to halt or reduce activity not a defense**

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

### **D. Duty to mitigate**

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

### **E. Proper operation and maintenance**

1. The permittee shall at all times properly operate and maintain in good working order and operate as efficiently as possible all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

Proper operation and maintenance includes effective performance based on design facility removals, adequate funding, adequate operator staffing and training and also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Power Failures. In order to maintain compliance with effluent limitations and prohibitions of this permit, the permittee shall either:
  - a. provide an alternative power source sufficient to operate the wastewater control facilities;
  - b. or have a plan of operation which will halt, reduce, or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.
3. The permittee shall develop and maintain at the facility a complete Operations and Maintenance Manual for the waste treatment facilities. The manual shall be made available for on-site review during normal working hours. The manual shall contain operation and maintenance instructions for all equipment and appurtenances associated with the waste treatment facilities and land application system, if applicable. The manual shall contain a general description of the treatment process(es), the operational procedures to meet the requirements of E.1 above, and the corrective action to be taken should operating difficulties be encountered.
4. The permittee shall provide for the performance of daily treatment facility inspections by a certified operator of the appropriate grade as defined in Part V.E of this permit. The Department may make exceptions to the daily operator requirement in accordance with R.61-9.122.41(e)(3)(ii). The inspections shall include, but should not necessarily be limited to, areas which require visual observation to determine efficient operation and for which immediate corrective measures can be taken using the O & M manual as a guide. All inspections shall be recorded and shall include the date, time, and name of the person making the inspection, corrective measures taken, and routine equipment maintenance, repair, or replacement performed. The permittee shall maintain all records of inspections at the permitted facility as required by the permit, and the records shall be made available for on-site review during normal working hours.
5. A roster of operators associated with the facility's operation and their certification grades shall be submitted to the DHEC/Bureau of Water/Water Pollution Control Division. For existing facilities, this roster shall be submitted within thirty (30) days of the effective date of this permit. For new facilities, this roster must be submitted prior to placing the facility into operation. Additionally, any changes in operator or operators (including their certification grades) shall be submitted to the Department as they occur.
6. Wastewater Sewer Systems
  - a. Purpose. This section establishes rules for governing the operation and maintenance of wastewater sewer systems, including gravity or pressure interceptor sewers. It is the purpose of this section to establish standards for the management of sewer systems to prevent and/or minimize system failures that would lead to public health or environmental impacts.
  - b. Applicability. This section applies to all sewer systems that have been or would be subject to a DHEC construction permit under Regulation 61-67 and whose owner owns or operates the wastewater

treatment system to which the sewer discharges.

c. General requirements. The permittee must:

- (1) Properly manage, operate, and maintain at all times all parts of its sewer system(s), to include maintaining contractual operation agreements to provide services, if appropriate;
- (2) Provide adequate capacity to convey base flows and peak flows for all parts of the sewer system or, if capital improvements are necessary to meet this standard, develop a schedule of short and long term improvements;
- (3) Take all reasonable steps to stop and mitigate the impact of releases of wastewater to the environment; and
- (4) Notify the Department within 30 days of a proposed change in ownership of a sewer system.

F. Permit actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

G. Property rights

This permit does not convey any property rights of any sort, or any exclusive privilege nor does it authorize any injury to persons or property or invasion of other private rights, or any infringement of State or local law or regulations.

H. Duty to provide information

The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the Department upon request, copies of records required to be kept by this permit.

I. Inspection and entry

The permittee shall allow the Department, or an authorized representative (including an authorized contractor acting as a representative of the Department), upon presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act and Pollution Control Act, any substances or parameters at any location.

J. Monitoring and records

1. a. (1) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.  
  
(2) Samples shall be reasonably distributed in time, while maintaining representative sampling.  
  
(3) No analysis, which is otherwise valid, shall be terminated for the purpose of preventing the analysis from showing a permit or water quality violation.
- b. Flow Measurements.  
  
(1) Where primary flow meters are required, appropriate flow measurement devices and methods consistent with accepted scientific practices shall be present and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to ensure that the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from the true discharge rates throughout the range of expected discharge volumes. The primary flow device, where required, must be accessible to the use of a continuous flow recorder.  
  
(2) Where permits require an estimate of flow, the permittee shall maintain at the permitted facility a record of the method(s) used in estimating the discharge flow (e.g., pump curves, production charts, water use records) for the outfall(s) designated on limits pages to monitor flow by an estimate.  
  
(3) Records of any necessary calibrations must be kept.
2. Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by R.61-9.503 or R.61-9.504), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time.
3. Records of monitoring information shall include:
  - a. The date, exact place, and time of sampling or measurements;
  - b. The individual(s) who performed the sampling or measurements;

- c. The date(s) analyses were performed;
  - d. The individual(s) who performed the analyses;
  - e. The analytical techniques or methods used; and
  - f. The results of such analyses.
4. a. Analyses for required monitoring must be conducted according to test procedures approved under 40 CFR Part 136, equivalent test procedures approved by the Department or other test procedures that have been specified in the permit.

In the case of sludge use or disposal, analysis for required monitoring must be conducted according to test procedures approved under 40 CFR Part 136, test procedures specified in R.61-9.503 or R.61-9.504, equivalent test procedures approved by the Department or other test procedures that have been specified in the permit.

- b. Unless addressed elsewhere in this permit, the permittee shall use a sufficiently sensitive analytical method that achieves a value below the derived permit limit stated in Part III. For the purposes of reporting analytical data on the Discharge Monitoring Report (DMR):
    - (1) Analytical results below the PQL conducted using a method in accordance with Part II.J.4.a above shall be reported as zero (0). Zero (0) shall also be used to average results which are below the PQL. When zero (0) is reported or used to average results, the permittee shall report, in the "Comment Section" or in an attachment to the DMR, the analytical method used, the PQL achieved, and the number of times results below the PQL were reported as zero (0).
    - (2) Analytical results above the PQL conducted using a method in accordance with Part II.J.4.a shall be reported as the value achieved. When averaging results using a value containing a "less than," the average shall be calculated using the value and reported as "less than" the average of all results collected.
    - (3)(a) The mass value for a pollutant collected using a grab sample shall be calculated using the 24-hour totalized flow for the day the sample was collected (if available) or the instantaneous flow at the time of the sample and either the concentration value actually achieved or the value as determined from the procedures in (1) or (2) above, as appropriate. Grab samples should be collected at a time representative of the discharge.
    - (b) The mass value for a pollutant collected using a composite sample shall be calculated using the 24-hour totalized flow measured for the day the sample was collected and either the concentration value actually achieved or the value as determined from the procedures in (1) or (2) above, as appropriate.
5. The PCA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$25,000 or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment provided by the Clean Water Act is also by imprisonment of not more than 4 years.

K. Signatory requirement.

1. All applications, reports, or information submitted to the Department shall be signed and certified.

a. Applications. All permit applications shall be signed as follows:

(1) For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(a) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or

(b) The manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

(3) For a municipality, State, Federal, or other public agency or public facility: By either a principal executive officer, mayor, or other duly authorized employee or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(a) The chief executive officer of the agency, or

(b) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator, Region IV, EPA).

b. All reports required by permits, and other information requested by the Department, shall be signed by a person described in Part II.K.1.a of this section, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described in Part II.K.1.a of this section;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) and,

(3) The written authorization is submitted to the Department.

- c. Changes to authorization. If an authorization under Part II.K.1.b of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part II.K.1.b of this section must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.
  - d. Certification. Any person signing a document under Part II.K.1.a or b of this section shall make the following certification: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."
2. The PCA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than \$25,000 per violation, or by imprisonment for not more than two years per violation, or by both.

#### L. Reporting requirements

##### 1. Planned changes.

The permittee shall give written notice to DHEC/Bureau of Water/Water Facilities Permitting Division as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

- a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in R 61-9.122.29(b); or
  - b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under Part II.L.8 of this section.
  - c. The alteration or addition results in a significant change in the permittee's sewage sludge or industrial sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan (included in the NPDES permit directly or by reference);
- ##### 2. Anticipated noncompliance.

The permittee shall give advance notice to the DHEC/Bureau of Water/Water Pollution Control Division of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. Transfers.

This permit is not transferable to any person except after written notice to the DHEC/Bureau of Water/NPDES Administration. The Department may require modification or revocation and reissuance of the permit to change the name of permittee and incorporate such other requirements as may be necessary under the Pollution Control Act and the Clean Water Act.

- a. Transfers by modification. Except as provided in paragraph b of this section, a permit may be transferred by the permittee to a new owner or operator only if the permit has been modified or revoked and reissued (under R.61-9.122.62(e)(2)), or a minor modification made (under R.61-9.122.63(d)), to identify the new permittee and incorporate such other requirements as may be necessary under CWA.
- b. Other transfers. As an alternative to transfers under paragraph a of this section, any NPDES permit may be transferred to a new permittee if:
  - (1) The current permittee notifies the Department at least 30 days in advance of the proposed transfer date in Part II.L.3.b(2) of this section;
  - (2) The notice includes U.S. EPA NPDES Application Form 1 and a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and
  - (3) Permits are non-transferable except with prior consent of the Department. A modification under this section is a minor modification which does not require public notice.

4. Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit. Monitoring periods are calculated beginning with the permit effective date unless otherwise stated elsewhere in this permit. If the permit is modified, monitoring periods are calculated beginning with the modification effective date for those items that are part of the modification unless otherwise stated elsewhere in this permit.

- a. Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the Department for reporting results of monitoring of groundwater or sludge use or disposal practices including the following:
  - (1) Effluent Monitoring: Effluent monitoring results obtained at the required frequency shall be reported on a Discharge Monitoring Report Form (EPA Form 3320-1). The DMR is due postmarked no later than the 28th day of the month following the end of the monitoring period. One original and one copy of the Discharge Monitoring Reports (DMRs) shall be submitted to:

S.C. Department of Health and Environmental Control  
Bureau of Water/Water Pollution Control Division  
Data and Records Management Section  
2600 Bull Street  
Columbia, South Carolina 29201

- (2) Groundwater Monitoring: Groundwater monitoring results obtained at the required frequency shall be reported on a Groundwater Monitoring Report Form (DHEC 2110) (or in the laboratory report from the analyzing laboratory) postmarked no later than the dates specified in Part III.C.1.d of this permit. One original and one copy of the Groundwater Monitoring Report Form (DHEC 2110) (or the laboratory report from the analyzing laboratory) shall be submitted to:

S.C. Department of Health and Environmental Control  
Bureau of Water/Water Pollution Control Division  
Data and Records Management Section  
2600 Bull Street  
Columbia, South Carolina 29201

- (3) Sludge, Biosolids and/or Soil Monitoring: Sludge, biosolids and/or soil monitoring results obtained at the required frequency shall be reported in a laboratory format as stated in Part V of the permit postmarked no later than the 28th day of the month following the end of the monitoring period, unless otherwise stated elsewhere in this permit. Two copies of these results shall be submitted to:

S.C. Department of Health and Environmental Control  
Bureau of Water/Water Pollution Control Division  
Data and Records Management Section  
2600 Bull Street  
Columbia, South Carolina 29201

- (4) All other reports required by this permit shall be submitted postmarked no later than the 28th day of the month following the end of the monitoring period, unless otherwise stated elsewhere in this permit. Two copies of these reports shall be submitted to:

S.C. Department of Health and Environmental Control  
Bureau of Water/Water Pollution Control Division  
Data and Records Management Section  
2600 Bull Street  
Columbia, South Carolina 29201

- b. If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in R.61-9.503 or R.61-9.504, or as specified in the permit, all valid results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Department. The permittee has sole responsibility for scheduling analyses, other than for the sample date specified in Part V, so as to ensure there is sufficient opportunity to complete and report the required number of valid results for each monitoring period.
- c. Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Department in the permit.

5. Twenty-four hour reporting

- a. The permittee shall report any non-compliance, which may endanger health or the environment. Any information shall be provided orally to local DHEC office within 24 hours from the time the permittee becomes aware of the circumstances. During normal working hours call:

<b>County</b>	<b>DHEC Regional Area</b>	<b>Phone No.</b>
Anderson, Oconee	Upstate Region BEHS Anderson	864-260-5569
Abbeville, Edgefield, Greenwood, Laurens, McCormick, Saluda	Upstate Region BEHS Greenwood	864-223-0333
Greenville, Pickens	Upstate Region BEHS Greenville	864-241-1090
Cherokee, Spartanburg, Union	Upstate Region BEHS Spartanburg	864-596-3800
Fairfield, Lexington, Newberry, Richland	Midlands Region BEHS Columbia	803-896-0620
Chester, Lancaster, York	Midlands Region BEHS Lancaster	803-285-7461
Aiken, Allendale, Bamberg, Barnwell, Calhoun, Orangeburg	Midlands Region BEHS Aiken	803-642-1637
Chesterfield, Darlington, Dillon, Florence, Marion, Marlboro	Pee Dee Region BEHS Florence	843-661-4825
Clarendon, Kershaw, Lee, Sumter	Pee Dee Region BEHS Sumter	803-778-6548
Georgetown, Horry, Williamsburg	Pee Dee Region BEHS Myrtle Beach	843-238-4378
Berkeley, Charleston, Dorchester	Low Country Region BEHS Charleston	843-953-0150
Beaufort, Colleton, Hampton, Jasper	Low Country Region BEHS Beaufort	843-846-1030

\*After-hour reporting should be made to the 24-Hour Emergency Response telephone number 803-253-6488 or 1-888-481-0125 outside of the Columbia area.

A written submission shall also be provided to the address in Part II.L.4.a(4) within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

- b. The following shall be included as information which must be reported within 24 hours under this paragraph.
- (1) Any unanticipated bypass which exceeds any effluent limitation in the permit. (See R.61-9.122.44(g)).
  - (2) Any upset which exceeds any effluent limitation in the permit.
  - (3) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Department in the permit to be reported within 24 hours (See R 61-9.122.44(g)). If the permit

contains maximum limitations for any of the pollutants listed below, a violation of the maximum limitations shall be reported orally to the DHEC/Bureau of Water/Water Pollution Control Division within 24 hours or the next business day.

- (a) Whole Effluent Toxicity (WET),
- (b) tributyl tin (TBT), and
- (c) any of the following bioaccumulative pollutants:

$\alpha$ BHC	Mercury
$\beta$ BHC	Mirex
$\delta$ BHC (Lindane)	Octachlorostyrene
BHC	PCBs
Chlordane	Pentachlorobenzene
DDD	Photomirex
DDE	1,2,3,4-Tetrachlorobenzene
DDT	1,2,4,5-Tetrachlorobenzene
Dieldrin	2,3,7,8-TCDD
Hexachlorobenzene	Toxaphene
Hexachlorobutadiene	

- c. The Department may waive the written report on a case-by-case basis for reports under Part II.L.5.b of this section if the oral report has been received within 24 hours.

6. Other noncompliance.

The permittee shall report all instances of noncompliance not reported under Part II.L.4 and 5 of this section and Part IV at the time monitoring reports are submitted. The reports shall contain the information listed in Part II.L.5 of this section.

7. Other information.

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information to the Water Facilities Permitting Division. This information may result in permit modification, revocation and reissuance, or termination in accordance with Regulation 61-9.

8. Existing manufacturing, commercial, mining, and silvicultural dischargers.

In addition to the reporting requirements under Part II.L.1-7 of this section, all existing manufacturing, commercial, mining, and silvicultural dischargers must notify the DHEC/Bureau of Water/Water Pollution Control Division of the Department as soon as they know or have reason to believe:

- a. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

- (1) One hundred micrograms per liter (100  $\mu\text{g/l}$ );

- (2) Two hundred micrograms per liter (200 µg/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;
  - (3) Five (5) times the maximum concentration value reported for that pollutant in the permit application; or
  - (4) The level established by the Department in accordance with section R.61-9.122.44(f).
- b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed in the highest of the following “notification levels”:
- (1) Five hundred micrograms per liter (500 µg/l);
  - (2) One milligram per liter (1 mg/l) for antimony;
  - (3) Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with R.61-9.122.21(g)(7).
  - (4) The level established by the Department in accordance with section R.61-9.122.44(f).

#### M. Bypass

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Part II.M.2 and 3 of this section.
2. Notice.
  - a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible, at least ten days before the date of the bypass to the DHEC/Bureau of Water/ Water Facilities Permitting Division.
  - b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Part II.L.5 of this section.
3. Prohibition of bypass
  - a. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless:
    - (1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
    - (2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise

of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(3) The permittee submitted notices as required under Part II.M.2 of this section.

b. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the three conditions listed above in Part II.M.3.a of this section.

#### N. Upset

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Part II.N.2 of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
  - a. An upset occurred and that the permittee can identify the cause(s) of the upset;
  - b. The permitted facility was at the time being properly operated; and
  - c. The permittee submitted notice of the upset as required in Part II.L.5.b(2) of this section.
  - d. The permittee complied with any remedial measures required under Part II.D of this section.
3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

#### O. Misrepresentation of Information

1. Any person making application for a NPDES discharge permit or filing any record, report, or other document pursuant to a regulation of the Department, shall certify that all information contained in such document is true. All application facts certified to by the applicant shall be considered valid conditions of the permit issued pursuant to the application.
2. Any person who knowingly makes any false statement, representation, or certification in any application, record, report, or other documents filed with the Department pursuant to the State law, and the rules and regulations pursuant to that law, shall be deemed to have violated a permit condition and shall be subject to the penalties provided for pursuant to 48-1-320 or 48-1-330.

**Part III. Limitations and Monitoring Requirements**

**A. Effluent Limitations and Monitoring Requirements**

**1.a**

**INTERIM LIMITS**

During the period beginning on the effective date of this permit and lasting through 12 months after the effective date, the permittee is authorized to discharge from outfall serial number 003: Low volume wastes, coal pile runoff, and other storm water runoff.

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS						MONITORING REQUIREMENTS		
	Mass			Concentration			Sampling Frequency	Sample Type	
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Instantaneous Maximum				
Flow	MR <sup>2</sup> , MGD	MR <sup>2</sup> , MGD	-	-	-	-	Daily	Instantaneous <sup>3</sup>	
pH	-	-	Min <sup>1</sup> 6.0 su, Max 9.0 s.u.			-	2/month	Grab	
Total Suspended Solids	-	-	30 mg/l	89 mg/l	-	-	2/month	Grab	
Oil & Grease	-	-	14 mg/l	19 mg/l	-	-	2/month	Grab	
Arsenic, total	-	-	MR <sup>2</sup> , ug/l	MR <sup>2</sup> , ug/l	-	-	1/month	24-Hour Composite	

<sup>1</sup>See Part I.T

<sup>2</sup>MR: Monitor and Report

<sup>3</sup>See Part II.J.1.b

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):  
after treatment and prior to mixing with the receiving stream or any other waste stream.

**FINAL LIMITS**

1.b

During the period beginning on 12 months after the effective date of this permit and lasting through the expiration date the permittee is authorized to discharge from outfall serial number 003: Low volume wastes, coal pile runoff, and other storm water runoff.

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS						MONITORING REQUIREMENTS		
	Mass			Concentration			Sampling Frequency	Sample Type	
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Instantaneous Maximum				
Flow	MR <sup>2</sup> , MGD	MR <sup>2</sup> , MGD	-	-	-	-	Daily	Instantaneous <sup>3</sup>	
pH	-	-	Min <sup>1</sup> 6.0 su, Max 9.0 s.u.			-	2/month	Grab	
Total Suspended Solids	-	-	19 mg/l	-	50 mg/l	-	2/month	Grab	
Oil & Grease	-	-	8 mg/l	13 mg/l	-	-	2/month	Grab	
Arsenic, total	-	-	MR <sup>2</sup> , ug/l	MR <sup>2</sup> , ug/l	-	-	1/month	24-Hour Composite	

<sup>1</sup>See Part I.T

<sup>2</sup>MR: Monitor and Report

<sup>3</sup>See Part II.J.1.b

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):  
after treatment and prior to mixing with the receiving stream or any other waste stream.

B. Whole Effluent Toxicity and Other Biological Limitations and Monitoring Requirements

During the period beginning on the effective date and lasting through the expiration date, the permittee is authorized to discharge from outfall 003: Low volume wastes, coal pile runoff, and other storm water runoff.

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type
<i>Ceriodaphnia dubia</i> Chronic Whole Effluent Toxicity @ CTC= 65%	MR %	MR %	Semi-annually	24-hour composite

See Part V.B.1 for additional toxicity reporting requirements.  
MR = Monitor and Report.

The following notes apply only to valid tests. For invalid tests see Part V.B.

- Note 1: The overall % effect is defined as the larger of the % survival effect or the % reproduction effect from DMR Attachment Form 3880.
- Note 2: If only one test is conducted during a month, the monthly average and daily maximum are each equal to the overall % effect.
- Note 3: If more than one test is conducted during a month, the monthly average is the arithmetic mean of the overall % effect values of all tests conducted during the month.
- Note 4: The monthly average to be reported on the DMR is the highest monthly average for any month during the monitoring period. There is no averaging of data from tests from one month to another.
- Note 5: The daily maximum to be reported on the DMR is the highest of the % survival effect or % reproduction effect of all tests conducted during the monitoring period.
- Note 6: When a sample is collected in one month and the test is completed in the next month, the overall % effect applies to the month in which the sample was collected.
- Note 7: Tests must be separated by at least 7 days (from the time the first sample is collected to start one test until the time the first sample is collected to start a different test). There is no restriction on when a new test may begin following a failed or invalid test.
- Note 8: For any split sample:
- a. Determine the % survival effect and % reproduction effect values separately for each test.
  - b. Determine the arithmetic mean of the % survival effects and of the % reproduction effects for all tests.
  - c. The monthly average and daily maximum shall be the higher of the % effect values from (b) above.
  - d. For the purposes of reporting, split samples are reported as an individual sample regardless of the number of times it is split. All laboratories used shall be identified on the DMR attachment and each test shall be reported individually on DMR Attachment Form DHEC 3880 (08/2005).
- a. Samples used to demonstrate compliance with the discharge limitations and monitoring requirements specified above shall be taken at or near the final point-of-discharge but prior to mixing with the receiving waters or other waste streams.

C. Groundwater Requirements

1. Groundwater Monitoring Requirements

- a. During the period beginning on the effective date of this permit and lasting through the expiration date, the permittee shall monitor the ten groundwater monitoring wells JGSMW-2, JGSMW-3, JGSMW-6, JGSMW-7, JGSMW-8, JGSMW-9, JGSMW-10, JGSMW-11 and JGSMW-12 as specified below:

Parameter	Measurement Frequency	Sample Method
Groundwater Elevation (Report within 0.01 feet above mean sea level)	Semi-annually	Probe or Tape
Depth to Water (Report within 0.01 feet)	Semi-annually	Probe or Tape
Water Temperature	Semi-annually	Pump, Bailer or Low Flow Method
Field Specific Conductance	Semi-annually	Pump, Bailer or Low Flow Method
Field pH	Semi-annually	Pump, Bailer or Low Flow Method
Turbidity	Semi-annually	Pump, Bailer or Low Flow Method
Total Dissolved Solids	Semi-annually	Pump, Bailer or Low Flow Method
Chloride	Semi-annually	Pump, Bailer or Low Flow Method
Sulfate	Semi-annually	Pump, Bailer or Low Flow Method
Oxidation Reduction Potential	Semi-annually	Pump, Bailer or Low Flow Method
Arsenic, Total	Semi-annually	Pump, Bailer or Low Flow Method
Arsenic, Dissolved	Semi-annually	Pump, Bailer or Low Flow Method
Barium, Total	Semi-annually	Pump, Bailer or Low Flow Method
Cadmium, Total	Semi-annually	Pump, Bailer or Low Flow Method
Chromium, Total	Semi-annually	Pump, Bailer or Low Flow Method
Copper, Total	Semi-annually	Pump, Bailer or Low Flow Method
Iron, Total	Semi-annually	Pump, Bailer or Low Flow Method
Lead, Total	Semi-annually	Pump, Bailer or Low Flow Method

Selenium, Total	Semi-annually	Pump, Bailer or Low Flow Method
Thallium, Total	Semi-annually	Pump, Bailer or Low Flow Method
Zinc, Total	Semi-annually	Pump, Bailer or Low Flow Method

- b. During the period beginning on the effective date of this permit and lasting through the expiration date, the permittee shall monitor the surface water locations designated JGS\_D1, JGS\_D2, JGS\_D3, TAILRACE\_LOW, TAILRACE\_UP, TRCMW\_2, TRCMW\_2\_500, TRCMW\_7 as specified below:

Parameter	Measurement Frequency	Sample Method
Field pH	Semi-annual	Grab
Field Specific Conductance	Semi-annual	Grab
Arsenic, Total	Semi-annual	Grab
Arsenic, Dissolved	Semi-annual	Grab

- c. Reserved

- d. The permittee shall follow the Groundwater Monitoring Sampling Period and Reporting Deadline in the table below for the coordinating Measurement Frequency indicated in the table (in paragraph a.) above:

Measurement Frequency	Sampling Period	Reporting Deadline
Semi-annual	January 1st - April 30th	May 16th
	July 1st - October 31st	December 15th

- e. For new in-ground wastewater treatment units or new land application activities, background groundwater quality data must be submitted prior to final approval to place into operation.
- f. Sample collection methods shall be in accordance with the December 30, 2010 Revised Groundwater Sampling Plan for the NPDES Groundwater Monitoring Program. Analytical methods must be EPA-approved, appropriate for the media being analyzed, and must be able to achieve a practical quantitation limit (i.e. reporting limit) below the standard for Class GB groundwater as established in South Carolina Water Classifications and Standards R.61-68 if applicable to the parameter being analyzed.
- g. All groundwater monitoring wells must be properly maintained at all times and are to yield a representative sample of the aquifer. If the groundwater elevation drops to a level that prevents the collection of a sample for two consecutive sampling periods, then this well shall be considered as "rendered unusable." In accordance with Regulation 61-71, any monitoring well which is destroyed, rendered unusable, or abandoned, shall be reported to the Department, and shall be properly abandoned, revitalized, or replaced. The permittee shall revitalize or replace the dry well within six months after recording the second dry sampling period.
- h. In accordance with R.61-9.505.5(d), "If a deleterious impact to the groundwaters of the State from permitted use or disposal practices is documented through groundwater monitoring levels exceeding the

standards set forth in R. 61-68 or a significant adverse trend occurs, then it will be the obligation of the permittee as directed by the Department to conduct an investigation to determine the vertical and horizontal extent of groundwater impact. The Department may require remediation of the groundwater to within acceptable levels for groundwater as set forth in R.61-68."

i. The permittee shall notify SC DHEC within thirty (30) calendar days after receipt of the results for groundwater monitoring and becoming aware of an exceedance of a Class GB groundwater standard as establish in the South Carolina Water Classifications and Standards R. 61-68.

D. Sludge Monitoring Requirements

Not applicable to this permit.

E. Soil Monitoring Requirements

Not applicable to this permit.

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**Part IV. Schedule of Compliance**

A. Schedule(s)

1. Reserved
  
2. For the Total Suspended Solids and Oil & Grease limits on Outfall 003:

<b>Date Due</b>	<b>Action Required</b>
6 months after the effective date	The permittee shall submit an updated Minimum Level of Treatment determination for the ash pond with current pond depth measurements. If the permittee determines that an updated Minimum Level of Treatment determination is not necessary, the permittee shall submit a letter to the Department requesting that the final limits become effective immediately and/or submit an alternative request based on the method of compliance chosen.
12 months after the effective date	The discharge shall be in compliance with the Total Suspended Solids and Oil & Grease limitations set forth on page 21 of this permit.

- B. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each scheduled date.

## Part V. Other Requirements

### A. Effluent Requirements

1. There shall be no discharge of floating solids or visible foam in other than trace amounts, nor shall the effluent cause a visible sheen on the receiving waters.
2. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.
3. Neither free available chlorine or total residual chlorine may be discharged from any single generating unit for more than two (2) hours in any one day, and not more than one unit in any plant may discharge Free Available Chlorine or Total Residual Chlorine at any one time unless the permittee can demonstrate to the Department that the units in a particular location cannot operate at or below this level of chlorination.
4. Unless authorized elsewhere in this permit, the permittee must meet the following requirements concerning maintenance chemicals for the following waste streams: once-through noncontact cooling water, boiler blowdown. Maintenance chemicals shall be defined as any man-induced additives that may be added to the referenced waste streams.
  - a. Detectable amounts of any of the one hundred and twenty-six priority pollutants is prohibited in the discharge, if the pollutants are present due to the use of maintenance chemicals.
  - b. Slimicides, algicides and biocides are to be used in accordance with registration requirements of the Federal Insecticides, Fungicide and Rodenticide Act.
  - c. The use of maintenance chemicals containing bis(tributyltin) oxide is prohibited.
  - d. Any maintenance chemicals added must degrade rapidly, either due to hydrolytic decomposition or biodegradation.
  - e. Discharges of maintenance chemicals added to waste streams must be limited to concentrations which protect indigenous aquatic populations in the receiving stream.
  - f. The permittee must keep the following documentation on-site for each maintenance chemical used. The information shall be made available for on-site review by Department personnel during normal working hours.
    - a. Safety Data Sheets (SDS) including name, general composition, and aquatic toxicity information (i.e., NOEC or LC50) for each chemical used;
    - b. Quantity of each chemical used,
    - c. Frequency and location of use (including outfall to which it flows), and
    - d. Information, samples and/or calculations which demonstrate compliance with items (a) – (e) above.
  - g. The permittee shall submit the information in (f) above with each permit renewal application.
  - h. The Department may request submittal of the information in (f) above at any time to determine permit compliance and may modify this permit to include additional monitoring and/or limitations as necessary

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to protect water quality.

5. Reserved
6. This permit may be reopened to change, add or remove monitoring requirements and/or limitations for Total Suspended Solids and Oil & Grease at Outfall 003 based on additional information described in compliance schedules in Part IV.A if the modification is in accordance with Regulation 61-9.122.62 .

## B. Whole Effluent Toxicity and Other Biological Requirements

### 1. For the requirements identified in Part III.B:

- a. A *Ceriodaphnia dubia* three brood chronic toxicity test shall be conducted at the frequency stated in Part III.B, Effluent Toxicity Limitations and Monitoring Requirements, using the chronic test concentration (CTC) of 65% and the following test concentrations: 0% (control), 20%, 40%, 65%, 80% and 100% effluent. The permittee may add additional test concentrations without prior authorization from the Department provided that the test begins with at least 10 replicates in each concentration and all data is used to determine permit compliance.
- b. The test shall be conducted using EPA Method 1002.0 in accordance with "Short-Term Methods for Estimating Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms," EPA/821/R-02/013 (October 2002).
- c. The permittee shall use the linear interpolation method described in "Short-Term Methods for Estimating Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms," EPA/821/R-02/013 (October 2002), Appendix M to estimate the percent effect at the CTC according to the equations in d below.
- d. The linear interpolation estimate of percent effect is  $\left(1 - \frac{M_{CTC}}{M_1}\right) * 100$  if the CTC is a tested

concentration. Otherwise, it is  $\left(1 - \frac{M_J - \frac{M_{J+1} - M_J}{C_{J+1} - C_J} * C_J + \frac{M_{J+1} - M_J}{C_{J+1} - C_J} * CTC}{M_1}\right) * 100$ .

- e. A test shall be invalidated if any part of Method 1002.0 is not followed or if the laboratory is not certified at the time the test is conducted.
- f. All valid toxicity test results shall be submitted on the DHEC Form 3880 (08/2005) entitled "DMR Attachment for Toxicity Test Results" in accordance with Part I.L.4. In addition, results from all invalid tests must be appended to DMRs, including lab control data. The permittee has sole responsibility for scheduling toxicity tests so as to ensure there is sufficient opportunity to complete and report the required number of valid test results for each monitoring period.

g. The permittee is responsible for reporting a valid test during each monitoring period. However, the Department acknowledges that invalid tests may occur. All of the following conditions must be satisfied for the permittee to be in compliance with Whole Effluent Toxicity (WET) testing requirements for a particular monitoring period when a valid test was not obtained.

- (1) A minimum of three (3) tests have been conducted which were invalid in accordance with Part V.B.1.e above;
- (2) The data and results of all invalid tests are attached to the DMR;
- (3) At least one additional State-certified laboratory was used after two (2) consecutive invalid tests were determined by the first laboratory. The name(s) and lab certification number(s) of the additional lab(s) shall be reported in the comment section of the DMR; and
- (4) A valid test was reported during each of the previous three reporting periods.

If these conditions are satisfied, the permittee may enter "H" in the appropriate boxes on the toxicity DMR and add the statement to the Comment Section of the DMR that "H indicates invalid tests."

h. This permit may be modified based on new information that supports a modification in accordance with Regulation 61-9.122.62 and Regulation 61-68.D.

C. Groundwater Requirements  
See Part III.C

D. Sludge Requirements

1. The permittee shall apply in writing to the DHEC/Bureau of Water requesting written approval for sludge/ash disposal. A letter of acceptance from the facility that will accept the sludge/ash for disposal or reuse shall be included with the request.

E. Other Conditions

1. The wastewater treatment plant is assigned a classification of Group III-Biological. This classification corresponds to an operator with a Grade of B-Biological.
2. The permittee shall maintain an all weather access road to the wastewater treatment plant and appurtenances at all times.
3. The permittee shall continue to maintain a Best Management Practices (BMP) plan to identify and control the discharge of significant amounts of oils and the hazardous and toxic substances listed in 40 CFR Part 117 and Tables II and III of Appendix D to 40 CFR Part 122. The plan shall include a listing of all potential sources of spills or leaks of these materials, a method for containment, a description of training, inspection and security procedures, and emergency response measures to be taken in the event of a discharge to surface waters or plans and/or procedures which constitute an equivalent BMP. Sources of such discharges may include materials storage areas; in-plant transfer, process and material handling areas; loading and unloading operations; plant site runoff; and sludge and waste disposal areas. The BMP plan

shall be developed in accordance with good engineering practices, shall be documented in narrative form, and shall include any necessary plot plans, drawings, or maps. The BMP plan shall be maintained at the plant site and shall be available for inspection by EPA and Department personnel.

4. The company shall notify the South Carolina Department of Health and Environmental Control in writing no later than sixty (60) days prior to instituting use of any additional maintenance chemicals in the cooling water system. Such notification shall include:
  - a. Name and general composition of the maintenance chemical
  - b. Quantities to be used
  - c. Frequency of use
  - d. Proposed discharge concentration
  - e. EPA registration number, if applicable
  - f. Aquatic toxicity information
  
5. The permittee shall not store coal, soil nor other similar erodible materials in a manner in which runoff is uncontrolled, nor conduct construction activities in a manner which produces uncontrolled runoff unless such uncontrolled runoff has been specifically approved by SCDHEC. "Uncontrolled" shall mean without sedimentation basin or other controls approved by SCDHEC.
  
6. Coal Ash Basin Requirements: A coal ash basin is defined as a wastewater basin designed to hold and/or treat wastewater containing coal ash from the generation of power at a coal-fired power plant.
  - a. Coal Ash Basin Operation and Maintenance
    - (1) Coal ash basins used to hold or treat wastewater shall be operated and maintained to minimize the discharge of pollutants to waters of the State, except as authorized under this permit.
    - (2) Operation, and maintenance of these types of basins shall be in accordance with Regulation 61-9.122, the South Carolina Pollution Control Act and all other relevant State and Federal regulations.
  - b. Coal Ash Basin Integrity Inspections
    - (1) Coal ash basins shall be inspected at least monthly by qualified personnel with knowledge and training in impoundment integrity. In addition, impoundments shall be inspected annually by a qualified, State-registered professional engineer. At least one additional inspection by qualified personnel shall be performed within 7 days after a 10-year, 24 hour precipitation event at the site.
    - (2) Inspections shall, at a minimum, include the following: observations of dams, dikes and toe areas for erosion, cracks or bulges, seepage, or wet or soft soil; changes in geometry, the depth and elevation of the impounded water, sediment or slurry, or freeboard; changes in vegetation such as overly lush, dead or unnaturally tilted vegetation or trees or other vegetation growing in or on the basin or basin dikes; and any other changes which may indicate a potential compromise to impoundment integrity. When practicable, piezometers or other instrumentation may be installed as a means to aid monitoring of basin integrity.
    - (3) Within 24 hours of discovering changes (e.g. significant increases in seepage or seepage carrying sediment) that indicate an imminent threat to the structural integrity of the basin, the permittee shall begin procedures to remediate the problem, if remediation is determined to be necessary.

c. Reporting and Recordkeeping Requirements for Coal Ash Basins

- (1) Within 5 days of discovering any changes in the basin that indicate a potential compromise to the structural integrity, the permittee must notify the Department in writing at the address in Part II.L.4(a)(4) describing the findings of the inspection, corrective measures taken or planned, and a timeline for implementation of the planned measures.
- (2) The permittee shall **submit an annual report** to the Department summarizing findings of all monitoring activities, inspections, and remediation measures pertaining to the structural integrity and operation and maintenance of coal ash basins. The report shall be submitted to the Department in accordance with Part II.L.4(a)(4).
- (3) With regards to other issues which may have long term impacts on integrity, such as the items described in 4.10.2 of the permittee's BMP plan (revised 2/17/2012), a plan to address these issues shall be submitted to the Department within 45 days of discovery (or 45 days of the effective date of the permit if the condition already exists). A discussion of the need for remedial action in these situations shall be included in the plan. The report shall be submitted to the Department in accordance with Part II.L.4(a)(4).
- (4) The permittee shall maintain records of all inspection and maintenance activities, including corrective actions made in response to inspections and all other activities undertaken to repair or maintain the basin. All records shall be kept on site and made available to State or Federal inspectors upon request.
- (5) All pertinent basin permits, design, construction, operation, and maintenance information, including but not limited to plans, geotechnical and structural integrity documentation, copies of permits, associated certifications by a qualified inspector, and other pertinent information, shall be kept on site and made available to State or Federal inspectors upon request.

d. Permit Re-opener: This permit may be reopened to incorporate additional or more stringent requirements pertaining to the operation and maintenance of coal ash basins.

7. The permittee shall monitor all parameters consistent with conditions established by this permit on the 2<sup>nd</sup> Wednesday of every calendar month in which sampling is required, unless otherwise approved by this Department. If this day falls on a holiday, sampling shall be conducted on the next business day. If no discharge occurs on this day, the permittee shall collect an effluent sample during the reporting period on a day when there is a discharge or report "no discharge" for the reporting period for all parameters. Additional monitoring as necessary to meet the frequency requirements of this permit shall be performed by the permittee.
8. This permit may be reopened to address compliance with 316(b) requirements for cooling water intake structures upon resolution of the EPA regulations in 40 CFR Part 125 Subpart J.
9. Any stormwater that passes through Outfall 003 that is subject to the definition of "stormwater associated with industrial activity" shall meet the requirements of Appendix A. Other stormwater outfalls that are not combined with wastewater should be covered under the NPDES General Permit for Storm Water Associated with Industrial Activity via number SCR004133. Note that for combined stormwater and wastewater outfalls where the stormwater can be sampled separately prior to mixing with the wastewater, the stormwater portion should be covered under the General Permit.

10. The discharge of any waste resulting from the combustion of chemical metal cleaning wastes, toxic wastes, or hazardous wastes to any waste stream which ultimately discharges to waters of the State is prohibited.

## APPENDIX A: Storm Water Pollution Prevention Plan (SWPPP) Requirements

You must prepare a SWPPP for your facility covered by this permit. The SWPPP must be prepared in accordance with good engineering practices. The plan shall identify potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges associated with industrial activity from the facility. In addition, the plan shall describe the implementation of practices which are to be used to reduce the pollutants in storm water discharges associated with industrial activity at the facility and to assure compliance with the terms and conditions of this permit. The SWPPP is intended to document the selection, design, and installation of control measures. The facility must implement the provisions of the storm water pollution prevention plan required under this part as a condition of this permit. If you prepared a SWPPP for coverage under a previous NPDES permit, you must review and update the SWPPP to implement all provisions of this permit. Consider using the Department's template on the following web page in preparing your SWPPP, with appropriate changes for this permit: <http://www.scdhec.gov/environment/water/swater/docs/npdes-ind-swppp.doc>.

### I. Contents of Your SWPPP

- A. For coverage under this permit, your SWPPP must contain all of the following elements:
  - 1. Storm water pollution prevention team (see Section II);
  - 2. Site description (see Section III);
  - 3. Summary of potential pollutant sources (see Section IV);
  - 4. Description of control measures (see Section V);
  - 5. Schedules and procedures pertaining to control measures (see Section VI); and
  - 6. Signature requirements (see Section VII).
- B. Where your SWPPP refers to procedures in other facility documents, such as a Spill Prevention, Control, and Countermeasure (SPCC) Plan, a copy of the relevant portions of those documents must be kept with or within close proximity to your SWPPP.

### II. Storm Water Pollution Prevention Team

You must identify the staff members (by name or title) that comprise the facility's storm water pollution prevention team as well as their individual responsibilities. Your storm water pollution prevention team is responsible for assisting the facility manager in developing and revising the facility's SWPPP as well as maintaining control measures and taking corrective actions where required. Each member of the storm water pollution prevention team must have ready access to either an electronic or paper copy of applicable portions of this permit and your SWPPP.

### III. Site Description

Your SWPPP must include the following:

- A. *Activities at the Facility*. Provide a description of the nature of the industrial activities at your facility.
- B. *General location map*. Provide a general location map (e.g., U.S. Geological Survey (USGS) quadrangle map) with enough detail to identify the location of your facility and all receiving waters for your storm water discharges.
- C. *Site map*. Provide a map showing:
  - 1. The size of the property in acres;
  - 2. The location and extent of significant structures and impervious surfaces;
  - 3. Directions of storm water flow (use arrows);

4. Locations of all existing structural control measures;
5. Locations of all receiving waters in the immediate vicinity of your facility, indicating if any of the waters are impaired and, if so, whether the waters have TMDL established for them;
6. Locations of all storm water conveyances including ditches, pipes, and swales;
7. Locations of potential pollutant sources identified under Section IV.B;
8. Locations where significant spills or leaks identified under Section IV.C. have occurred;
9. Locations of all storm water monitoring points;
10. Locations of storm water inlets and outfalls, with a unique identification code for each outfall (e.g., Outfall No. 1, No. 2, etc), indicating if you are treating one or more outfalls as “substantially identical” (i.e., discharge substantially identical effluents) and an approximate outline of the areas draining to each outfall with an indication of the applicable Sector(s) for each outlined area;
11. Municipal separate storm sewer systems, where your storm water discharges to them;
12. Locations and descriptions of all non-storm water discharges;
13. Locations of the following activities where such activities are exposed to precipitation:
  - a. Fueling stations;
  - b. Vehicle and equipment maintenance and/or cleaning areas;
  - c. Loading/unloading areas;
  - d. Locations used for the treatment, storage, or disposal of wastes;
  - e. Liquid storage tanks;
  - f. Processing and storage areas;
  - g. Immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility;
  - h. Transfer areas for substances in bulk; and
  - i. Machinery; and
14. Locations and sources of run-on to your site that contains significant quantities of pollutants from adjacent property.

#### IV. Summary of Potential Pollutant Sources

You must document areas at your facility where industrial materials or activities are exposed to storm water. *Industrial materials or activities* include, but are not limited to: material handling equipment or activities; industrial machinery; raw materials; industrial production and processes; and intermediate products, by-products, final products, and waste products. *Material handling activities* include, but are not limited to: the storage, loading and unloading, transportation, disposal, or conveyance of any raw material, intermediate product, final product or waste product. For each area identified, the description must include:

- A. *Activities in the area.* A list of the industrial activities exposed to storm water (e.g., material storage; equipment fueling, maintenance, and cleaning; cutting steel beams).
- B. *Pollutants.* A list of the pollutant(s) or pollutant constituents (e.g., crankcase oil, zinc, sulfuric acid, and cleaning solvents) associated with each identified activity. The pollutant list must include all significant materials that have been handled, treated, stored, or disposed, and that have been exposed to storm water in the 3 years prior to the date you prepare or amend your SWPPP.
- C. *Spills and Leaks.* You must document where potential spills and leaks could occur that could contribute pollutants to storm water discharges, and the corresponding outfall(s) that would be affected by such spills and leaks. You must document all significant spills and leaks of oil or toxic or hazardous pollutants that actually occurred at exposed areas, or that drained to a storm water conveyance, in the 3 years prior to the date you prepare or amend your SWPPP.

Note: Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in

excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602. This permit does not relieve you of the reporting requirements of 40 CFR 110, 40 CFR 117, and 40 CFR 302 relating to spills or other releases of oils or hazardous substances. Also, you must appropriately notify the Department's Emergency Response Section at 803/253-6488 or 888/481-0125.

D. *Salt Storage and Pavement De-icing.*

1. You must document the location of any storage piles containing salt used for de-icing or other commercial or industrial purposes and areas where de-icing is expected to occur.
2. *Pavement de-icing activities.* For any pavement de-icing activities at facilities, other than airports, covered under this permit, the SWPPP must include measures to assure that no SARA 313 chemical[s] is used for deicing and that no deicing occurs where spills or leaks of toxic or hazardous materials have occurred (unless all spilled material has been removed). Deicing is to be carried out only for safety purposes during inclement weather and must meet water quality standards and MS4 permit conditions (pertinent to the discharge).

E. *Sampling Data.* You must summarize all storm water discharge sampling data collected at your facility during the previous permit term.

V. Description of Control Measures

*Control Measures to Meet Technology-Based and Water Quality-Based Effluent Limits.* You must select, design, install, and implement control measures (including best management practices [BMP]) to meet the non-numeric effluent limits in Section VI. The selection, design, installation, and implementation of these control measures must be in accordance with good engineering practices and manufacturer's specifications. Note that you may deviate from such manufacturer's specifications where you provide justification for such deviation and include documentation of your rationale in the part of your SWPPP that describes your control measures. If you find that your control measures are not achieving their intended effect of minimizing pollutant discharges, you must modify these control measures as expeditiously as practicable. Regulated storm water discharges from your facility include storm water run-on that commingles with storm water discharges associated with industrial activity at your facility.

You must document the location and type of control measures you have installed and implemented at your site. This documentation must describe how the control measures at your site address both the pollutant sources identified in Section IV, and any storm water run-on that commingles with any discharges covered under this permit. You must keep, operate, and maintain any permanent storm water detention or retention pond or other permanent storm water management device installed under the requirements of State or local regulatory authority, unless you receive a written waiver from the Department.

VI. Schedules and Procedures Pertaining to Control Measures

A. Control Measures

1. *Minimize Exposure.* You must minimize the exposure of manufacturing, processing, and material storage areas (including loading and unloading, storage, disposal, cleaning, maintenance, and fueling operations) to rain, snow, snowmelt, and runoff by either locating these industrial materials and activities inside or protecting them with storm resistant coverings (although significant enlargement of impervious surface area is not recommended). In minimizing exposure, you should pay particular attention to the following:

- a. Use grading, berming, or curbing to prevent runoff of contaminated flows and divert run-on away from these areas;
  - b. Locate materials, equipment, and activities so that leaks are contained in existing containment and diversion systems (confine the storage of leaky or leak-prone vehicles and equipment awaiting maintenance to protected areas);
  - c. Clean up spills and leaks promptly using dry methods (e.g., absorbents) to prevent the discharge of pollutants;
  - d. Use drip pans and absorbents under or around leaky vehicles and equipment or store indoors where feasible;
  - e. Use spill/overflow protection equipment;
  - f. Drain fluids from equipment and vehicles prior to on-site storage or disposal;
  - g. Perform all cleaning operations indoors, under cover, or in bermed areas that prevent runoff and run-on and also that capture any overspray; and
  - h. Ensure that all wash water drains to a proper collection system (i.e., not the storm water drainage system).
- 2.- *Good Housekeeping.* You must keep clean all exposed areas that are potential sources of pollutants, using such measures as sweeping at regular intervals, keeping materials orderly and labeled, and storing materials in appropriate containers. A schedule for regular pickup and disposal of waste materials, along with routine inspections for leaks and conditions of drums, tanks and containers must be documented in your SWPPP.
3. *Maintenance.* You must regularly inspect, test, maintain, and repair all industrial equipment and systems to avoid situations that may result in leaks, spills, and other releases of pollutants in storm water discharged to receiving waters. You must maintain in effective operating condition all control measures that are used to achieve the effluent limits required by this permit. Nonstructural control measures must also be diligently maintained (e.g., keeping spill response supplies available, training personnel appropriately). If you find that your control measures need to be replaced or repaired, you must make the necessary repairs or modifications as expeditiously as practicable. Preventative maintenance procedures, including regular inspections, testing, maintenance, and repair of all industrial equipment and systems, and control measures, to avoid situations that may result in leaks, spills, and other releases, and any back-up practices in place should a runoff event occur while a control measure is off-line must be documented in your SWPPP
4. *Spill Prevention and Response Procedures.* You must minimize the potential for leaks, spills, and other releases that may be exposed to storm water and develop plans for effective response to such spills if or when they occur. At a minimum, you must implement:
- a. Procedures for plainly labeling containers (e.g., “used oil,” “spent solvents,” “fertilizers and pesticides,” etc.) that could be susceptible to spillage or leakage to encourage proper handling and facilitate rapid response if spills or leaks occur;
  - b. Preventative measures such as barriers between material storage and traffic areas, secondary containment provisions, and procedures for material storage and handling;
  - c. Procedures for expeditiously stopping, containing, and cleaning up leaks, spills, and other releases. Employees who may cause, detect, or respond to a spill or leak must be trained in these procedures and have necessary spill response equipment available. If possible, one of these individuals should be a member of your storm water pollution prevention team (see Part 5.1.1); and
  - d. Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302, occurs during a 24-hour period, you must notify the National

Response Center (NRC) at (800) 424-8802 in accordance with the requirements of 40 CFR Part 110, 40 CFR Part 117, and 40 CFR Part 302 and the Department's Emergency Response Section at (803/253-6488 or 888-481-0125) as soon as you have knowledge of the discharge. State or local requirements may necessitate reporting spills or discharges to local emergency response, public health, or drinking water supply agencies. Contact information must be in locations that are readily accessible and available.

You must document in your SWPPP procedures for preventing and responding to spills and leaks. You may reference the existence of other plans for Spill Prevention Control and Countermeasure (SPCC) developed for the facility under Section 311 of the CWA or BMP programs otherwise required by an NPDES permit for the facility, provided that you keep a copy of that other plan onsite and make it available for review.

5. *Erosion and Sediment Controls.* You must stabilize exposed areas and manage runoff using structural and/or non-structural control measures to minimize onsite erosion and sedimentation and the resulting discharge of pollutants. Among other actions you must take to meet this limit, you must place flow velocity-dissipation devices at discharge locations and within outfall channels where necessary to reduce erosion and/or settle out pollutants. In selecting, designing, installing, and implementing appropriate control measures, you are encouraged to consult with U.S. EPA's internet-based resources relating to BMP for erosion and sedimentation, including the sector-specific *Industrial Stormwater Fact Sheet Series*, (<http://cfpub.epa.gov/npdes/stormwater/swsectors.cfm>), *National Menu of Stormwater BMPs* ([www.epa.gov/npdes/stormwater/menuofbmps](http://www.epa.gov/npdes/stormwater/menuofbmps)), in particular the Post-Construction link on this page, and *National Management Measures to Control Nonpoint Source Pollution from Urban Areas* ([www.epa.gov/owow/nps/urbanmm/index.html](http://www.epa.gov/owow/nps/urbanmm/index.html)), and any similar State or Tribal publications.
6. *Management of Runoff.* You must divert, infiltrate, reuse, contain, or otherwise reduce storm water runoff, to minimize pollutants in your discharges. In selecting, designing, installing, and implementing appropriate control measures, you are encouraged to consult with EPA's internet-based resources relating to runoff management, including the sector-specific *Industrial Stormwater Fact Sheet Series*, (<http://cfpub.epa.gov/npdes/stormwater/swsectors.cfm>), *National Menu of Stormwater BMPs* ([www.epa.gov/npdes/stormwater/menuofbmps](http://www.epa.gov/npdes/stormwater/menuofbmps)), in particular the Post-Construction link on this page, and *National Management Measures to Control Nonpoint Source Pollution from Urban Areas* ([www.epa.gov/owow/nps/urbanmm/index.html](http://www.epa.gov/owow/nps/urbanmm/index.html)), and any similar State or Tribal publications.
7. *Salt Storage and Pavement Deicing.*
  - a. *Salt Storage Piles or Piles Containing Salt.* You must enclose or cover storage piles of salt, or piles containing salt, used for de-icing or other commercial or industrial purposes, including maintenance of paved surfaces. You must implement appropriate measures (e.g., good housekeeping, diversions, containment) to minimize exposure resulting from adding to or removing materials from the pile. Piles do not need to be enclosed or covered if storm water runoff from the piles is not discharged or if discharges from the piles are authorized under another NPDES permit.
  - b. *Pavement De-icing Activities.* For any pavement deicing activities at facilities, other than airports, covered under this permit, the SWPPP must include measures to assure that no SARA 313 chemicals are used for de-icing and that no de-icing occurs where spills or leaks of toxic or hazardous materials have occurred (unless all spilled material has been removed). Deicing is to be carried out only for safety purposes during inclement weather and must meet water quality standards and meet MS4 permit conditions (pertinent to the discharge).
8. *Sector Specific Non-Numeric Effluent Limits.* You must achieve any additional non-numeric limits stipulated in the relevant sector-specific section(s) of Section X.
9. *Employee Training.* You must train all employees who work in areas where industrial materials or

activities are exposed to storm water, or who are responsible for implementing activities necessary to meet the conditions of this permit (e.g., inspectors, maintenance personnel), including all members of your Pollution Prevention Team. Training must cover both the specific control measures used to achieve the effluent limits in this Part. The Department recommends that training be conducted at least annually (or more often if employee turnover is high). A schedule for all types of training necessary to implement specific control measures must be documented in your SWPPP.

10. *Waste, Garbage, and Floatable Debris.* You must ensure that waste, garbage, and floatable debris are not discharged to receiving waters by keeping exposed areas free of such materials or by intercepting them before they are discharged.
11. *Dust Generation and Vehicle Tracking of Industrial Materials.* You must minimize generation of dust and off-site tracking of raw, final, or waste materials.

## B. Inspections

1. *Inspection Procedures.* Routine inspections (at least quarterly) should be conducted of all areas of the facility where industrial materials or activities are exposed to storm water and of all storm water control measures. These inspections should occur when the facility is in operation and must be performed by qualified personnel with at least one member of your storm water pollution prevention team participating. At least once each calendar year, the routine inspection should be conducted during a period when a storm water discharge is occurring. The requirement to conduct routine inspections does not apply to facilities where there are no industrial materials or activities exposed to storm water.
2. *Inspection Documentation.*
  - a. For each type of inspection performed, your SWPPP should identify: the person(s) or position(s) person(s) responsible for inspection; schedules for conduction inspections; and specific items to be covered by the inspection.
  - b. The findings of each routine inspection should be documented and maintained onsite with your SWPPP. This documentation should include:
    - i. Inspection date and time;
    - ii. Name(s) and signature(s) of the inspector(s);
    - iii. Weather information and a description of any discharges occurring during the inspection;
    - iv. Any previously unidentified pollutants from the site;
    - v. Any control measures needing maintenance, repairs, or replacement;
    - vi. Any additional control measures needed.

## C. Corrective Actions

1. *Conditions Requiring Review and Revision to Eliminate a Problem.* If any of the following conditions occur, you must review and revise the selection, design, installation, and implementation of your control measures to ensure that the condition is eliminated and will not be repeated in the future:
  - a. An unauthorized release or discharge (e.g., spill, leak, or discharge of non-storm water not authorized by this or another NPDES permit);
  - b. A discharge violates a numeric effluent limit as a result of the storm water component of your discharge;
  - c. You become aware, or the Department notifies you, that your control measures are not stringent enough for the discharge to meet applicable water quality standards as a result of the storm water component of your discharge;
  - d. An inspection or evaluation of your facility by the Department, determines that modifications to the

control measures are necessary to meet the effluent limits in this permit; or

- e. You find in your routine inspection that your control measures are not being properly operated and maintained.
2. *Conditions Requiring Review to Determine if Modifications are Necessary.* If construction or a change in design, operation, or maintenance at your facility significantly changes the nature of pollutants discharged in storm water from your facility or significantly increases the quantity of pollutants discharged, then you must review the selection, design, installation, and implementation of your control measures to determine if modifications are necessary to meet effluent limits in this permit.
  3. *Corrective Action Deadlines.* You must document your discovery of any of the conditions listed in Conditions VI.C.1 and VI.C.2 above within 24 hours of making the discovery. If there are extenuating circumstances that prevent documentation within the 24-hour time frame (such as occurrence over a weekend or holiday), then the documentation must occur by the end of the next business day after discovery. Subsequently, within 14 days of discovery, you must document any corrective action(s) to be taken to eliminate or further investigate the deficiency, or if no corrective action is needed, the basis for that determination. Specific documentation required is detailed in Condition VI.C.4 below. If you determine that changes are necessary following your review, any modifications to your control measures must be made before the next storm event, if possible, or as soon as practicable following that storm event.
  4. *Corrective Action Documentation.*
    - a. Within 24 hours of discovery (or by the end of the next business day (see Condition VI.C.3 above)) of any condition listed in Conditions VI.C.1 and VI.C.2 above, you must document the following information: identification of the condition triggering the need for corrective action review; description of the problem identified; and date the problem was identified.
    - b. Within 14 days of discovery of any condition listed in Conditions VI.C.1 and VI.C.2, you document the following information:
      - i. Summary of the corrective action taken or to be taken or the basis for why corrective action is not necessary.
      - ii. Notice of whether or not SWPPP modifications are required as a result of this discovery or corrective action;
      - iii. Date corrective action is initiated; and
      - iv. Date corrective action is completed or expected to be completed.

## VII. Signature Requirements

You must sign and date your SWPPP in accordance with Part II.K (signatory requirements).

## VIII. Required SWPPP Modifications

You must modify your SWPPP whenever there is construction or a change in design, operation, or maintenance at your facility that significantly changes the nature of pollutants discharged in storm water or significantly increases the quantity of pollutants discharged in storm water and which has not otherwise been addressed in the plan or if the storm water pollution prevention plan proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified in the plan or in otherwise achieving the general objectives of controlling pollutants in storm water discharges associated with industrial activity.

The Department may notify you at any time that the plan does not meet one or more of the minimum requirements of this Part. Within thirty (30) days of such notification from the Department, (or as otherwise provided by the Department), or

authorized representative, the permittee shall make the required changes to the plan and shall submit to the Department a written certification that the requested changes have been made.

Changes to your SWPPP document must be signed and dated in accordance with Section VII above.

#### IX. SWPPP Availability

Your SWPPP must be completed within six (6) months of the effective date of this permit (and updated as appropriate). Plans shall provide for compliance with the terms of the plan within one (1) year of the effective date of the permit. You must retain a copy of the current SWPPP required by this permit at the facility, and it must be immediately available to the Department at the time of an onsite inspection or upon request. The Department may provide access to portions of your SWPPP to a member of the public upon request. Confidential Business Information (CBI) may be withheld from the public, but may not be withheld from those staff cleared for CBI review within the Department or EPA.

#### X. Additional Documentation Requirements

You are required to maintain the following inspection, monitoring, and certification records and make them readily available to the Department:

- A. Descriptions and dates of any incidences of any incidences of significant spills, leaks, or other releases that resulted in discharges of pollutants to waters of the State through storm water; the circumstances leading to the release and actions taken in response to the release; and measures taken to prevent the recurrence of such releases;
- B. Records of employee training, including the date training is received, documentation of maintenance and repairs on control measures, including the date(s) of regular maintenance, date(s) of discovery of areas in need of repair/replacement, and for repairs, date(s) that the control measure(s) returned to full function, and the justification for any extended maintenance/repair schedules;
- C. All Routine Inspection Reports; and
- D. Description of any corrective action taken at your site, including triggering event and dates when problems were discovered and modifications occurred.

#### XI. Sector-Specific SWPPP Requirements and Control Measures

You must comply with sector-specific requirements associated with your primary industrial activity and any co-located industrial activities, as defined in Section XII. The sector-specific requirements apply to those areas of your facility where those sector-specific activities occur. These sector-specific requirements are in addition to any requirements specified elsewhere in this permit.

Sector E – Glass, Clay, Cement, Concrete, and Gypsum Products.

##### 1. Covered Storm Water Discharges.

The requirements in this section apply to storm water discharges associated with industrial activity from Glass, Clay, Cement, Concrete, and Gypsum Products facilities, as identified by the SIC Codes specified under Sector E in Table XIII-1.

##### 2. Additional Control Measures.

*Good Housekeeping Measures.* (See also Section VI.A.2.) With good housekeeping, prevent or minimize the

discharge of spilled cement, aggregate (including sand or gravel), kiln dust, fly ash, settled dust, or other significant material in storm water from paved portions of the site that are exposed to storm water. Consider sweeping regularly or using other equivalent measures to minimize the presence of these materials. Indicate in your SWPPP the frequency of sweeping or equivalent measures. Determine the frequency based on the amount of industrial activity occurring in the area and the frequency of precipitation, but it must be performed at least once a week if cement, aggregate, kiln dust, fly ash, or settled dust are being handled or processed. You must also prevent the exposure of fine granular solids (cement, fly ash, kiln dust, etc.) to storm water, where practicable, by storing these materials in enclosed silos, hoppers, or buildings, or under other covering.

### 3. Additional SWPPP Requirements.

*Drainage Area Site Map.* (See also Section III) Document in the SWPPP the locations of the following, as applicable: bag house or other dust control device; recycle/sedimentation pond, clarifier, or other device used for the treatment of process wastewater; and the areas that drain to the treatment device.

## Sector O – Steam Electric Generating Facilities.

### 1. Covered Storm water Discharges.

The requirements in this section apply to storm water discharges associated with industrial activity from Steam Electric Power Generating Facilities as identified by the Activity Code specified under Sector O in Table XIII-1.

### 2. Industrial Activities Covered by Sector O.

This permit authorizes storm water discharges from the following industrial activities at Sector O facilities:

- a. Steam electric power generation using coal, natural gas, oil, nuclear energy, etc., to produce a steam source, including coal-handling areas;
- b. Coal pile runoff, including effluent limitations established by 40 CFR Part 423; and
- c. Dual fuel facilities that could employ a steam boiler.

### 3. Limitations on Coverage.

a. *Prohibition of Storm Water Discharges.* Storm water discharges from the following are not covered by this section:

- i. Ancillary facilities (e.g., fleet centers and substations) that are not contiguous to a steam electric power generating facility;
- ii. Gas turbine facilities (providing the facility is not a dual-fuel facility that includes a steam boiler), and combined-cycle facilities where no supplemental fuel oil is burned (and the facility is not a dual-fuel facility that includes a steam boiler); and
- iii. Cogeneration (combined heat and power) facilities utilizing a gas turbine.

### 4. Additional Technology-Based Effluent Limits.

The following good housekeeping measures are required in addition to Section VI.A.2:

- a. *Fugitive Dust Emissions.* Minimize fugitive dust emissions from coal handling areas. To minimize the tracking of coal dust offsite, consider procedures such as installing specially designed tires or washing vehicles in a designated area before they leave the site and controlling the wash water.
- b. *Delivery Vehicles.* Minimize contamination of storm water runoff from delivery vehicles arriving at the plant site. Consider procedures to inspect delivery vehicles arriving at the plant site and ensure overall integrity of the body or container and procedures to deal with leakage or spillage from vehicles or containers.
- c. *Fuel Oil Unloading Areas.* Minimize contamination of precipitation or surface runoff from fuel oil unloading areas. Consider using containment curbs in unloading areas, having personnel familiar with spill prevention and response procedures present during deliveries to ensure that any leaks or spills are immediately contained and

cleaned up, and using spill and overflow protection devices (e.g., drip pans, drip diapers, or other containment devices placed beneath fuel oil connectors to contain potential spillage during deliveries or from leaks at the connectors).

d. *Chemical Loading and Unloading.* Minimize contamination of precipitation or surface runoff from chemical loading and unloading areas. Consider using containment curbs at chemical loading and unloading areas to contain spills, having personnel familiar with spill prevention and response procedures present during deliveries to ensure that any leaks or spills are immediately contained and cleaned up, and loading and unloading in covered areas and storing chemicals indoors.

e. *Miscellaneous Loading and Unloading Areas.* Minimize contamination of precipitation or surface runoff from loading and unloading areas. Consider covering the loading area; grading, berming, or curbing around the loading area to divert run-on; locating the loading and unloading equipment and vehicles so that leaks are contained in existing containment and flow diversion systems; or equivalent procedures.

f. *Liquid Storage Tanks.* Minimize contamination of surface runoff from above-ground liquid storage tanks. Consider protective guards around tanks, containment curbs, spill and overflow protection, dry cleanup methods, or equivalent measures.

g. *Large Bulk Fuel Storage Tanks.* Minimize contamination of surface runoff from large bulk fuel storage tanks. Consider containment berms (or their equivalent). You must also comply with applicable State and Federal laws, including Spill Prevention, Control and Countermeasure (SPCC) Plan requirements.

h. *Spill Reduction Measures.* Minimize the potential for an oil or chemical spill, or reference the appropriate part of your SPCC plan. Visually inspect as part of your routine facility inspection the structural integrity of all above-ground tanks, pipelines, pumps, and related equipment that may be exposed to storm water, and make any necessary repairs immediately.

i. *Oil-Bearing Equipment in Switchyards.* Minimize contamination of surface runoff from oil-bearing equipment in switchyard areas. Consider using level grades and gravel surfaces to retard flows and limit the spread of spills, or collecting runoff in perimeter ditches.

j. *Residue-Hauling Vehicles.* Inspect all residue-hauling vehicles for proper covering over the load, adequate gate sealing, and overall integrity of the container body. Repair vehicles without load covering or adequate gate sealing, or with leaking containers or beds.

k. *Ash Loading Areas.* Reduce or control the tracking of ash and residue from ash loading areas. Clear the ash building floor and immediately adjacent roadways of spillage, debris, and excess water before departure of each loaded vehicle.

l. *Areas Adjacent to Disposal Ponds or Landfills.* Minimize contamination of surface runoff from areas adjacent to disposal ponds or landfills. Reduce ash residue that may be tracked on to access roads traveled by residue handling vehicles, and reduce ash residue on exit roads leading into and out of residue handling areas.

m. *Landfills, Scrap yards, Surface Impoundments, Open Dumps, General Refuse Sites.* Minimize the potential for contamination of runoff from these areas.

## 5. Additional SWPPP Requirements.

a. *Drainage Area Site Map.* (See also Section III) Document in your SWPPP the locations of any of the following activities or sources that may be exposed to precipitation or surface runoff: storage tanks, scrap yards, and general refuse areas; short- and long-term storage of general materials (including but not limited to supplies, construction materials, paint equipment, oils, fuels, used and unused solvents, cleaning materials, paint, water treatment chemicals, fertilizer, and pesticides); landfills and construction sites; and stock pile areas (e.g., coal or limestone piles).

b. *Documentation of Good Housekeeping Measures.* You must document in your SWPPP the good housekeeping measures implemented.

## 6. Additional Inspection Requirements.

Inspect the following areas monthly: coal handling areas, loading or unloading areas, switchyards, fueling areas, bulk storage areas, ash handling areas, areas adjacent to disposal ponds and landfills, maintenance areas, liquid storage tanks, and long term and short term material storage areas.

## XII. Definitions, Abbreviations and Acronyms

### A. Definitions (for the purposes of this section):

**Action Area** – all areas to be affected directly or indirectly by the storm water discharges, allowable non-storm water discharges, and storm water discharge-related activities, and not merely the immediate area involved in these discharges and activities.

**Best Available Technology Economically Achievable (BAT)** – Best Available Technology Economically Achievable (BAT) is defined at Section 304(b)(2) of the CWA. In general, Best Available Technology Economically Achievable (BAT) represents the best available economically achievable performance of plants in the industrial subcategory or category. The factors considered in assessing BAT include the cost of achieving BAT effluent reductions, the age of equipment and facilities involved, the process employed, potential process changes, non-water quality environmental impacts, including energy requirements and other such factors as the EPA Administrator deems appropriate. EPA retains considerable discretion in assigning the weight according to these factors. BAT limitations may be based on effluent reductions attainable through changes in a facility's processes and operations. Where existing performance is uniformly inadequate, BAT may reflect a higher level of performance than is currently being achieved within a particular subcategory based on technology transferred from a different subcategory or category. BAT may be based upon process changes or internal controls, even when these technologies are not common industry practice.

**Best Conventional Pollution Control Technology (BCT)** – Best Conventional Pollutant Control Technology (BCT) is defined at Section 304(b)(4) of the CWA. The 1977 amendments to the CWA required EPA to identify effluent reduction levels for conventional pollutants associated with BCT for discharges from existing industrial point sources. In addition to the other factors specified in section 304(b)(4)(B), the CWA requires that EPA establish BCT limitations after consideration of a two part "cost-reasonableness" test. EPA explained its methodology for the development of BCT limitations in a Federal Register notice on July 9, 1986 (51 FR 24974).

**Best Management Practices (BMP)** – schedules of activities, practices (and prohibitions of practices), structures, vegetation, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMP also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. See S.C. R.61-9.122.2.

**Best Practicable Control Technology Currently Available (BPT)** – Best Practicable Control Technology Currently Available (BPT) is defined at Section 304(b)(1) of the Clean Water Act (CWA). EPA sets Best Practicable Control Technology Currently Available (BPT) effluent limitations for conventional, toxic, and non-conventional pollutants. Section 304(a)(4) designates the following as conventional pollutants: biochemical oxygen demand (BOD5), total suspended solids, fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease as an additional conventional pollutant on July 30, 1979 (see 44 FR 44501).

EPA has identified 65 pollutants and classes of pollutants as toxic pollutants, of which 126 specific substances have been designated priority toxic pollutants (see Appendix A to part 403, reprinted after 40 CFR 423.17). All other pollutants are considered to be non-conventional.

In specifying BPT, EPA looks at a number of factors. EPA first considers the total cost of applying the control technology in relation to the effluent reduction benefits. The Agency also considers the age of the equipment and facilities, the processes employed and any required process changes, engineering aspects of the control technologies, non-water quality environmental impacts (including energy requirements), and such other factors as the EPA Administrator deems appropriate. Traditionally, EPA establishes BPT effluent limitations based on the average of the best performance of facilities within the industry of various ages, sizes, processes or other common characteristics. Where existing performance is uniformly inadequate, BPT may reflect higher levels of control than currently in place in an industrial category if the Agency determines that the technology can be practically applied.

**Co-located Industrial Activities** – Any industrial activities, excluding your primary industrial activity, located on-site that are defined by the storm water regulations at 122.26(b)(14)(i)-(ix) and (xi). An activity at a facility is not considered co-located if the activity, when considered separately, does not meet the description of a category of industrial activity covered by the storm water regulations or identified by the SIC code list in Appendix D.

**Control Measure** – refers to any BMP or other method (including effluent limitations) used to prevent or reduce the discharge of pollutants to waters of the United States.

**The Department** - the South Carolina Department of Health and Environmental Control.

**Director** – a Regional Administrator of the Environmental Protection Agency or an authorized representative. See 40 CFR 122.2.

**Discharge** – when used without qualification, means the "discharge of a pollutant." See S.C. R.61-9. 122.2.

**Discharge of a Pollutant** – any addition of any "pollutant" or combination of pollutants to waters of the State or "waters of the United States" from any "point source," or any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation. This includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works. See S.C. R.61-9. 122.2.

**Discharge-related Activities** – activities that cause, contribute to, or result in storm water and allowable non-storm water point source discharges, and measures such as the siting, construction, and operation of BMP to control, reduce, or prevent pollution in the discharges.

**Drought-stricken area** – a period of below average water content in streams, reservoirs, ground-water aquifers, lakes and soils.

**EPA Approved or Established Total Maximum Daily Loads (TMDL)** – "EPA Approved TMDL" are those that are developed by the Department and approved by EPA. "EPA Established TMDL" are those that are developed by EPA.

**Existing Discharger** – an operator applying for coverage under this permit for discharges authorized previously under an NPDES general or individual permit.

**Facility or Activity** – any NPDES “point source” (including land or appurtenances thereto) that is subject to regulation under the NPDES program. See S.C. R.61-9. 122.2.

**Federal Facility** – any buildings, installations, structures, land, public works, equipment, aircraft, vessels, and other vehicles and property, owned by, or constructed or manufactured for the purpose of leasing to, the federal government.

**Impaired Water** (or “Water Quality Impaired Water” or “Water Quality Limited Segment”) – A water is impaired for purposes of this permit if it has been identified by a State or EPA pursuant to Section 303(d) of the Clean Water Act as not meeting applicable State water quality standards (these waters are called “water quality limited segments” under 40 CFR 30.2(j)). Impaired waters include both waters with approved or established TMDL, and those for which a TMDL has not yet been approved or established. Refer to the following website for more information on impaired waterbodies: <http://www.scdhec.gov/tmdl/>

**Indian Country** – (a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and including rights-of-way running through the reservation; (b) all dependent Indian communities within the borders of the United States, whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a State, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same. This definition includes all land held in trust for an Indian tribe. (18 U.S.C. 1151)

**Industrial Activity** – the 10 categories of industrial activities included in the definition of “storm water discharges associated with industrial activity” as defined in S.C. R.61-9.122.26(b)(14)(i)-(ix) and (xi). NOTE: Storm water associated with construction activity, as defined at S.C. R.61-9.122.26(b)(14)(x) and (15), is not covered by this permit.

**Industrial Storm Water** – storm water runoff from industrial activity.

**Minimize** - reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

**Municipal Separate Storm Sewer** – a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

- a. Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
- b. Designed or used for collecting or conveying storm water;

- c. Which is not a combined sewer; and
- d. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at S.C. R.61-9.122.2. See S.C. R.61-9.122.26(b)(4) and (b)(7).

Note: Additional information on the State's MS4 program, including a listing of small MS4s, may be found at <http://www.scdhec.gov/environment/water/swnsms4.htm>.

**Natural Background Pollutant Levels** – Concentrations or mass loadings of specific chemical parameters in storm water runoff that result from naturally occurring levels in soils, groundwater, or native biota. Natural background pollutant levels do not include legacy pollutants from earlier activity on your site, or pollutants in run-on from neighboring sources that are not naturally occurring.

**New Discharger** – an operator applying for coverage under this permit for discharges not authorized previously under an NPDES general or individual permit.

**New Source** – any building, structure, facility, or installation from which there is or may be a “discharge of pollutants,” the construction of which commenced:

- a. after promulgation of standards of performance under section 306 of the CWA which are applicable to such source, or
- b. after proposal of standards of performance in accordance with section 306 of the CWA which are applicable to such source, but only if the standards are promulgated in accordance with section 306 within 120 days of their proposal. See S.C. R.61-9. 122.2.

**New Source Performance Standards (NSPS)** – technology-based standards for facilities that qualify as new sources under S.C. R.61-9.122.2 and 122.29.

**No exposure** – means all industrial materials or activities are protected by a storm-resistant shelter to prevent exposure to rain, snow, snowmelt, and/or runoff. See S.C. R.61-9. 122.26(g).

**Operator** – any entity with a storm water discharge associated with industrial activity that meets either of the following two criteria:

- a. The entity has operational control over industrial activities, including the ability to modify those activities; or
- b. The entity has day-to-day operational control of activities at a facility necessary to ensure compliance with the permit (e.g., the entity is authorized to direct workers at a facility to carry out activities required by the permit).

**Person** – an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof. See S.C. R.61-9. 122.2.

**Point source** – any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm

water runoff. See S.C. R.61-9. 122.2.

**Pollutant** – dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act [42 U.S.C. 2011, et seq.]), heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water. See S.C. R.61-9. 122.2.

**Pollutant of concern** – A pollutant that causes or contributes to a violation of a water quality standard, including a pollutant which is identified as causing an impairment in a state's 303(d) list.

**Primary industrial activity** – includes any activities performed on-site which are (1) identified by the facility's primary SIC code; or (2) included in the narrative descriptions of 122.26(b)(14)(i), (iv), (v), or (vii), and (ix). [For co-located activities covered by multiple SIC codes, it is recommended that the primary industrial determination be based on the value of receipts or revenues or, if such information is not available for a particular facility, the number of employees or production rate for each process may be compared. The operation that generates the most revenue or employs the most personnel is the operation in which the facility is primarily engaged. In situations where the vast majority of on-site activity falls within one SIC code, that activity may be the primary industrial activity.] Narrative descriptions in S.C. R.61-9. 122.26(b)(14) identified above include: (i) activities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards; (iv) hazardous waste treatment storage, or disposal facilities including those that are operating under interim status or a permit under subtitle C of the Resource Conservation and Recovery Act (RCRA); (v) landfills, land application sites and open dumps that receive or have received industrial wastes; (vii) steam electric power generating facilities; and (ix) sewage treatment works as defined at S.C. R.61-9.122.26(b)(14)(ix).

**Qualified Personnel** – personnel who possess the knowledge and skills to assess conditions and activities that could impact storm water quality at your facility, and who can also evaluate the effectiveness of control measures.

**Reportable Quantity Release** – a release of a hazardous substance at or above the established legal threshold that requires emergency notification. Refer to 40 CFR Parts 110, 117, and 302 for complete definitions and reportable quantities for which notification is required.

**Runoff coefficient** – the fraction of total rainfall that will appear at the conveyance as runoff. See S.C. R.61-9.122.26(b)(11).

**Significant materials** – includes, but is not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under section 101(14) of CERCLA; any chemical the facility is required to report pursuant to section 313 of Title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag and sludge that have the potential to be released with storm water discharges. See S.C. R.61-9.122.26(b)(12).

**Special Aquatic Sites** – sites identified in 40 CFR 230 Subpart E. These are geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region.

**Storm Water** – storm water runoff, snowmelt runoff, and surface runoff and drainage. See S.C. R.61-9.122.26(b)(13).

**Storm Water Discharges Associated with Construction Activity** – a discharge of pollutants in storm water runoff from areas where soil disturbing activities (e.g., clearing, grading, or excavating), construction materials, or equipment storage or maintenance (e.g., fill piles, borrow areas, concrete truck washout, fueling), or other industrial storm water directly related to the construction process (e.g., concrete or asphalt batch plants) are located. See S.C. R.61-9. 122.26(b)(14)(x) and (15).

**Storm Water Discharges Associated with Industrial Activity** – the discharge from any conveyance that is used for collecting and conveying storm water and that is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the NPDES program under Part 122. For the categories of industries identified in this section, the term includes, but is not limited to, storm water discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at 40 CFR part 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and final products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water. For the purposes of this paragraph, material handling activities include storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, final product, by-product or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with storm water drained from the above described areas. Industrial facilities include those that are federally, State, or municipally owned or operated that meet the description of the facilities listed in S.C. R.61-9. 122.26(b)(14). The term also includes those facilities designated under the provisions of S.C. R.61-9. 122.26(a)(1)(v).

**Substantially Identical Outfalls** - outfalls that have generally similar industrial activities, control measures, exposed materials that may significantly contribute pollutants to storm water, and runoff coefficients of their drainage areas.

**Total Maximum Daily Load (TMDL)** –a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL includes wasteload allocations (WLA) for point source discharges; load allocations (LA) for nonpoint sources and/or natural background, and must include a margin of safety (MOS) and account for seasonal variations. (See section 303(d) of the Clean Water Act and 40 CFR 130.2 and 130.7).

**Uncontaminated** – means free from the presence of pollutants attributable to industrial activity.

**Water Quality Impaired** – See 'Impaired Water'.

**Water Quality Standards** – definition of the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. States and EPA adopt water quality standards to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (See CWA sections 101(a)2 and 303(c)) and the S.C. Pollution Control Act, S.C. Code 48-1-10, et seq. Water quality standards also include an anti-degradation

policy.

**Waters of the State** - means lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic Ocean within the territorial limits of the State, and all other bodies of surface or underground water, natural or artificial, public or private, inland or coastal, fresh or salt, which are wholly or partially within or bordering the State or within its jurisdiction.

**“You” and “Your”** – as used in this permit are intended to refer to the permittee, the operator, or the discharger as the context indicates and that party’s facility or responsibilities. The use of “you” and “your” refers to a particular facility and not to all facilities operated by a particular entity. For example, “you must submit” means the permittee must submit something for that particular facility. Likewise, “all your discharges” would refer only to discharges at that one facility.

## B. Abbreviations and Acronyms

BAT – Best Available Technology Economically Achievable  
BCT - Best Conventional Pollutant Control Technology  
BOD<sub>5</sub> – Biochemical Oxygen Demand (5-day test)  
BMP – Best Management Practice  
BPT – Best Practicable Control Technology Currently Available  
CERCLA – Comprehensive Environmental Response, Compensation and Liability Act  
CGP – Construction General Permit  
COD – Chemical Oxygen Demand  
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 *et seq*)  
CWT – Centralized Waste Treatment  
DMR – Discharge Monitoring Report  
EPA – U. S. Environmental Protection Agency  
ESA – Endangered Species Act  
FWS – U. S. Fish and Wildlife Service  
IGP - S.C. Industrial Storm Water General NPDES permit  
LA – Load Allocations  
MDMR – MSGP Discharge Monitoring Report  
MGD – Million Gallons per Day  
MOS – Margin of Safety  
MS4 – Municipal Separate Storm Sewer System  
MSDS – Material Safety Data Sheet  
MSGP – Multi-Sector General Permit  
NAICS – North American Industry Classification System  
NEPA – National Environmental Policy Act  
NHPA – National Historic Preservation Act  
NMFS – U. S. National Marine Fisheries Service  
NOI – Notice of Intent  
NOT – Notice of Termination  
NPDES – National Pollutant Discharge Elimination System  
NRC – National Response Center  
NRHP – National Register of Historic Places  
NSPS – New Source Performance Standard  
NTU – Nephelometric Turbidity Unit  
OMB – U. S. Office of Management and Budget

- ORW – Outstanding Resource Water
- ONRW - Outstanding National Resource Water
- OSM – U. S. Office of Surface Mining
- PCA – the South Carolina Pollution Control Act, S.C. Code 48-1-10, et. seq.
- POTW – Publicly Owned Treatment Works
- RCRA – Resource Conservation and Recovery Act
- RQ – Reportable Quantity
- SARA – Superfund Amendments and Reauthorization Act
- SHPO – State Historic Preservation Officer
- SIC – Standard Industrial Classification
- SMCRA – Surface Mining Control and Reclamation Act
- SPCC – Spill Prevention, Control, and Countermeasures
- SWPPP – Storm Water Pollution Prevention Plan
- THPO – Tribal Historic Preservation Officer
- TMDL – Total Maximum Daily Load
- TSDf – Treatment, Storage, or Disposal Facility
- TSS – Total Suspended Solids
- USGS – United States Geological Survey
- WLA – Wasteload Allocation
- WQS – Water Quality Standard

**XIII. Facilities and Activities Covered**

These sector descriptions are based on Standard Industrial Classification (SIC) Codes and Industrial Activity Codes. References to “sectors” in this permit (e.g., sector-specific monitoring requirements) refer to these groupings.

<b>Table XIII-1. Sectors of Industrial Activity</b>		
<b>Subsector (May be subject to more than one sector/subsector)</b>	<b>SIC Code or Activity Code<sup>1</sup></b>	<b>Activity Represented</b>
<b>SECTOR A: TIMBER PRODUCTS</b>		
A1	2421	General Sawmills and Planing Mills
A2	2491	Wood Preserving
A3	2411	Log Storage and Handling
A4	2426	Hardwood Dimension and Flooring Mills
	2429	Special Product Sawmills, Not Elsewhere Classified
	2431-2439 (except 2434)	Millwork, Veneer, Plywood, and Structural Wood (see Sector W)
	2448	Wood Pallets and Skids
	2449	Wood Containers, Not Elsewhere Classified
	2451, 2452	Wood Buildings and Mobile Homes
	2493	Reconstituted Wood Products
	2499	Wood Products, Not Elsewhere Classified
A5	2441	Nailed and Lock Corner Wood Boxes and Shook
<b>SECTOR B: PAPER AND ALLIED PRODUCTS</b>		

**Table XIII-1. Sectors of Industrial Activity**

Subsector (May be subject to more than one sector/subsector)	SIC Code or Activity Code <sup>1</sup>	Activity Represented
B1	2631	Paperboard Mills
B2	2611	Pulp Mills
	2621	Paper Mills
	2652-2657	Paperboard Containers and Boxes
	2671-2679	Converted Paper and Paperboard Products, Except Containers and Boxes
<b>SECTOR C: CHEMICALS AND ALLIED PRODUCTS</b>		
C1	2873-2879	Agricultural Chemicals
C2	2812-2819	Industrial Inorganic Chemicals
C3	2841-2844	Soaps, Detergents, and Cleaning Preparations; Perfumes, Cosmetics, and Other Toilet Preparations
C4	2821-2824	Plastics Materials and Synthetic Resins, Synthetic Rubber, Cellulosic and Other Manmade Fibers Except Glass
C5	2833-2836	Medicinal Chemicals and Botanical Products; Pharmaceutical Preparations; in vitro and in vivo Diagnostic Substances; and Biological Products, Except Diagnostic Substances
	2851	Paints, Varnishes, Lacquers, Enamels, and Allied Products
	2861-2869	Industrial Organic Chemicals
	2891-2899	Miscellaneous Chemical Products
	3952 (limited to list of inks and paints)	Inks and Paints, Including China Painting Enamels, India Ink, Drawing Ink, Platinum Paints for Burnt Wood or Leather Work, Paints for China Painting, Artist's Paints and Artist's Watercolors
	2911	Petroleum Refining
<b>SECTOR D: ASPHALT PAVING AND ROOFING MATERIALS AND LUBRICANTS</b>		
D1	2951, 2952	Asphalt Paving and Roofing Materials
D2	2992, 2999	Miscellaneous Products of Petroleum and Coal
<b>SECTOR E: GLASS, CLAY, CEMENT, CONCRETE, AND GYPSUM PRODUCTS</b>		
E1	3251-3259	Structural Clay Products
	3261-3269	Pottery and Related Products
E2	3271-3275	Concrete, Gypsum, and Plaster Products
E3	3211	Flat Glass
	3221, 3229	Glass and Glassware, Pressed or Blown
	3231	Glass Products Made of Purchased Glass
	3241	Hydraulic Cement
	3281	Cut Stone and Stone Products
	3291-3299	Abrasive, Asbestos, and Miscellaneous Nonmetallic Mineral Products
<b>SECTOR F: PRIMARY METALS</b>		
F1	3312-3317	Steel Works, Blast Furnaces, and Rolling and Finishing Mills
F2	3321-3325	Iron and Steel Foundries
F3	3351-3357	Rolling, Drawing, and Extruding of Nonferrous Metals
F4	3363-3369	Nonferrous Foundries (Castings)

<b>Table XIII-1. Sectors of Industrial Activity</b>		
<b>Subsector (May be subject to more than one sector/subsector)</b>	<b>SIC Code or Activity Code<sup>1</sup></b>	<b>Activity Represented</b>
F5	3331-3339	Primary Smelting and Refining of Nonferrous Metals
	3341	Secondary Smelting and Refining of Nonferrous Metals
	3398, 3399	Miscellaneous Primary Metal Products
<b>SECTOR G: METAL MINING (ORE MINING AND DRESSING)</b>		
G1	1021	Copper Ore and Mining Dressing Facilities
G2	1011	Iron Ores
	1021	Copper Ores
	1031	Lead and Zinc Ores
	1041, 1044	Gold and Silver Ores
	1061	Ferroalloy Ores, Except Vanadium
	1081	Metal Mining Services
	1094, 1099	Miscellaneous Metal Ores
<b>SECTOR H: [Reserved.] COAL MINES AND COAL MINING-RELATED FACILITIES</b>		
<b>SECTOR I: [Reserved.] OIL AND GAS EXTRACTION AND REFINING</b>		
<b>SECTOR J: [Reserved.] MINERAL MINING AND DRESSING</b>		
<b>SECTOR K: HAZARDOUS WASTE TREATMENT, STORAGE, OR DISPOSAL FACILITIES</b>		
K1	HZ	Hazardous Waste Treatment, Storage, or Disposal Facilities, including those that are operating under interim status or a permit under subtitle C of RCRA
<b>SECTOR L: LANDFILLS, LAND APPLICATION SITES, AND OPEN DUMPS</b>		
L1	LF	All Landfill, Land Application Sites and Open Dumps
L2	LF	All Landfill, Land Application Sites and Open Dumps, except Municipal Solid Waste Landfill (MSWLF) Areas Closed in Accordance with 40 CFR 258.60
<b>SECTOR M: AUTOMOBILE SALVAGE YARDS</b>		
M1	5015	Automobile Salvage Yards
<b>SECTOR N: SCRAP RECYCLING FACILITIES</b>		
N1	5093	Scrap Recycling and Waste Recycling Facilities except Source-Separated Recycling
N2	5093	Source-separated Recycling Facility
<b>SECTOR O: STEAM ELECTRIC GENERATING FACILITIES</b>		
O1	SE	Steam Electric Generating Facilities, including coal handling sites
<b>SECTOR P: LAND TRANSPORTATION AND WAREHOUSING</b>		
P1	4011, 4013	Railroad Transportation
	4111-4173	Local and Highway Passenger Transportation
	4212-4231	Motor Freight Transportation and Warehousing

<b>Table XIII-1. Sectors of Industrial Activity</b>		
<b>Subsector (May be subject to more than one sector/subsector)</b>	<b>SIC Code or Activity Code<sup>1</sup></b>	<b>Activity Represented</b>
	4311	United States Postal Service
	5171	Petroleum Bulk Stations and Terminals
<b>SECTOR Q: WATER TRANSPORTATION</b>		
Q1	4412-4499	Water Transportation Facilities
<b>SECTOR R: SHIP AND BOAT BUILDING AND REPAIRING YARDS</b>		
R1	3731, 3732	Ship and Boat Building or Repairing Yards
<b>SECTOR S: AIR TRANSPORTATION FACILITIES</b>		
S1	4512-4581	Air Transportation Facilities
<b>SECTOR T: TREATMENT WORKS</b>		
T1	TW	Treatment Works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 mgd or more, or required to have an approved pretreatment program under 40 CFR Part 403. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with section 405 of the CWA
<b>SECTOR U: FOOD AND KINDRED PRODUCTS</b>		
U1	2041-2048	Grain Mill Products
U2	2074-2079	Fats and Oils Products
U3	2011-2015	Meat Products
	2021-2026	Dairy Products
	2032-2038	Canned, Frozen, and Preserved Fruits, Vegetables, and Food Specialties
	2051-2053	Bakery Products
	2061-2068	Sugar and Confectionery Products
	2082-2087	Beverages
	2091-2099	Miscellaneous Food Preparations and Kindred Products
	2111-2141	Tobacco Products
<b>SECTOR V: TEXTILE MILLS, APPAREL, AND OTHER FABRIC PRODUCT MANUFACTURING; LEATHER AND LEATHER PRODUCTS</b>		
V1	2211-2299	Textile Mill Products
	2311-2399	Apparel and Other Finished Products Made from Fabrics and Similar Materials
	3131-3199	Leather and Leather Products (note: see Sector Z1 for Leather Tanning and Finishing)
<b>SECTOR W: FURNITURE AND FIXTURES</b>		
W1	2434	Wood Kitchen Cabinets
	2511-2599	Furniture and Fixtures
<b>SECTOR X: PRINTING AND PUBLISHING</b>		

<b>Table XIII-1. Sectors of Industrial Activity</b>		
<b>Subsector (May be subject to more than one sector/subsector)</b>	<b>SIC Code or Activity Code<sup>1</sup></b>	<b>Activity Represented</b>
X1	2711-2796	Printing, Publishing, and Allied Industries
<b>SECTOR Y: RUBBER, MISCELLANEOUS PLASTIC PRODUCTS, AND MISCELLANEOUS MANUFACTURING INDUSTRIES</b>		
Y1	3011	Tires and Inner Tubes
	3021	Rubber and Plastics Footwear
	3052, 3053	Gaskets, Packing and Sealing Devices, and Rubber and Plastic Hoses and Belting
	3061, 3069	Fabricated Rubber Products, Not Elsewhere Classified
Y2	3081-3089	Miscellaneous Plastics Products
	3931	Musical Instruments
	3942-3949	Dolls, Toys, Games, and Sporting and Athletic Goods
	3951-3955 (except 3952 – see Sector C)	Pens, Pencils, and Other Artists' Materials
	3961, 3965	Costume Jewelry, Costume Novelties, Buttons, and Miscellaneous Notions, Except Precious Metal
	3991-3999	Miscellaneous Manufacturing Industries
<b>SECTOR Z: LEATHER TANNING AND FINISHING</b>		
Z1	3111 (also see sector V.)	Leather Tanning and Finishing
<b>SECTOR AA: FABRICATED METAL PRODUCTS</b>		
AA1	3411-3499 (except 3479)	Fabricated Metal Products, Except Machinery and Transportation Equipment, and Coating, Engraving, and Allied Services.
	3911-3915	Jewelry, Silverware, and Plated Ware
AA2	3479	Fabricated Metal Coating and Engraving
<b>SECTOR AB: TRANSPORTATION EQUIPMENT, INDUSTRIAL OR COMMERCIAL MACHINERY</b>		
AB1	3511-3599 (except 3571-3579)	Industrial and Commercial Machinery, Except Computer and Office Equipment (see Sector AC)
	3711-3799 (except 3731, 3732)	Transportation Equipment Except Ship and Boat Building and Repairing (see Sector R)
<b>SECTOR AC: ELECTRONIC, ELECTRICAL, PHOTOGRAPHIC, AND OPTICAL GOODS</b>		
AC1	3571-3579	Computer and Office Equipment
	3812-3873	Measuring, Analyzing, and Controlling Instruments; Photographic and Optical Goods, Watches, and Clocks
	3612-3699	Electronic and Electrical Equipment and Components, Except Computer Equipment
<b>SECTOR AD: NON-CLASSIFIED FACILITIES</b>		
AD1	Other storm water discharges designated by the Director as needing a permit (see 40 CFR 122.26(a)(9)(i)(C) & (D)) or any facility discharging storm water associated with industrial activity not described by any of Sectors A-AC. NOTE: Facilities may not elect to be covered under Sector AD. Only the Director may assign a facility to Sector AD.	

<sup>01</sup> A complete list of SIC Codes can be found at: [http://www.osha.gov/pls/imis/sic\\_manual.html](http://www.osha.gov/pls/imis/sic_manual.html)  
Conversions to and from the newer North American Industry Classification System<sup>7</sup> (NAICS)) can be obtained from the Internet at: <http://www.census.gov/eos/www/naics/concordances/concordances.html> or in paper form from various locations in the document titled *Handbook of Standard Industrial Classifications*, Office of Management and Budget, 1987.