

**ENTERGY ARKANSAS
HAMILTON MOSES PLANT
NPDES PERMIT RENEWAL APPLICATION
SUPPLEMENTAL INFORMATION**

General Information

Hamilton Moses Plant is located in St. Francis County, Arkansas, approximately 6 miles west of Forrest City, Arkansas (on Highway 70). The area bordering the plant is farmland, the L'Anguille River and the Rock Island Railroad. The plant operates under NPDES Permit Number AR0000370 and consists of two (2) gas/petroleum fired units. Both units have a maximum generator nameplate rating of 69 MW. Both units burn natural gas primarily with number 6 fuel oil as a backup. This station is approximately 51 years old and was designed so that the L'Anguille River would serve as the principal water supply for the plant while three (3) wells would supplement the river supply during low river flow conditions. The Moses plant is in extended reserve shutdown (ERS) status and has not operated since the last permit renewal submittal. Well water is the principal source of water supply. The municipal water system provides potable water. Effluent from the Hamilton Moses plant consists of low volume wastewater, stormwater, cooling tower blowdown and non-chemical metal cleaning wastewater. The NPDES outfall locations are depicted in Attachment B and a schematic of the wastewater flow (process flow diagram) is shown in Attachment C. The information below describes wastewater contributing to each outfall.

For purposes of this application, the period of record used to summarize the data generated by the current permit is from August 2005 through August 2007.

Outfall 01A and 002 – Low Volume Wastewater

Water from the intake structure enters the treatment plant through a weir well where acid, chlorine and lime or polyelectrolyte are added. From the weir well, the water is evenly proportioned into one of two reactor clarifiers where both suspended and precipitated solids settle out. Clarified water is stored in a clear well. From the clear well, the clarified river water is processed through a bank of five (5) anthracite filters for general service, auxiliary cooling and cooling tower make-up. A portion of the water stored in the clear well is processed through zeolite filters and softeners as preparation for evaporator make-up and ultimately boiler make-up water. Potable water for the station is supplied by the municipal water system.

All wastewaters associated with the water treatment plant, including boiler make-up treatment, are classified as low volume wastewater. Settling pond overflow, filter backwash, zeolite regenerant, evaporator blowdown and boiler blowdown, are the principal water plant wastewater sources. Other low volume wastewater consists of cooling water from auxiliary equipment and surface runoff.

Outfall 01A consists of settling pond overflow, boiler blowdown, and the majority of the plant's surface runoff. (Discharge from building sump pumps and reactor blowdown are

pumped to the settling pond.) Zeolite softeners are regenerated with a 25% sodium chloride solution. Two or three zeolite softeners are regenerated each week based on effluent water quality. Wastewater collected in the water treatment sump is discharged via two (2) vertical centrifugal sump pumps to a settling pond. The station has five (5) service water filters and one filter is backwashed each day. Service filter backwash is pumped from the building sump to the settling pond.

Zeolite softened water is processed through evaporators to supply make-up water to the boilers. Make-up is introduced into the boiler recirculation system through the low and high pressure heaters.

Boiler water chemical treatment includes the addition of: Pretect 2000, Conquor 3475 and 3485, Burolock HP52 and HP53. Pretect 2000 is a neutralizing amine for condensate pH control. It is highly effective in reducing the levels of iron and copper throughout a pre-boiler system. Conquor 3475 and 3485 act as oxygen scavengers and are used to prevent boiler system corrosion. Burolock HP52 and HP53 are used for boiler alkalinity control and scale protection to maintain desired PO₄ residual levels.

To control the build-up of dissolved solids, the boiler system is continuously blown down. During a unit start-up, boiler water is discharged from the unit as pressure within the boiler approaches line conditions. Start-up blowdown is routed to discharge through a flash tank. The flash tank discharges to a yard drainage ditch and then internal outfall 01A.

The settling pond is square, approximately 100' x 100'. Wastewater enters the southeast corner of the pond and discharges via an overflow pipe diagonally across the pond. Overflow from the settling pond discharges to the northeast ditch where it combines with other low volume wastes prior to monitoring.

Surface runoff from the east and northeast areas of the plant drain through a ditch and culvert system to the northeast yard ditch for discharge through Outfall 01A. This area includes the switchyard, water plant, parking lot, fuel oil storage and a portion of the plant area. The discharge flows to the L'Anguille River via an unnamed slough. Average flow for Outfall 01A is 0.0459 MGD.

Outfall 002 consists of the majority of the plant's process wastewater and some surface runoff. This includes evaporator blowdown and auxiliary cooling wastewater. Most of the active plant area drains to the lower pond and ultimately discharges through Outfall 002. The turbine area drains are collected in a common line and discharged to the lower pond via an underground culvert. This area contains the majority of active equipment and thus produces the majority of equipment draining.

The lower pond serves as a gravity settling and flotation basin. Wastewater enters the pond from the north and southeast corners and flows out of the west side. Wastewater exits the lower pond from the bottom via a seal leg which maintains the pond level. The pond has an emergency overflow on the south side which is protected by a baffle. The average flow for Outfall 002 is 0.0228 MGD.

Outfall 003, Metal Cleaning Wastewater

Metals cleaning wastewater at the Hamilton Moses Plant is produced during furnace washes, air pre-heater washes, boiler tube chemical cleaning and potentially during condenser tube cleaning operations. These activities involve rinsing tubes and related equipment with water or an inhibited hydrochloric acid or other solution to remove scale and other deposits, improve circulation, and improve heat transfer. The tubes are then flushed with water and drained. The wash water is then collected in a "frac tank" leased for this purpose so that the wastewater generated can be sampled and treated to meet specified permit limitations, prior to discharge. Wastewater that meets permit limitations is discharged to a drainage ditch which drains to an unnamed creek and then to the L'Anguille River. The average flow from Outfall 003 is 790 gallons per day. No chemical cleaning waste has been generated or discharged in approximately 7-10 years.

Outfall 01C, Cooling Tower Blowdown

The recirculating cooling water system creates the largest volume of wastewater discharged from the Hamilton Moses Plant in the form of cooling tower blowdown. A single main cooling tower currently serves both units at the plant with a maximum recirculation rate of 49,000 gallons per minute per unit.

As designed, the treated L'Anguille River water supplies make-up to the cooling tower to compensate for evaporation, drift losses and cooling tower blowdown. However, groundwater is currently used to supply make-up to the cooling tower. Make-up water is normally routed to the tower via once through auxiliary cooling systems. The pH of the circulating cooling water is controlled to within a 7.8 – 8.2 range by addition of concentrated sulfuric acid. The recirculating cooling water system is also chlorinated twice per day for 30 minutes to control bio-fouling. TowerBrom 960, a microbiocide, is added to the recirculating cooling water system three times per week. In addition, H-130 microbiocide is a non-oxidizing liquid organic biocide containing quaternary ammonium compounds formulated for use in industrial cooling water system. It is used to control the growth of bacteria and algae. H-640, a liquid triazine compound is also used for algae control.

Phreeguard 2200 and Cuprostat are added to the recirculating cooling water system for corrosion control as the water passes through the service water filters. PCL-1346 is used to control the formation of silica based scale and magnesium silicate scale at the heat transfer surfaces.

To limit the dissolved solids build-up in the recirculating water system, water is discharged from the cooling tower as blowdown and replaced with higher quality make-up water. Groundwater is added to cooling tower blowdown in order to meet permitted temperature limit. Sampling for other permitted parameters occurs prior to the addition of groundwater. The combined flow exits the tower over a rectangular flow measurement

weir and discharges to the L'Anguille River via an unnamed slough. Average flow for Outfall 01C, cooling tower blowdown is 0.3963 MGD.