

# Draft Missouri State Operating Permit

STATE OF MISSOURI  
DEPARTMENT OF NATURAL RESOURCES  
MISSOURI CLEAN WATER COMMISSION



## MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92<sup>nd</sup> Congress) as amended,

Permit No. MO-0098001

Owner: Union Electric Company d/b/a Ameren Missouri  
Address: 1901 Chouteau Ave. MC 602, St. Louis MO 63166-6149

Continuing Authority: Union Electric Company  
Address: 1901 Chouteau Ave. MC 602, St. Louis MO 63166-6149

Facility Name: Ameren Missouri Callaway Energy Center  
Facility Address: 8315 County Rd. 459, Steedman, MO 65251

Legal Description: Callaway County; See following pages  
UTM Coordinates: See following pages

Receiving Stream: Multiple, See following pages  
First Classified Stream and ID: Multiple, See following pages  
USGS Basin & Subwatershed No.: Multiple, See following pages

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

### FACILITY DESCRIPTION

Steam electric power generating facility using nuclear fuel; SIC# 4911; NAICS# 221113.

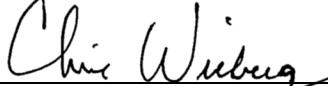
This permit authorizes only wastewater and stormwater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas.

July 1, 2020  
Effective Date

XXXXXXX  
Mod Date

  
Edward B. Galbraith, Director, Division of Environmental Quality

June 30, 2025  
Expiration Date

  
Chris Wieberg, Director, Water Protection Program

## **FACILITY DESCRIPTION (CONTINUED)**

### OUTFALL #001: Industrial Process Wastewater

Radwaste Treatment System (RTS); mixed with #002 or #016 and piped to Missouri River.

The RTS serves to collect, process, store, recycle and discharge treated wastewater generated at Callaway. In addition, radioactive solids removed by this system are prepared for disposal and transported to a licensed off-site disposal facility. The Boron Recycle System receives reactor coolant for the purpose of recovering the boric acid for reuse in the plant. Boric acid is used as a neutron absorber/moderator in the primary loop. The Liquid Radwaste System collects and processes floor and equipment drains from the containment, auxiliary building, fuel building, and radwaste buildings during normal operation. The laundry and hot shower system collects waste generated from washing radioactively contaminated protective gear and clothing, and personnel decontamination shower wastewater. These wastes are then transferred to the liquid radwaste system for treatment. The Secondary Liquid Waste system is used to process condensate demineralizer regeneration wastes and potentially radioactive liquid waste collected from the turbine building. The condensate demineralizer regeneration waste is divided into two waste streams; high total dissolved solids (TDS) waste from the acid and caustic rinses used when chemically regenerating spent resin, and low TDS waste which results from the initial back-flushing of un-regenerated resin and the final rinsing of the regenerated resin to remove acid and caustic substances.

Steam generator blowdown is normally recycled back to the main condenser for reuse in the secondary cycle. Provisions also exist to discharge the treated blowdown via outfall #001. The following wastewater treatment systems are used as required to treat this waste stream for recycle or discharge in compliance with Nuclear Regulatory Commission (NRC) requirements and are also available as auxiliary or backup treatment systems to treat this discharge for compliance with NPDES permit limitations: Evaporation and/or Mixing and/or Filtration and/or Carbon Absorption and/or Ion Exchange and/or Neutralization and/or Reuse/Recycle of treated effluent. All processing in the RTS is done on a batch basis except steam generator blowdown. After monitoring for radioactive content, release rates are controlled managerially to ensure as low as practicable NRC radioactive discharge criteria are met; water quality standards are met using these procedures.

UTM Coordinates: X = 606040; Y = 4291049 (discharges through outfall #100)  
Legal Description: NE ¼, NE ¼, Sec. 14, T46N, R8W, Callaway Co.  
Receiving & First Classified Stream & ID: Missouri River (P) WBID# 0701  
Design Flow: 0.190 MGD, 158.5 gpm  
Average Flow: 0.054 MGD, 45 gpm

### OUTFALL #002: Industrial Process Wastewater

Cooling Tower Blowdown; piped to Missouri River. Includes: Circulating Water System, Service Water System (SWS), and Essential Service Water (ESW) System wastewater. Blowdown from the cooling tower is necessary to maintain the dissolved solids concentration in the recirculating water system within acceptable operating limits. The ESW system is not routinely used, but is periodically run to demonstrate operability. The ESW System can be used to maintain proper freeboard in the ultimate heat sink pond (outfall #017) by transferring water to the SWS.

UTM Coordinates: X = 606218; Y = 4291158 (discharges through outfall #100)  
Legal Description: NW ¼, NW ¼, Sec. 13, T46N, R8W, Callaway Co.  
Receiving & First Classified Stream & ID: Missouri River (P) WBID# 0701  
Design Flow: 14.4 MGD  
Daily Flow: 5.37 MGD

### OUTFALL #003: Industrial Wastewater

Water treatment plant wastewater is normally recycled to treatment plant headworks. Supernatant from wastewater treatment lagoon; settles to remove solids. The wastewater treated in the lagoon is mainly from the blowdown of accumulated river solids in the water treatment plant clarifiers. The sand and carbon filter backwash, oil water separator, and demineralizer system wastewater is also routed to this treatment lagoon. The oil water separator flow consists of wastewater from some plant sumps as well as flow from an oil recovery well being used to remediate a historic on-site release. Normally recycled by routing it back to the head of the water treatment plant.

UTM Coordinates: X = 606183; Y = 4289944  
Receiving Stream: Tributary to Mud Creek  
First Classified Stream & ID: 100K Extent Remaining Stream (C) WBID# 3960  
USGS Basin & Sub-watershed No.: Deer Creek – Missouri River (10300102-1606)  
Design Flow: 1.645 MGD  
Average Discharge Flow: 0.0 MGD  
Average Recycle Flow: 0.42 MGD

## **FACILITY DESCRIPTION (CONTINUED)**

### OUTFALL #007: Domestic and Laboratory Wastewater

Lagoon system; wastewater normally recycled to WTP headworks. Three-cell lagoon (1 through 3) and polishing at constructed wetland (basins 1 and 2). Receives sanitary/domestic wastewater, on-site cafeteria wastewater, and laboratory waste from the plant. Sludge is stored in the lagoon.

Design Population Equivalent:	400
UTM Coordinates:	X = 606400; Y = 4290125
Legal Description:	SW ¼, SW ¼, Sec. 13, T46N, R8W, Callaway Co.
Receiving Stream:	Tributary to Mud Creek
First Classified Stream and ID:	100 K Extent-Remaining Stream (C) WBID# 3960
USGS Basin & Sub-watershed No.:	Deer Creek – Missouri River (10300102-1606)
Design Flow:	0.040 MGD
Average Discharge Flow:	0.0 MGD
Average Recycle Flow:	0.025 MGD

### OUTFALL/PERMITTED FEATURE #009: Intake and Industrial Wastewater

Intake Structure, and Intake Heater Blowdown (located on Missouri River). Subject to CWA §316(b). The river intake structure contains two recirculating electric heaters which are used to prevent ice formation on the intake bar screens during the winter months. Outfall #009 consists of discharges from the infrequent blowdown or drainage of these boilers. The boilers are currently in a dry lay-up condition (non-operational).

UTM Coordinates:	X = 609694; Y = 4284633
Legal Description:	NW ¼, NW ¼, Sec. 5, T45N, R7W, Callaway Co.
Receiving & First Classified Stream & ID:	Missouri River (P) WBID# 0701
USGS Basin & Sub-watershed No.:	Deer Creek – Missouri River (10300102-1606)
Design Heater Blowdown Flow:	0.006 MGD
Average Heater Blowdown Flow:	0 MGD
Design Makeup Water Intake Flow:	24.5 MGD
Average Makeup Water Intake Flow:	18.1 MGD

### OUTFALL #010: Stormwater

Settling pond drains 108 acres, 16.2 acres is impervious surface. Drainage area includes the cooling water chemical control building, the quality control building, the former Unit #2 (not constructed) excavation and the area of the plant west of the radwaste system. Retention time greater than 24 hours.

UTM Coordinates:	X = 606515; Y = 4291869
Legal Description:	SW ¼, SW ¼, Sec. 12, T46N, R8W, Callaway Co.
Receiving Stream:	Tributary to Logan Creek
First Classified Stream and ID:	100k Extent Remaining Stream (C) WBID# 3960
USGS Basin & Sub-watershed No.:	Logan Creek (10300102-1605)
Application Design Storm Flow:	4.6 MGD; daily flow is dependent on precipitation

### OUTFALL #011: Stormwater

Settling pond drains 425 acres, 8.5 acres is impervious surface. Drainage area includes the water treatment plant, radwaste building, operation support facility, demineralizer portable water building and the circulating and service water pumphouse. Retention time less than 24 hours. Non-stormwater discharges permissible: fire protection test water from outfall #018.

UTM Coordinates:	X = 607139; Y = 4291930
Legal Description:	NW ¼, SE ¼, Sec. 12, T46N, R8W, Callaway Co.
Receiving Stream:	Tributary to Logan Creek
First Classified Stream and ID:	100K Extent Remaining Stream (C) WBID# 3960
USGS Basin & Sub-watershed No.:	Logan Creek (10300102-1605)
Application Design Storm Flow:	19.7 MGD; daily flow dependent on precipitation



## **FACILITY DESCRIPTION (CONTINUED)**

Outfalls #012, #014, and #015 are also under permit MORA19240 for land disturbance to effectuate removal of the retention basins during the 2022 modification. The facility shall determine which outfall best represents facility stormwater during this term and choose the old or new locations to sample the stormwater for the purposes of this permit. After construction/demolition is completed, the facility shall sample from the new location only.

### OUTFALL #012: Stormwater

Settling pond drains 87 acres, 22 acres is impervious surface. Drainage area includes most of the plant area including the parking lots, office buildings, switch yards, the turbine building, the outage maintenance building, and the Stores I building. **The 2022 modification removed the retention basins from this description.**

UTM Coordinates: X = 605884; Y = 4290257  
UTM Coordinates: X = 605852; Y = 4290489 (new location 2022 mod)  
Legal Description: NE ¼, SE ¼, Sec. 14, T46N, R8W, Callaway Co.  
Receiving Stream: Classified Tributary to Logan Creek  
Receiving & First Classified Stream & ID: 100K Extent Remaining Stream (C) WBID# 3960  
USGS Basin & Sub-watershed No.: Deer Creek – Missouri River (10300102-1606)  
Application Design Storm Flow: 6.6 MGD; daily flow is dependent on precipitation

### OUTFALL #014: Stormwater

Settling pond drains 100 acres, 4 acres is impervious surface. Drainage area includes half of the construction parking lot, the Stores II building, and the maintenance shop annex. **The 2022 modification removed the retention basins from this description.**

UTM Coordinates: X = 605569; Y = 4291979  
UTM Coordinates: X = 605639; Y = 4291849 (new location 2022 mod)  
Legal Description: NW ¼, SE ¼, Sec. 11, T46N, R8W, Callaway Co.  
Receiving Stream: Tributary to 100K Extent Remaining Stream  
First Classified Stream and ID: 100K Extent Remaining Stream (C) WBID# 3960  
USGS Basin & Sub-watershed No.: Cow Creek (10300102-1504)  
Application Design Storm Flow: 4.8 MGD; daily flow is dependent on precipitation

### OUTFALL #015: Stormwater

Settling pond drains 60 acres, 0.6 acres is impervious surface. Drainage area includes paved roadways. **The 2022 modification removed the retention basins from this description.**

UTM Coordinates: X = 605918; Y = 4292305  
UTM Coordinates: X = 605939; Y = 4292059 (new location 2022 mod)  
Legal Description: SE ¼, NE ¼, Sec. 11, T46N, R8W, Callaway Co.  
Receiving Stream: Classified Tributary to Canyon Lake (L3)  
Receiving & First Classified Stream & ID: 100K Extent Remaining Stream (C) WBID# 3960  
USGS Basin & Sub-watershed No.: Cow Creek (10300102-1504)  
Design Storm Flow: 2.8 MGD; daily flow is dependent on precipitation

### OUTFALL #016: Process Wastewater

Cooling Tower Bypass, piped to Missouri River. Clarified river water and wastewater recycled through the water treatment plant (outfall #003). Wastewater traveling thorough outfall #016 is used to moderate flow through the water treatment plant and to provide carrier water in the discharge line when also discharging from outfall #001. May also sample from Manhole 86-2 if necessary.

UTM Coordinates: X = 606175; Y = 4290754 (discharges through outfall #100)  
Legal Description: NW ¼, NW ¼, Sec. 13, T46N, R8W, Callaway Co.  
Receiving & First Classified Stream & ID: Missouri River (P) WBID# 0701  
Design Flow: 14.4 MGD  
Average Flow: 2.32 MGD  
Minimal Carrier Water Flow: 3000 gpm, 4.32 MGD

### OUTFALL #017: No Discharge

This permit does not authorize discharge from this outfall. Ultimate Heat Sink. Backup cooling water retention pond used to provide cooling water to various plant systems during other than normal conditions.

UTM Coordinates: X = 606094; Y = 4290861  
Legal Description: SE ¼, NE ¼, Sec. 14, T46N, R8W, Callaway Co.  
Receiving Stream: Tributary to Logan Creek  
First Classified Stream and ID: 100 K Extent-Remaining Stream (C) WBID# 3960  
USGS Basin & Sub-watershed No.: Logan Creek (10300102-1605)

## **FACILITY DESCRIPTION (CONTINUED)**

### OUTFALL #018: Wastewater (new outfall 2020 renewal)

Fire Protection Test Water. Annual discharges are 80,000 gallons; biennial discharges are 300,000 gallons.

UTM Coordinates: X = 606091; Y = 4290978  
Legal Description: SE ¼, NE ¼, Sec. 14, T46N, R8W, Callaway Co.  
Receiving Stream: Tributary to Logan Creek  
First Classified Stream and ID: 100K Extent Remaining Stream (C) WBID# 3960  
USGS Basin & Sub-watershed No.: Logan Creek (10300102-1605)  
Design Flow: 0.3 MGD  
Average Flow: 0 MGD

### OUTFALL #100: Discharge point at Missouri River for outfalls #001, #002, and #016.

UTM Coordinates: X = 6061695; Y = 4284614  
Legal Description: NW ¼, NW ¼, Sec. 5, T45N, R7W, Callaway Co.  
Receiving & First Classified Stream & ID: Missouri River (P) WBID# 0701  
USGS Basin & Sub-watershed No.: Deer Creek – Missouri River (10300102-1606)  
Design Flow: 16.24 MGD  
Average Flow: 14.4 MGD

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

OUTFALL #001 radwaste treatment	TABLE A-1 FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on <b>July 1, 2020</b> and remain in effect until expiration of the permit. Such discharges shall be controlled, limited, and monitored by the permittee as specified below:						
EFFLUENT PARAMETERS	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MINIMUM MEASUREMENT FREQUENCY	SAMPLE TYPE
LIMIT SET: M						
PHYSICAL						
Flow, total	MGD	*		* total	each batch	batch total
Flow, instantaneous	gpm	*		-	once/batch	TWA
Temperature	°F	*		*	once/month	measured
CONVENTIONAL						
Chlorine, Total Residual	µg/L	200		104	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
pH †	SU	6.0 to 9.0		6.0 to 9.0	once/batch	grab
Total Suspended Solids	mg/L	45		30	once/batch	grab
METALS						
Boron, Total Recoverable	mg/L	8000		*	once/batch	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>AUGUST 28, 2020</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

\* Monitoring and reporting requirement only

† pH: the facility will report the minimum and maximum values; pH is not to be averaged.

TWA – time weighted average flow

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (CONTINUED)**

OUTFALL #002 cooling tower blowdown	TABLE A-2 FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on <b>July 1, 2020</b> and remain in effect until expiration of the permit. Such discharges shall be controlled, limited, and monitored by the permittee as specified below:						
EFFLUENT PARAMETERS	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MINIMUM MEASUREMENT FREQUENCY	SAMPLE TYPE
LIMIT SET: M						
PHYSICAL						
Flow	MGD	*		*	daily	24 hr. total
Temperature	°F	*		*	daily	measured
CONVENTIONAL						
Biocides, Continuous Feed ‡	µg/L	50		50	daily	grab
Chlorine, Total Residual (Intermittent) ‡	µg/L	200		104	once/week	grab
Chlorine, Total Residual – Time ‡	minutes	120		*	daily	grab
pH †	SU	6.0 to 9.0		6.0 to 9.0	continuous	grab
pH †	minutes	60		446 (total)	continuous	grab
Total Dissolved Solids	mg/L	5500		*	once/week	grab
Total Suspended Solids	mg/L	*		*	once/week	grab
NUTRIENTS						
Ammonia as N	mg/L	*		*	once/month	grab
Kjeldahl Nitrogen, Total (TKN)	mg/L	*		*	once/month	grab
Nitrate plus Nitrite as N	mg/L	*		*	once/month	grab
Phosphorus, Total (TP)	mg/L	*		*	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>AUGUST 28, 2020</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
LIMIT SET: Q						
CONVENTIONAL						
Oil and Grease	mg/L	15		10	once/quarter ◇	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>OCTOBER 28, 2020</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
LIMIT SET: A						
OTHER						
Whole Effluent Toxicity, Acute See Special Condition #1	TU <sub>a</sub>	*			once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>ANNUALLY</u> ; THE FIRST REPORT IS DUE <u>JANUARY 28, 2021</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

\* Monitoring and reporting requirement only

‡ Chlorination and biocide use, see Special Condition #4.

† pH is not to be averaged. The pH is limited to the range of 6.0-9.0 pH standard units and must be continuously monitored at outfall #002. The facility may exceed the numeric effluent limitations for a total of 446 minutes per month but never more than 60 minutes at one time. The daily maximum is the measured time of the longest excursion for any one time during the month; the monthly value is a total excursion time for the month.

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (CONTINUED)**

OUTFALL #003 Water Treatment Plant		TABLE A-3 FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS				
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on <b>July 1, 2020</b> and remain in effect until expiration of the permit. Such discharges shall be controlled, limited, and monitored by the permittee as specified below:						
EFFLUENT PARAMETERS	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MINIMUM MEASUREMENT FREQUENCY	SAMPLE TYPE
LIMIT SET: UM						
PHYSICAL						
Flow	MGD	*		*	once/month	24 hr. total
CONVENTIONAL						
Chlorine, Total Residual ‡	µg/L	18 (ML50)		9 (ML50)	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
pH †	SU	6.5 to 9.0		6.5 to 9.0	once/month	grab
Total Suspended Solids	mg/L	100		30	once/month	grab
METALS						
Aluminum, Total Recoverable	µg/L	750		374	once/month	grab
NUTRIENTS						
Ammonia as N (April 1 – Sept 30)	mg/L	*		*	once/month	grab
Kjeldahl Nitrogen, Total (TKN)	mg/L	*		*	once/month	grab
Nitrate plus Nitrite	mg/L	*		*	once/month	grab
Phosphorus, Total (TP)	mg/L	*		*	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>BY THE 28<sup>TH</sup> DAY OF THE MONTH FOLLOWING DISCHARGE.</u> A REPORT IS NOT NECESSARY IF THERE WAS NO DISCHARGE. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
LIMIT SET: UA						
OTHER						
Whole Effluent Toxicity, Chronic See Special Condition #2	TU <sub>c</sub>	1.6			once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>BY THE 28<sup>TH</sup> DAY OF JANUARY FOR THE PRECEDING CALENDAR YEAR</u> <u>IF A DISCHARGE OCCURRED WITHIN THE CALENDAR YEAR.</u> THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

\* Monitoring and reporting requirement only

‡ Chlorine, Total Residual. This outfall contains a Total Residual Chlorine (TRC) limit below the minimum quantification level of the most sensitive EPA approved CLTRC methods. The Department has determined the current acceptable minimum level (ML) for total residual chlorine to be 50 µg/L when using the DPD Colorimetric Method #4500 – CL G. from Standard Methods for the Examination of Waters and Wastewater. The permittee will conduct analyses in accordance with this method, or equivalent, and report actual analytical values. Measured values greater than or equal to the minimum quantification level of 50 µg/L will be considered violations of the permit and values less than the minimum quantification level of 50 µg/L will be considered to be in compliance with the permit limitation. The minimum quantification level does not authorize the discharge of chlorine in excess of the effluent limits stated in the permit.

† pH: the facility will report the minimum and maximum values; pH is not to be averaged.

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (CONTINUED)**

OUTFALL #007 domestic and laboratory wastewater		TABLE A-4 FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS				
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on <b>July 1, 2020</b> and remain in effect until expiration of the permit. Such discharges shall be controlled, limited, and monitored by the permittee as specified below:						
EFFLUENT PARAMETERS	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MINIMUM MEASUREMENT FREQUENCY	SAMPLE TYPE
LIMIT SET: UM						
PHYSICAL						
Flow	MGD	*		*	once/week ▲	24 hr. total
CONVENTIONAL						
Biochemical Oxygen Demand, 5 day	mg/L	*	65	45	once/week ▲	grab
<i>E. coli</i> †	#/100 ml	1030	-	206	once/week ▲	grab
Oil & Grease	mg/L	15	-	10	once/week ▲	grab
pH †	SU	6.5 to 9.0	6.5 to 9.0	6.5 to 9.0	once/week ▲	grab
Total Suspended Solids	mg/L	*	110	70	once/week ▲	grab
METALS						
Chromium, Hexavalent, Dissolved *	µg/L	*		*	once/week ▲	grab
NUTRIENTS						
Ammonia as N	mg/L	*		*	once/week ▲	grab
Kjeldahl Nitrogen, Total (TKN)	mg/L	*		*	once/week ▲	grab
Nitrate plus Nitrite as N	mg/L	*		*	once/week ▲	grab
Phosphorus, Total (TP)	mg/L	*		*	once/week ▲	grab
OTHER						
Chloride	mg/L	378		188	once/week ▲	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>BY THE 28<sup>TH</sup> DAY OF THE MONTH FOLLOWING DISCHARGE.</u> A REPORT IS NOT NECESSARY IF THERE WAS NO DISCHARGE. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
LIMIT SET: UA						
OTHER						
Whole Effluent Toxicity, Chronic See Special Condition #2	TU <sub>c</sub>	1.6			once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>BY THE 28<sup>TH</sup> DAY OF JANUARY FOR THE PRECEDING CALENDAR YEAR</u> <u>IF A DISCHARGE OCCURRED WITHIN THE CALENDAR YEAR.</u> THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

\* Monitoring and reporting requirement only

† pH: the facility will report the minimum and maximum values; pH is not to be averaged.

‡ *E. coli*: final limitations and monitoring requirements are applicable only during the recreational season from April 1 through October 31. The Monthly Average Limit for *E. coli* is expressed as a geometric mean.

▲ Weekly monitoring required when discharging.

\* This permit establishes monitoring for dissolved hexavalent chromium. This permit establishes the requirement to use Standard Method 3500-Cr C-2011 or newer to ensure data submitted to the Department conforms to the most sensitive method as required by Standard Conditions Part I Section A 4 and is analyzed within the required method holding times.



**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (CONTINUED)**

PERMITTED FEATURE #009 intake and intake heater discharge	TABLE A-5 FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on <b>July 1, 2020</b> and remain in effect until expiration of the permit. Such discharges shall be controlled, limited, and monitored by the permittee as specified below:						
EFFLUENT PARAMETERS	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MINIMUM MEASUREMENT FREQUENCY	SAMPLE TYPE
LIMIT SET: M						
PHYSICAL						
Flow (intake)	MGD	*		*	daily	24 hour total
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE AUGUST 28, 2020. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
LIMIT SET: U						
PHYSICAL						
Flow (heater discharge)	MGD	*		*	once/week ▲	24 hour total
Temperature	°F	*		*	once/week ▲	measured
CONVENTIONAL						
Oil & Grease	mg/L	15		10	once/week ▲	grab
pH †	SU	6.0 to 9.0		6.0 to 9.0	once/week ▲	grab
Total Suspended Solids	mg/L	100		30	once/week ▲	grab
MONITORING REPORTS SHALL BE SUBMITTED BY THE 28 <sup>TH</sup> DAY OF THE MONTH FOLLOWING DISCHARGE; NO REPORT IS DUE IF NO HEATER DISCHARGE OCCURRED. THE FACILITY MUST SAMPLE FOR ALL APPROPRIATE PARAMETERS ON FORMS C AND D UPON DISCHARGE; SEE SPECIAL CONDITIONS.						

\* Monitoring and reporting requirement only

† pH: the facility will report the minimum and maximum values; pH is not to be averaged.

▲ Weekly monitoring required when discharging.

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (CONTINUED)**

OUTFALL #016 cooling tower bypass		TABLE A-6 FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS				
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on <b>July 1, 2020</b> and remain in effect until expiration of the permit. Such discharges shall be controlled, limited, and monitored by the permittee as specified below:						
EFFLUENT PARAMETERS	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MINIMUM MEASUREMENT FREQUENCY	SAMPLE TYPE
LIMIT SET: M						
PHYSICAL						
Flow, total	MGD	*		*	daily	24 hr. total
Flow, instantaneous	gpm	*		*	daily	instantaneous
NUTRIENTS						
Ammonia as N	mg/L	*		*	once/month	grab
Kjeldahl Nitrogen, Total (TKN)	mg/L	*		*	once/month	grab
Nitrate plus Nitrite as N	mg/L	*		*	once/month	grab
Phosphorus, Total (TP)	mg/L	*		*	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>AUGUST 28, 2020</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
LIMIT SET: Q						
PHYSICAL						
Temperature	°F	*		*	once/quarter ◇	grab
CONVENTIONAL						
Chlorine, Total Residual	µg/L	200		104	once/quarter ◇	grab
Oil & Grease	mg/L	15		10	once/quarter ◇	grab
pH †	SU	6.0 to 9.0		6.0 to 9.0	once/quarter ◇	grab
Total Suspended Solids	mg/L	100		30	once/quarter ◇	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>OCTOBER 28, 2020</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
LIMIT SET: A						
OTHER						
Whole Effluent Toxicity, Acute See Special Condition #1	TUa	*			once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>ANNUALLY</u> ; THE FIRST REPORT IS DUE <u>JANUARY 28, 2021</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

\* Monitoring and reporting requirement only

† pH: the facility will report the minimum and maximum values; pH is not to be averaged.

◇ Quarterly sampling

<b>MINIMUM QUARTERLY SAMPLING REQUIREMENTS</b>			
QUARTER	MONTHS	QUARTERLY EFFLUENT PARAMETERS	REPORT IS DUE
First	January, February, March	Sample at least once during any month of the quarter	April 28 <sup>th</sup>
Second	April, May, June	Sample at least once during any month of the quarter	July 28 <sup>th</sup>
Third	July, August, September	Sample at least once during any month of the quarter	October 28 <sup>th</sup>
Fourth	October, November, December	Sample at least once during any month of the quarter	January 28 <sup>th</sup>

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (CONTINUED)**

OUTFALL #018 Fire Water Test Discharge	TABLE A-7 FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on <b>July 1, 2020</b> and remain in effect until expiration of the permit. Such discharges shall be controlled, limited, and monitored by the permittee as specified below:						
EFFLUENT PARAMETERS	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MINIMUM MEASUREMENT FREQUENCY	SAMPLE TYPE
LIMIT SET: UM						
PHYSICAL						
Flow	MGD	*		*	once/day ♦	24 hr. total
CONVENTIONAL						
pH †	SU	6.5 to 9.0		6.5 to 9.0	once/day ♦	grab
MONITORING REPORTS SHALL BE SUBMITTED BY THE 28 <sup>TH</sup> DAY OF THE MONTH FOLLOWING DISCHARGE. A REPORT IS NOT NECESSARY IF THERE WAS NO DISCHARGE.						

OUTFALL #100 <i>combined discharge pipe</i>		TABLE A-8 FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS				
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on <b>July 1, 2020</b> and remain in effect until expiration of the permit. Such discharges shall be controlled, limited, and monitored by the permittee as specified below:						
EFFLUENT PARAMETERS	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MINIMUM MEASUREMENT FREQUENCY	SAMPLE TYPE
LIMIT SET: M						
PHYSICAL						
Flow	MGD	*		*	daily	calculated, combined total ♠
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>AUGUST 28, 2020</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

\* monitoring and reporting requirement only

‡ Chlorine, Total Residual. This outfall contains a Total Residual Chlorine (TRC) limit below the minimum quantification level of the most sensitive EPA approved CLTRC methods. The Department has determined the current acceptable minimum level (ML) for total residual chlorine to be 50 µg/L when using the DPD Colorimetric Method #4500 – CL G. from Standard Methods for the Examination of Waters and Wastewater. The permittee will conduct analyses in accordance with this method, or equivalent, and report actual analytical values. Measured values greater than or equal to the minimum quantification level of 50 µg/L will be considered violations of the permit and values less than the minimum quantification level of 50 µg/L will be considered to be in compliance with the permit limitation. The minimum quantification level does not authorize the discharge of chlorine in excess of the effluent limits stated in the permit.

† pH: the facility will report the minimum and maximum values; pH is not to be averaged.

♦ the facility shall sample at least once per day when discharging; the report is due on the month following discharge, no report is due if there was no discharge. Confirmatory samples (if obtained) taken of the tank prior to discharge shall not be reported on the DMRs.

♠ The facility shall provide a sum of all outfalls discharging to the Missouri River for the day.

**A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (CONTINUED)**

OUTFALLS #010, #011, #012, #014, #015 <i>Stormwater Only</i>		TABLE A-9 FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS				
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on <b>July 1, 2020</b> and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
EFFLUENT PARAMETERS	UNITS	FINAL LIMITATIONS		BENCH- MARKS	MONITORING REQUIREMENTS	
		DAILY MAXIMUM	QUARTERLY AVERAGE		MINIMUM MEASUREMENT FREQUENCY	SAMPLE TYPE
LIMIT SET: Q						
PHYSICAL						
Flow	MGD	*	*	-	once/quarter ◇	24 Hr Est.
CONVENTIONAL						
Chemical Oxygen Demand	mg/L	**	*	90	once/quarter ◇	grab
Oil & Grease	mg/L	**	*	10	once/quarter ◇	grab
pH †	SU	**	*	6.5 to 9.0	once/quarter ◇	grab
Total Suspended Solids	mg/L	**	*	100	once/quarter ◇	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE OCTOBER 28, 2020. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

\* Monitoring and reporting requirement only; if more than one sample was collected in the quarter, the facility shall include the average for the quarter

\*\* Monitoring and reporting requirement with benchmark. See Special Conditions for additional requirements.

◇ Quarterly sampling

MINIMUM QUARTERLY SAMPLING REQUIREMENTS			
QUARTER	MONTHS	QUARTERLY EFFLUENT PARAMETERS	REPORT IS DUE
First	January, February, March	Sample at least once during any month of the quarter	April 28 <sup>th</sup>
Second	April, May, June	Sample at least once during any month of the quarter	July 28 <sup>th</sup>
Third	July, August, September	Sample at least once during any month of the quarter	October 28 <sup>th</sup>
Fourth	October, November, December	Sample at least once during any month of the quarter	January 28 <sup>th</sup>

**B. STANDARD CONDITIONS**

In addition to specified conditions stated herein, this permit is subject to the attached Part I and Part III standard conditions dated August 1, 2014 and August 1, 2019, respectively, and hereby incorporated as though fully set forth herein.

## C. SPECIAL CONDITIONS

### 1. Acute Whole Effluent Toxicity (WET) tests shall be conducted as follows:

For outfalls #002 and #016:

- (a) Freshwater Species and Test Methods: Species and short-term test methods for estimating the acute toxicity of NPDES effluents are found in the most recent edition of *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA/821/R-02/012; Table IA, 40 CFR Part 136). The permittee shall concurrently conduct 48-hour, static, non-renewal toxicity tests with the following species:
  - The fathead minnow, *Pimephales promelas* (Acute Toxicity EPA Test Method 2000.0).
  - The daphnid, *Ceriodaphnia dubia* (Acute Toxicity EPA Test Method 2002.0).
- (b) Chemical and physical analysis of the upstream control sample and effluent sample shall occur immediately upon being received by the laboratory, prior to any manipulation of the effluent sample beyond preservation methods consistent with federal guidelines for WET testing required to stabilize the sample during shipping. Where upstream receiving water is not available or known to be toxic, other approved control water may be used.
- (c) Test conditions must meet all test acceptability criteria required by the EPA Method used in the analysis.
- (d) The laboratory shall not chemically dechlorinate the sample.
- (e) The Allowable Effluent Concentration (AEC) is 9%; the dilution series is: 2.25%, 4.5%, 9%, 18%, and 36%.
- (f) All chemical and physical analysis of the effluent sample performed in conjunction with the WET test shall be performed at the 100% effluent concentration.
- (g) The facility must submit a full laboratory report for all toxicity testing. The report must include a quantification of acute toxic units ( $TU_a = 100/LC_{50}$ ) reported according to the test methods manual chapter on report preparation and test review. The Lethal Concentration 50 Percent ( $LC_{50}$ ) is the effluent concentration causing death in 50 percent of the test organisms at a specific time.

### 2. Chronic Whole Effluent Toxicity (WET) tests shall be conducted as follows for outfalls #003 and #007:

- (a) Freshwater Species and Test Methods: Species and short-term test methods for estimating the chronic toxicity of NPDES effluents are found in the most recent edition of *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (EPA/821/R-02/013; Table IA, 40 CFR Part 136). The permittee shall concurrently conduct 7-day, static renewal toxicity tests with the following species:
  - The fathead minnow, *Pimephales promelas* (Survival and Growth Test Method 1000.0).
  - The daphnid, *Ceriodaphnia dubia* (Survival and Reproduction Test Method 1002.0).
- (b) Chemical and physical analysis of the upstream control sample and effluent sample shall occur immediately upon being received by the laboratory, prior to any manipulation of the effluent sample beyond preservation methods consistent with federal guidelines for WET testing required to stabilize the sample during shipping. Where upstream receiving water is not available or known to be toxic, other approved control water may be used.
- (c) Test conditions must meet all test acceptability criteria required by the EPA Method used in the analysis.
- (d) The laboratory shall not chemically dechlorinate the sample.
- (e) The Allowable Effluent Concentration (AEC) is 100%, the dilution series is: 100%, 50%, 25%, 12.5%, and 6.25%.
- (f) All chemical and physical analysis of the effluent sample performed in conjunction with the WET test shall be performed at the 100% effluent concentration.
- (g) The facility must submit a full laboratory report for all toxicity testing. The report must include a quantification of chronic toxic units ( $TU_c = 100/IC_{25}$ ) reported according to the *Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* chapter on report preparation and test review. The 25 percent Inhibition Effect Concentration ( $IC_{25}$ ) is the toxic or effluent concentration causing 25 percent reduction in mean young per female or in growth for the test populations.
- (h) Accelerated Testing Trigger: If the regularly scheduled chronic WET test exceeds the  $TU_c$  limit, the permittee shall conduct accelerated follow-up WET testing as prescribed in the following conditions. Results of the follow-up accelerated WET testing shall be reported in  $TU_c$ . This permit requires the following additional toxicity testing if any one test result exceeds a  $TU_c$  limit.
  - (1) A multiple dilution test shall be performed for both test species within 60 calendar days of becoming aware the regularly scheduled WET test exceeded a  $TU_c$  limit, and once every two weeks thereafter until one of the following conditions are met:
    - i. Three consecutive multiple-dilution tests are below the  $TU_c$  limit. No further tests need to be performed until next regularly scheduled test period.
    - ii. A total of three multiple-dilution tests exceed the  $TU_c$  limit.
  - (2) Follow-up tests do not negate an initial test result.

C. SPECIAL CONDITIONS (CONTINUED)

- (3) The permittee shall submit a summary of all accelerated WET test results for the test series along with complete copies of the laboratory reports as received from the laboratory within 14 calendar days of the availability of the third test exceeding a  $TU_c$  limit.
- (i) TIE/TRE Trigger: The following shall apply upon the exceedance of the  $TU_c$  limit in three accelerated follow-up WET tests. The permittee should contact the Department within 14 calendar days from availability of the test results to ascertain as to whether a TIE and/or TRE is appropriate. If the permittee does not contact the Department upon the third follow up test exceeding a  $TU_c$  limit, a toxicity identification evaluation (TIE) and toxicity reduction evaluation (TRE) are automatically triggered. The permittee shall submit a plan for conducting a TIE and TRE within 60 calendar days of the date of the automatic trigger or the Department's direction to perform either a TIE and/or TRE. The plan shall be based on EPA Methods and include a schedule for completion. This plan must be approved by the Department before the TIE or TRE is begun.
3. Outfall #001 additional requirements.
- (a) This facility shall not directly discharge wastewater from the radwaste treatment system (boron recycle system, liquid radwaste system, laundry and hot shower, and secondary liquid waste system) without use of carrier water from outfall #002 or #016. The minimal proportion to be used shall be determined on a batch basis; but no less than 3000 gpm of carrier water shall be used to discharge from outfall #001.
- (b) Steam Generator Blowdown shall be sampled upon use for parameters of concern utilizing Department's Form C and Form D. This data shall be submitted to the Department by the 28<sup>th</sup> day of the month following discharge and also submitted with the application for renewal materials due 180 days prior to permit expiration. This is a one-time requirement.
- (c) The State of Missouri's Department of Natural Resources, and any other state agency or officer designated in the State's emergency response plan, or any other plan to protect its citizens from radioactive liquid discharge from the Callaway Energy Center, shall receive within one hour of the event, notice of any unplanned or uncontrolled liquid radioactive release in accordance with 10 CFR 50.72(a) and notification of reportable events per 10 CFR 20.2203 involving off-site releases of liquid radioactive material. The Department's 24 hour hotline is 573-635-2436.
- (d) Ameren shall submit the results of the monitoring programs performed under Technical Specification 5.6.2 and the Annual Radioactive Effluent Release Report per Technical Specification 5.6.3 of the NRC operating permit, and submit the report entitled "Annual Radiological Environmental Operating Report" by May 1 of each year, for each preceding calendar year. All data or supporting information shall be available for inspection during normal working hours or may be requested for submission by Department staff if necessary.
- (e) This permit does not supersede any safety requirements implemented by the Nuclear Regulatory Commission (NRC). The facility must inform the Department as soon as practicable if the terms or conditions of this permit have been disregarded due to safety reasons.
4. Outfall #002 additional requirements.
- The technology based limitations for chlorination and biocides imposed in this permit for outfall #002 are more stringent than the ELG language found at 40 CFR 423.12(b)(8) "neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine in any one time unless the utility can demonstrate to the [state] the units in a particular location cannot operate at or below this level or chlorination". This permit protects for both the ELG language (2-hour maximum) and continuous biocide feed with dechlorination situations.
- This permit allows the facility to use biocides and chlorinated products as necessary to prevent biofouling. No product may be discharged in amounts which are toxic to aquatic life in either acute or chronic amounts. The facility has authorization to use the following compounds: chlorine dioxide (sodium chlorate, hydrogen peroxide, and sulfuric acid), bromide activated chloramine (ammonium bromide and sodium hypochlorite), monochloramine (ammonia and sodium hypochlorite), sodium bisulfite, and ferrous chloride.
- (a) Total Residual Chlorine, "Standard": The facility shall adhere to TRC limitations according to 40 CFR 423.12(b)(8) best practicable control technology when controlling for biological growth using sodium hypochlorite/bromine for less than two hours per day without using chlorine removal technologies. Standard reflects the ELG limitations.
- (b) Total Residual Chlorine, "Daily": The facility takes one grab sample daily and must also dechlorinate. The facility may use a 40 CFR 136 equivalent method for measuring TRC continuously if the technology is comparable and available. (Continuous measurements, by nature, are not absolutely continuous but occur much more frequently than once per day.) Daily monitoring will reflect the conditions at the facility when using dechlorination products. The facility shall not discharge TRC at detectable levels (above 50  $\mu\text{g/L}$ ) when using continuous feed or feeding biocide for greater than two hours per day of monochloramine, chlorine dioxide, or bromine activated chloramine and also using chlorine removal technologies as needed to comply with chlorine limitations. Continuous de-chlorination will be performed when feeding biocide at the WTP and may not be necessary to meet the TRC limitations during biocide treatment for short periods such as equipment outages. Should a detection occur, the facility shall adhere to 40 CFR 423.12(b)(8) time limited by (c) below.



C. SPECIAL CONDITIONS (CONTINUED)

- (c) The facility may not discharge detectable levels of chlorine (greater than 50 µg/L Total Residual Chlorine – TRC) for more than 120 minutes (2 hours) per day.
  - (d) When monitoring TRC via “standard” (2-hour max) application methods, the facility will report analysis not required for “daily” monitoring. When monitoring daily under continuous feed, the facility will report analysis not required for standard. If both procedures were used during the month, the facility will report both.
5. Outfall #009: the facility shall sample for all pollutants of concern upon discharge at outfall #009 and submit Forms C and D the 28<sup>th</sup> day of the month following discharge. This data will be used to determine renewal requirements and TBEL determinations; this sampling requirement will also satisfy the reporting requirement per Changes in Discharges of Toxic Pollutant under 40 CFR 122.41(1) relating to discharges from this outfall. This data may also be used for the renewal application materials and should be submitted independently upon permit renewal in addition to the initial sampling on start-up requirement.
6. Outfall #017: There shall be no discharge from this outfall to waters of the State of Missouri.
7. 316(b) Cooling Water Makeup Intake Structure (CWMIS)
- (a) Ameren is required to continue operating the makeup water intake structure to minimize impingement and entrainment.
  - (b) Ameren has installed closed cycle cooling and will maintain traveling screens with fish returns. These technologies are deemed the best technology available (BTA) per 40 CFR 125.94(c)(1) and 40 CFR 125.94(c)(5) for impingement respectively. The closed cycle cooling system has also been determined as the BTA standard for entrainment in accordance with 40 CFR 125.94(d). These BTA decisions were implemented by the Department serving as the Director in accordance with 40 CFR 125.98(b)(2).
  - (c) This facility must conduct a visual or remote inspection of the CWMIS at least weekly to comply with 40 CFR 125.96(e). Reports or certification statements of the visual inspections will be submitted with the annual status report. If deficiencies are noted, the facility shall include a description of the deficiency and steps made to correct the deficiency.
  - (d) Annual status reports shall be submitted by February 28<sup>th</sup> each year and report any take by the facility.
  - (e) 40 CFR 125.98(b)(1): “Nothing in this permit authorizes take for the purposes of a facility’s compliance with the Endangered Species Act.”
  - (f) Conditions required in this section may be re-evaluated under 40 CFR 125.94(f) upon demonstration by the permittee these conditions would interfere with the safe operation of the nuclear facility.
  - (g) This permit may be reopened and modified, or alternatively revoked and reissued to: incorporate new or modified requirements applicable to existing cooling water intake structures under Section 316(b) of the Clean Water Act. In the event it is necessary for this permit to be reopened and modified, or alternatively revoked and reissued, the permittee shall comply with any such new or modified requirements or standards applicable to existing cooling water intake structures under §316(b) of the Clean Water Act.
8. Spills, Overflows, and Other Unauthorized Discharges.
- (a) Any spill, overflow, or other discharge(s) not specifically authorized above are unauthorized discharges.
  - (b) Should an unauthorized discharge cause or permit any contaminants to discharge or enter waters of the state, the unauthorized discharge must be reported to the regional office as soon as practicable but no more than 24 hours after the discovery of the discharge. If the spill or overflow needs to be reported after normal business hours or on the weekend, the facility must call the Department’s 24 hour spill line at 573-634-2436.
  - (c) If the unauthorized discharge was from an overflow from a no-discharge wastewater basin, the report must include all records confirming operation and maintenance records documenting proper maintenance in accordance with condition (d) below.
  - (d) Permittee shall adhere to the following minimum Best Management Practices (BMPs) for no-discharge wastewater holding structures:
    - i. To prevent unauthorized discharges, the no-discharge wastewater basin must be properly operated and maintained to contain all wastewater plus run-in and direct precipitation. During normal weather conditions, the liquid level in the storage structure shall be maintained below the upper operating level, so adequate storage capacity is available for use during adverse weather periods. The liquid level in the storage structure should be lowered on a routine schedule based on the design storage period. Typically this should be accomplished prior to expected seasonal wet and winter climate periods. Maintain liquid level in the no-discharge wastewater structure at least 4 inches from the bottom of the discharge pipe, top of the basin, or the bottom of the overflow canal, whichever is lower.
    - ii. Weekly inspection of no-discharge wastewater basins shall occur. Inspection notes or checklist will be kept at the facility and made available to the Department upon request.
    - iii. The inspections will note any issues with the no-discharge structure and will record the level of liquid as indicated by the depth marker.

C. SPECIAL CONDITIONS (CONTINUED)

9. Electronic Discharge Monitoring Report (eDMR) Submission System.

- (a) Discharge Monitoring Reporting Requirements. The permittee must electronically submit compliance monitoring data via the eDMR system. Standard Conditions Part I, Section B, #7 indicates the eDMR system is currently the only Department approved reporting method for this permit.
- (b) Programmatic Reporting Requirements. All reports must be electronically submitted as an attachment to the eDMR system until such a time when the current or a new system is available to allow direct input of the data. After such a system has been made available by the Department, required data shall be directly input into the system by the next report due date
  - (1) Schedule of Compliance Progress Reports;
  - (2) Whole Effluent Toxicity (WET) Reports;
  - (3) CWA Section 316(b) Annual Reports; and
  - (4) Any additional report required by the permit excluding bypass reporting.
- (c) The following shall be submitted electronically after such a system has been made available by the Department:
  - (1) General Permit Applications/Notices of Intent to discharge (NOIs);
  - (2) Notices of Termination (NOTs);
  - (3) No Exposure Certifications (NOEs);
  - (4) Low Erosivity Waivers, and Other Waivers from Stormwater Controls (LEWs); and
  - (5) Bypass reporting, see standard conditions.
- (d) Electronic Submission: access the eDMR system via: <https://edmr.dnr.mo.gov/edmr/E2/Shared/Pages/Main/Login.aspx>
- (e) Electronic Reporting Waivers. The permittee must electronically submit compliance monitoring data and reports unless a waiver is granted by the Department in compliance with 40 CFR Part 127. The permittee may obtain an electronic reporting waiver by first submitting an eDMR Waiver Request Form: <http://dnr.mo.gov/forms/780-2692-f.pdf>. The Department will either approve or deny this electronic reporting waiver request within 120 calendar days. Only permittees with an approved waiver request may submit monitoring data and reports on paper to the Department for the period the approved electronic reporting waiver is effective.

10. Per 40 CFR 423.13(a): There shall be no discharge of polychlorinated biphenyl compounds (PCBs) such as those commonly [historically] used for transformer fluid.

11. The facility shall not discharge chemical metal cleaning wastes [40 CFR 423.13(e)] to waters of the state.

12. Per 40 CFR 423.13(d)(1): The facility shall not utilize cooling tower maintenance chemicals containing any of the 126 priority pollutants (listed in Appendix A of 40 CFR 423 and incorporated by reference including all updates) in any detectable amount with the exception of chromium and zinc. The daily maximum and monthly average limit for chromium is 200 µg/L, and the daily maximum and monthly average limit for zinc is 1000 µg/L. The facility will submit the analytical data and attach a report detailing the findings of this special condition annually (by January 28<sup>th</sup>) and report the values. The attached report must include the laboratory's detection limit of each pollutant and a copy of the quality check report included with the laboratory narrative. The facility will sample a discharge from the cooling towers during a blowdown event prior to mixing with any other effluent.

Alternatively, the facility may certify the 126 priority pollutants are not utilized in cooling tower maintenance chemicals by attaching/uploading a narrative explaining the determination by January 28<sup>th</sup> for each calendar year.

13. Substances regulated by federal Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), being transported, stored, or used for maintenance, cleaning, or repair, shall be managed accordingly. Ameren is exempt from reporting quantities above the 40 CFR 117.12 values in accordance with the Clean Water Act Section 311(a)(2) for sodium hydroxide, sodium hypochlorite, sulfuric acid, and hydrazine when being used appropriately in the water treatment process as allowed discharges under this permit.

14. River water return is permissible for the following sources: intake structure stilling basin, intake line drainage, raw water bypass, downstream river sampler, and intake river sampler. Outfalls are not established for these discharges as they are not identified as contributing pollutants to the Missouri River.

### C. SPECIAL CONDITIONS (CONTINUED)

15. Stormwater Pollution Prevention Plan (SWPPP).

The facility's SIC code or description is found in 40 CFR 122.26(b)(14) and/or 10 CSR 20-6.200(2) and hence shall implement a Stormwater Pollution Prevention Plan (SWPPP) which must be prepared and implemented upon permit effective date. The SWPPP must be kept on-site and should not be sent to the Department unless specifically requested. The SWPPP must be reviewed and updated annually or if site conditions affecting stormwater change. The permittee shall select, install, use, operate, and maintain the Best Management Practices prescribed in the SWPPP in accordance with the concepts and methods described in: *Developing Your Stormwater Pollution Prevention Plan, A Guide for Industrial Operators*, (EPA 833-B-09-002) published by the EPA in 2015 [https://www.epa.gov/sites/production/files/2015-11/documents/swppp\\_guide\\_industrial\\_2015.pdf](https://www.epa.gov/sites/production/files/2015-11/documents/swppp_guide_industrial_2015.pdf) The purpose of the SWPPP and the Best Management Practices (BMPs) listed herein is the prevention of pollution of waters of the state. A deficiency of a BMP means it was not effective at preventing pollution [644.016(17)] to waters of the state. Corrective action describes the steps the facility took to eliminate the deficiency.

The SWPPP must include:

- (a) A listing of specific contaminants and their control measures (or BMPs) and a narrative explaining how BMPs are implemented to control and minimize the amount of contaminants potentially entering stormwater.
- (b) A map with all outfalls and structural BMPs marked.
- (c) A schedule for at least once per quarter site inspections and brief written reports. The inspection report must include precipitation information for the entire period since last inspection, as well as observations and evaluations of BMP effectiveness. Throughout coverage under this permit, the facility must perform ongoing SWPPP review and revision to incorporate any site condition changes.
  - i. Operational deficiencies must be corrected within seven (7) calendar days.
  - ii. Minor structural deficiencies must be corrected within fourteen (14) calendar days.
  - iii. Major structural deficiencies (deficiencies projected to take longer than 14 days to correct) must be reported as an uploaded attachment through the eDMR system with the DMRs. The initial report shall consist of the deficiency noted, the proposed remedies, the interim or temporary remedies (including proposed timing of the placement of the interim measures), and an estimate of the timeframe needed to wholly complete the repairs or construction. If required by the Department, the permittee shall work with the regional office to determine the best course of action. The permittee should consider temporary structures to control stormwater runoff. The facility shall correct the major structural deficiency as soon as reasonably achievable.
  - iv. All actions taken to correct the deficiencies shall be included with the written report, including photographs, and kept with the SWPPP. Additionally, corrective action of major structural deficiencies shall be reported as an uploaded attachment through the eDMR system with the DMRs.
  - v. BMP failure causing discharge through an unregistered outfall is considered an illicit discharge and must be reported in accordance with Standard Conditions Part I.
  - vi. Inspection reports must be kept on site with the SWPPP and maintained for a period of five (5) years. These must be made available to Department personnel upon request. Electronic versions of the documents and photographs are acceptable.
- (d) A provision for designating an individual to be responsible for environmental matters and a provision for providing training to all personnel involved in housekeeping, material handling (including but not limited to loading and unloading), storage, and staging of all operational, maintenance, storage, and cleaning areas. Proof of training shall be submitted upon request by the Department.

16. Site-wide minimum Best Management Practices (BMPs). At a minimum, the permittee shall adhere to the following:

- (a) Prevent the spillage or loss of fluids, oil, grease, fuel, etc. from vehicle maintenance, equipment cleaning, warehouse activities, and other areas, and thereby prevent the contamination of stormwater from these substances.
- (b) Ensure adequate provisions are provided to prevent surface water intrusion into the wastewater storage basin, to divert stormwater runoff around the wastewater storage basin, and to protect embankments from erosion.
- (c) Provide collection facilities and arrange for proper disposal of waste products including but not limited to petroleum waste products, and solvents.
- (d) Store all paint, solvents, petroleum products and petroleum waste products (except fuels), and storage containers (such as drums, cans, or cartons) so these materials are not exposed to stormwater or provide other prescribed BMPs such as plastic lids and/or portable spill pans to prevent the commingling of stormwater with container contents. Commingled water may not be discharged under this permit. Provide spill prevention control, and/or management sufficient to prevent any spills of these pollutants from entering waters of the state. Any containment system used to implement this requirement shall be constructed of materials compatible with the substances contained and shall also prevent the contamination of groundwater. Spill records should be retained on-site.
- (e) Provide good housekeeping practices on the site to keep trash from entry into waters of the state.
- (f) Provide sediment and erosion control sufficient to prevent or control sediment loss off of the property.
- (g) Ensure the facilities drainage areas are free from erosion; the facility may install rip-rap or other velocity control devices to mitigate erosion.

C. SPECIAL CONDITIONS (CONTINUED)

- (h) Manhole Pump-Outs.
- Ensure all manhole pump-out discharges are free of oil or sheen prior to pumping. Oil sheen disqualifies the wastewater from discharge allowance.
  - Ensure pH is maintained between 6.0 and 9.0 SU. pH adjustment can occur if necessary prior to pump out.
  - Ensure manhole pump-outs are occurring prior to stormwater contact with galvanized surfaces to the greatest extent possible.
  - Manholes known to have had a release of wastewater or other chemicals must be evaluated individually prior to land application; the facility shall contact the Department for further direction if contaminants are present and the facility wishes to land apply the effluent. The effluent shall not be land applied without direction from the Department.
  - One qualitative sample for zinc of at least one representative manhole pump-out shall be obtained quarterly. This shall be uploaded with the applicable quarter's DMRs.
  - This permit does not authorize discharge of wastewater if wastewater is suspected within the manhole. The facility shall containerize and introduce the wastewater at the water treatment plant headworks or into the cooling tower bypass system (provided the introduction will not cause or contribute to discharges not compliant with the terms or conditions of the permit); or disposed at a permitted POTW agreeing to accept the effluent.
- (i) Fire Water Test (Fire test water does not include annual/biennial purge water as identified at outfall #018 in outfall descriptions).
- Ensure pH is maintained between 6.0 and 9.0 SU.
  - Wastewater may be containerized and introduced at the water treatment plant headworks or into the cooling tower bypass system (provided the introduction will not cause or contribute to discharges not compliant with the terms or conditions of the permit) for discharge to the Missouri River if discharge is not feasible, or disposed at a permitted POTW agreeing to accept the effluent.
- (j) Eyewash test water, shower test water, hose disconnect wastewater (<500 gallons), and air conditioner condensate discharges are authorized to discharge to the surface of the ground given the facility's acreage and soil substrate/gravel permeability. The facility must continue to disclose all non-stormwater wastewater sources to the Department with each renewal.
17. Stormwater Benchmarks. This permit stipulates pollutant benchmarks applicable to your stormwater discharges.
- The benchmarks do not constitute direct numeric effluent limitations; therefore, a benchmark exceedance alone is not a permit violation. Benchmark monitoring and visual inspections shall be used to determine the overall effectiveness of the SWPPP and to assist you in knowing when additional corrective action may be necessary to protect water quality. If a sample exceeds a benchmark concentration you must review your SWPPP and your BMPs to determine what improvements or additional controls are needed to reduce the pollutant in your stormwater discharge(s).
  - Any time a benchmark exceedance occurs, a Corrective Action Report (CAR) must be completed. A CAR is a document recording the efforts undertaken by the facility to improve BMPs to meet benchmarks in future samples. CARs must be retained with the SWPPP and be available to the Department upon request. If the efforts taken by the facility are not sufficient and subsequent exceedances of a benchmark occur, the facility must contact the Department if a benchmark value cannot be achieved. Failure to take corrective action to address a benchmark exceedance and failure to make measureable progress towards achieving the benchmarks is a permit violation.
18. Petroleum Secondary Containment.
- Before releasing water accumulated in petroleum secondary containment areas, it must be examined for hydrocarbon odor and presence of sheen to protect the general criteria found at 10 CSR 20-7.031(4).
- If odor or sheen is found, the water shall not be discharged without treatment and shall be disposed of in accordance with legally approved methods, such as being sent to an accepting wastewater treatment facility.
  - If the facility wishes to discharge the accumulated stormwater with hydrocarbon odor or presence of sheen, the water shall be treated using an appropriate removal method, which may include sending to the on-site oily waste treatment system. Following treatment and before release, the water shall be tested for oil and grease, benzene, toluene, ethylbenzene, and xylene using 40 CFR part 136 methods. All pollutant levels must be below the most protective, applicable standards for the receiving stream, found in 10 CSR 20-7.031 Table A before discharge is authorized. Records of all testing and treatment of water accumulated in secondary containment shall be available on demand to the Department. Electronic records retention is acceptable.
19. The full implementation of this operating permit, which includes implementation of any applicable schedules of compliance, shall constitute compliance with all applicable federal and state statutes and regulations in accordance with RSMo 644.051.16, and the CWA section 402(k); however, this permit may be reopened and modified, or alternatively revoked and reissued to comply with any applicable effluent standard or limitation issued or approved under Clean Water Act Sections 301(b)(2)(C) and (D), §304(b)(2), and §307(a) (2), if the effluent standard or limitation so issued or approved contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or controls any pollutant not limited in the permit. This permit

C. SPECIAL CONDITIONS (CONTINUED)

may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, termination, notice of planned changes, or anticipated non-compliance does not stay any permit condition.

20. All outfalls and permitted features must be clearly marked in the field.
21. Report no discharge when a discharge does not occur during the report period. It is a violation of this permit to report no-discharge when a discharge has occurred.
22. Changes in Discharges of Toxic Pollutant.  
In addition to the reporting requirements under 40 CFR 122.41(1), all existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Director as soon as they know or have reason to believe:
  - (a) That an 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 µg/L);
    - (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile;
    - (3) Five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and for 2-methyl-4, 6-dinitrophenol;
    - (4) One milligram per liter (1 mg/L) for antimony;
    - (5) Five (5) times the maximum concentration value reported for the pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or
    - (6) The notification level established by the Department in accordance with 40 CFR 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 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 40 CFR 122.21(g)(7).
    - (4) The level established by the Director in accordance with 40 CFR 122.44(f).
23. Reporting of Non-Detects.
  - (a) An analysis conducted by the permittee or their contracted laboratory shall be conducted in such a way the precision and accuracy of the analyzed result can be enumerated.
  - (b) The permittee shall not report a sample result as "non-detect" without also reporting the detection limit of the test or the reporting limit of the laboratory. Reporting as "non-detect" without also including the detection/reporting limit will be considered failure to report, which is a violation of this permit.
  - (c) The permittee shall report the non-detect result using the less than "<" symbol and the detection/reporting limit (e.g. <6).
  - (d) See sufficiently sensitive method requirements in Standard Conditions Part I, Section A, #4 regarding proper detection limits used for sample analysis.
  - (e) When calculating monthly averages, one-half of the minimum detection limit (MDL) should be used instead of a zero. Where all data are below the MDL, the "<MDL" shall be reported as indicated in item (C).
24. Failure to pay fees associated with this permit is a violation of the Missouri Clean Water Law (644.055 RSMo).
25. This permit does not cover land disturbance activities.
26. This permit does not authorize the placement of fill materials in flood plains, placement of solid materials into any waterway, the obstruction of stream flow, or changing the channel of a defined drainage course. The facility must contact the U.S. Army Corps of Engineers (Corps) to determine if a CWA §404 Department of Army permit is required.
27. Renewal Application Requirements.
  - (a) This facility shall submit an appropriate and complete application to the Department no less than 180 days from the expiration date listed on page 1 of the permit.
  - (b) Application materials shall include complete Form A, and Form C for all outfalls. Form B is required for outfall #007. Form D is required in addition for outfalls #001, #002, #003, #007, and #016. If the form names have changed, then the facility should ensure they are submitting the correct forms as required by regulation. Sampling for parameters on Form D is required by law for all process wastewater at this facility; see 40 CFR 122.21 Appendix D for specified pollutants according to industrial category.

C. SPECIAL CONDITIONS (CONTINUED)

- (c) The facility must sample the stormwater outfalls and provide analysis for every parameter contained in the permit for the site in accordance with 10 CSR 20-6.200(2)(C)1.E(I) and (II)
- (d) The facility may use the electronic submission system to submit the application to the Program, if available.
- (e) Outfall #100 is not required to be qualitatively sampled.
- (f) This facility must submit all corrective action reports completed for the last permit term if a benchmark exceedance occurred.
- (g) The facility shall submit all groundwater monitoring data collected over the term of the permit.
- (h) The following reports shall be completed and submitted to comply with 40 CFR 122.21 application requirements:
  - i. Source Water Physical Data Report per 40 CFR 122.21(r)(2)
  - ii. Cooling Water Intake Structure Data Report per 40 CFR 122.21(r)(3)
  - iii. Source Water Baseline Biological Characterization Data per 40 CFR 122.21(r)(4)
  - iv. Cooling Water System Data Report per 40 CFR 122.21(r)(5)
  - v. Chosen (or Continued) Method of Compliance with Impingement Mortality Standard per 40 CFR 122.21(r)(6)
  - vi. Two-year Impingement Technology Performance Optimization Study per 40 CFR 122.21(r)(6)(i)
  - vii. Operational Status per 40 CFR 122.21(r)(8)

D. NOTICE OF RIGHT TO APPEAL

If you were adversely affected by this decision, you may be entitled to pursue an appeal before the administrative hearing commission (AHC) pursuant to Sections 621.250 and 644.051.6 RSMo. To appeal, you must file a petition with the AHC within thirty days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC. Any appeal should be directed to:

Administrative Hearing Commission  
U.S. Post Office Building, Third Floor  
131 West High Street, P.O. Box 1557  
Jefferson City, MO 65102-1557  
Phone: 573-751-2422  
Fax: 573-751-5018  
Website: <https://ahc.mo.gov>



**MISSOURI DEPARTMENT OF NATURAL RESOURCES**  
**MODIFICATION STATEMENT OF BASIS FOR**  
**MO-0098001 - CALLAWAY ENERGY CENTER**

This Statement of Basis (Statement) gives pertinent information regarding modifications to the above listed operating permit. A Statement is not an enforceable part of a Missouri State Operating Permit. Changes found here supersede previous fact sheet determinations. The permit was revised as appropriate to reflect changes enumerated in this modification.

**PART I. FACILITY INFORMATION**

Much of the facility's basic information has not changed; see original permit and fact sheet. The facility description for the stormwater outfalls with basins; outfalls #012, #014, and #015 has changed. See revisions on page 4 of the permit noted as "2022 modification". The facility has authority to discharge from the old and new outfall locations for these three outfalls and should chose the appropriate location to sample for this permit based on the status of the construction activities. A sample from the old location *and* new location is not required for the purposes of this permit. Stormwater discharges associated with land disturbance activities should be addressed per the MORA19240 permit until completed.

**FACILITY MAP:**



Red markers are new outfall locations.

## **PART II. MODIFICATION RATIONALE**

This operating permit is hereby modified to reflect a change in treatment of stormwater. The facility determined that maintaining stormwater basins was ineffective at controlling pollutants in stormwater at this site. Typically stormwater basins are beneficial. However, because of the expansiveness of this site and the great distance to the facility perimeter and first classified streams, the facility has chosen to utilize vegetative buffers instead.

The storm water detention pond closure project is currently under construction at the Callaway Energy Center under Construction Permit #MORA19240. Three separate storm water ponds, as shown in the image above are being decommissioned. These three ponds were originally placed in service during plant construction in the 1980's to control stormwater runoff from various construction areas around the plant site. To reduce maintenance issues with the pond dams, a decision was made to decommission the stormwater ponds. Multiple sample studies were first completed on each pond discharge to prove that the proposed new discharge locations after closure will have no effect on the final effluent limitations. A detailed hydrologic evaluation was also completed on each pond drainage basin area, in order to restore each stormwater basin to its original pre pond alignment. As part of the closure project, each stormwater pond discharge location will be slightly re-located in order to accommodate the pre-pond alignment.

Callaway Energy Center's final effluent limitations on each of the three stormwater ponds are currently set as benchmarks, with sampling occurring once per quarter. Ameren completed sampling studies in early 2021 and these studies concluded a reduction in pollutant discharge at the newly proposed discharge locations is lower than the monitoring results at the current discharge locations. Because of these findings the Department will not be changing the sampling schedule or benchmark limitations at this time but future permit decisions may differ.

## **PART III. ADMINISTRATIVE REQUIREMENTS**

On the basis of preliminary staff review, and utilizing current applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue this permit subject to specified effluent limitations, schedules, and special conditions. The changes contained herein require a public notice comment period per 10 CSR 20-6.020 because this is a change in facility description. The proposed determinations are tentative pending public comment.

### **CONTINUING AUTHORITY:**

Pursuant to 10 CSR 20-6.010(2)(A) and (E), the Department has received the appropriate continuing authority authorized signature from the facility. Pursuant to 10 CSR 20-6.010(2)(B)4, this facility is a Level 4 Authority.

✓ Pursuant to 10 CSR 20-6.010(2)(D), the facility demonstrated the closest collection system was greater than 2000 feet from the property line per 10 CSR 20-6.010(2)(C)3.

### **PUBLIC NOTICE:**

The Department shall give public notice that a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in and water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing. The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit. For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

✓ The Public Notice period for this operating permit is tentatively scheduled to begin in February 2022.

**DATE OF FACT SHEET:** JANUARY 20, 2022

### **COMPLETED BY:**

PAM HACKLER, ENVIRONMENTAL SCIENTIST  
MISSOURI DEPARTMENT OF NATURAL RESOURCES  
WATER PROTECTION PROGRAM  
OPERATING PERMITS SECTION - INDUSTRIAL UNIT  
(573) 526-3386  
[pam.hackler@dnr.mo.gov](mailto:pam.hackler@dnr.mo.gov)

**MISSOURI DEPARTMENT OF NATURAL RESOURCES**  
**FACT SHEET**  
**FOR THE PURPOSE OF RENEWAL**  
**OF**  
**MO-0098001**  
**AMEREN MISSOURI – CALLAWAY ENERGY CENTER**

The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollutant Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of stormwater from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified for less.

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)(A)2.] a factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (MSOP or operating permit) listed below. A factsheet is not an enforceable part of an operating permit.

**PART I. FACILITY INFORMATION**

Facility Type:	Industrial: Major, Primary, Categorical; >1 MGD
SIC Code(s):	4911
NAICS Code(s):	221113
Application Date:	12/31/2020
Modification Date:	03/01/2017 (for biocide use increase approval)
Expiration Date:	06/30/2020
Last Inspection:	06/27/2019 (NRC inspection)

**FACILITY DESCRIPTION:**

This facility is a steam electric power plant using nuclear fuel. The facility is located between Missouri Route CC and Callaway County Roads 428, 448, and 459, about 10 to 14 miles southeast of Fulton, and about five miles north of the Missouri River. The facility is surrounded by the Reform Conservation Area. According to the Missouri Department of Conservation (MDC) website, the Reform area was purchased by Ameren, with the majority of the area leased to the MDC to provide recreational opportunities, including hiking, nature study, hunting, and fishing to Missouri citizens. The MDC website indicates the Reform Conservation Area is a 6,759-acre public use area with a 512-acre, centrally-located parcel withheld from public use (and surrounded by a fence) for the nuclear power plant. Additionally, the conservation area has four fishable ponds (15.5 acres), intermittent streams, and a permanent stream (Logan Creek). According to the Callaway Energy Center's visitor guide, Ameren Missouri owns 7,200 acres of land at the site, 6,300 of which are administered by the MDC as the Reform Conservation Area; land application of wastewater may occur on these areas to assist during droughts.

Callaway Energy Center (CEC) is a baseload, single-unit nuclear generating facility. CEC draws makeup water for its closed-cycle cooling water system at its shoreline cooling water makeup intake structure (CWMIS) at river mile (RM) 115.4. CEC consists of a pressurized water reactor, four steam generators, one steam turbine generator, and a closed-cycle heat dissipation system. The heat dissipation system consists of a 555 foot (ft) high hyperbolic natural draft cooling tower; the CWMIS; a main condenser; and a cooling tower basin and blowdown discharge pipeline. The system recirculates 530,000 gallons per minute (gpm) of water through the natural draft tower to remove waste heat during normal operations.

The charter number for the continuing authority for this facility is 00040441; this number was verified by the permit writer using sos.mo.gov on 1/27/2020 to be associated with the facility and precisely matches the continuing authority reported by the facility on the application. In accordance with 40 CFR 122.21(f)(6), the permittee reported other permits currently held by this facility. This facility has the following environmental permits:

- United States Nuclear Regulatory Commission (NRC) Operating License: Issued by NRC, License No. NPF-30, expires 10/18/2044; <https://www.nrc.gov/info-finder/reactors/call.html>
- Hazardous Waste Generation and Mixed Waste: Federal: MOD000687392; Missouri: 003518
- Air Operating Permit: Permit Number OP2015-016, expires April 03, 2020, issued by the Department



The Atomic Energy Act (AEA) established the Atomic Energy Commission (AEC) to promote the "utilization of atomic energy for peaceful purposes to the maximum extent consistent with the common defense and security and with the health and safety of the public." Since the abolition of the AEC, much of the AEA has been carried out by the [Nuclear Regulatory Commission](#) and the [U.S. Department of Energy](#). When EPA was formed, however, the AEC's authority to issue generally applicable environmental radiation standards was transferred to EPA. Other federal and state organizations must follow these standards when developing requirements for their areas of radiation protection. This permit does not supersede any safety requirements established for this facility by the NRC. It is the permittee's responsibility to inform the Department regarding any permit deviations as directed by the NRC.

**PERMITTED FEATURES TABLE:**

OUTFALL	AVERAGE FLOW	DESIGN FLOW	TREATMENT LEVEL	EFFLUENT TYPE
#001	0.02 MGD 0.001 0.0002 0.0013 0.0002 0.008 0.0093 0.0	0.19 MGD total all flows	none	radwaste treatment system, intermittent boron recycle equipment drains primary floor drains laundry/hot shower polisher regen waste secondary floor drains steam generator blowdown
#002	3.7 MGD	14.4 MGD	none	cooling tower blowdown
#003	0.36 MGD 0.33 0.004 0.023 0.0072	1.6 MGD total all flows	sedimentation floculation filtration separation neutralization	water treatment plant wastewater (has not discharged for 30 years) clarifier blowdown carbon filter backwash oily waste makeup demin plant waste
#007	0.018 MGD	0.05 MGD	sedimentation, recycled	domestic wastewater, recycled into head of water treatment plant (has not discharged for 10+ years)
#009	none	none	neutralization	intake electric heater blowdown, intermittent, only will be used under extremely cold conditions
#010	dependent on precipitation	n/a	BMPs	stormwater, north-central of plant, 208 acres
#011	dependent on precipitation	n/a	BMPs	stormwater, north-east of plant, 425 acres
#012	dependent on precipitation	n/a	BMPs	stormwater, south of plant, 87 acres
#014	dependent on precipitation	n/a	BMPs	stormwater, north-west of plant, 100 acres
#015	dependent on precipitation	n/a	BMPs	stormwater, north-central of plant, 60 acres
#016	2.88 MGD	14.4 MGD	discharge	cooling tower bypass, intermittent
#017	no-discharge	no-discharge	no-discharge	ultimate heat sink
#018	0 MGD	0.8 MGD	time-controlled dechlorination	fire protection test water; about one discharge per year
#100	6.978 MGD	30.64 MGD	discharge	combined discharge point identified for outfalls #001, #002, and #016; flows (new 2020 renewal)

**OUTFALL #001: RADWASTE TREATMENT SYSTEM**

This system serves to collect, process, store, recycle, and dispose of liquid radioactive waste generated at Callaway Energy Center and is discharged approximately weekly although more frequent discharges are permissible. Outfall #001 is the only outfall with the possibility to contain radioactive parameters. The application showed all non-detects for alpha, beta, and radium. The definition of pollutant per 40 CFR 122.2 includes radioactive materials except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq. Radioactive materials covered by the Atomic Energy Act are those encompassed in its definition of source, byproduct, or special nuclear materials. Examples of materials not covered include radium and accelerator-produced isotopes. See *Train v. Colorado Public Interest Research Group, Inc.*, 426 U.S. 1 (1976).

It should be noted the radwaste treatment system is specifically designed for flexibility to achieve Nuclear Regulatory Commission (NRC) limitations. Actual treatment for any given batch of wastewater is dictated by the following criteria:

- The level of radiological contamination and the corresponding NRC mandated discharge criteria
- The NPDES permit discharge limitations
- The most effective waste treatment scheme that will give the smallest volume of solid radwaste.
- Overall waste stream management - processing and holdup rates, volumes of other waste streams requiring treatment or storage, etc.
- The need, feasibility, and economics of the recycle versus discharge options.

The **Boron Recycle System** receives reactor coolant for the purpose of processing this waste stream for discharge. Boric acid is used as a neutron absorber in the primary system. The boron concentration can vary substantially in outfall #001 based on plant operation. Also the ion exchange resin utilized in the radwaste treatment system can become rapidly saturated with boron allowing boron to pass through the treatment demineralizers. Therefore, processing of liquid radwaste by demineralization could result in up to 1000 mg/L of boron being discharged in Outfall 001. This has been noted in past NPDES Permit Reapplications for Callaway Energy Center. Although boron concentration in this outfall may reach up to 1000 mg/L in the Discharge Monitor Tank (sample point prior to discharge), this waste stream is routed to the plant discharge line where it mixes with a minimal flow of 3,000 gpm as required by the plant's Nuclear Regulatory Commission operating license. However, with administrative controls, the dilution flow is maintained greater than 5,000 gpm allowing the final effluent at the point of discharge into the Missouri River to contain less than 50 mg/L of boron, well below the water quality standard of 2 mg/L for irrigation sources.

The **Liquid Radwaste System** collects and processes floor and equipment drains from the containment, auxiliary building, fuel building, and radwaste buildings during normal operation. However, during outages, non-radioactive drainage from equipment in these buildings may be treated by the Oily Waste System.

The **Laundry and Hot Shower** system collects waste generated from washing radioactively contaminated protective gear and clothing and personnel decontamination shower wastewater. These wastes are then transferred to the liquid radwaste system for treatment.

The **Secondary Liquid Waste** system is used to process condensate demineralizer regeneration wastes and potentially radioactive liquid waste collected from the turbine building. The condensate demineralizer regeneration waste is divided into two waste streams; High TDS waste from the acid and caustic rinses used when chemically regenerating spent resin, and low TDS waste which results from the initial back-flushing of the un-regenerated resin and the final rinsing of the regenerated resin to remove acid and caustic.

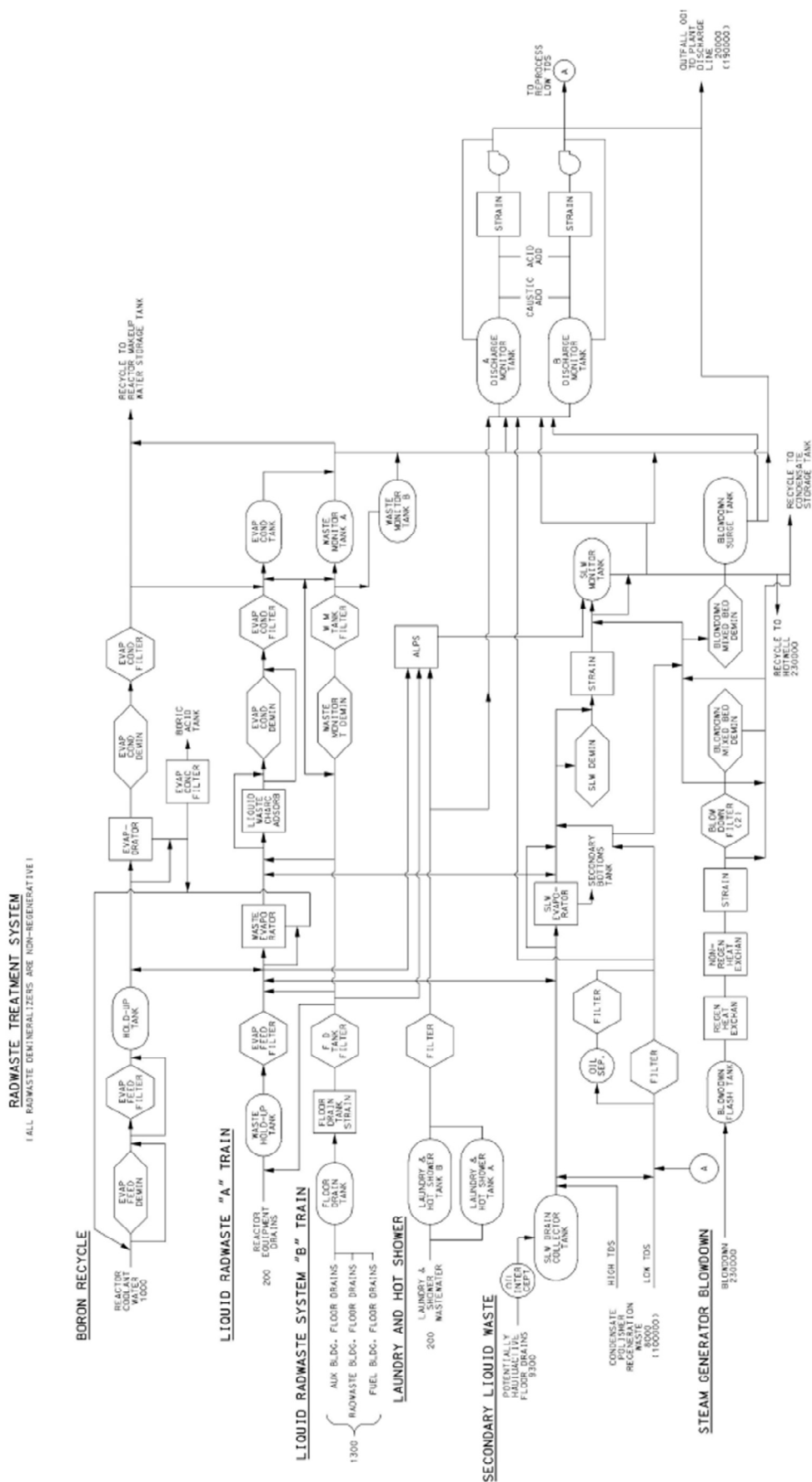
**Steam Generator Blowdown** is normally recycled to the main condenser for reuse in the secondary cycle. Provisions also exist to discharge the treated blowdown via outfall #001, if necessary, although this has not been done in the last thirty years.

The following wastewater treatment systems are used as required to treat this waste stream for recycle or discharge in compliance with NRC requirements and are also available as auxiliary or backup treatment systems to treat this discharge for compliance with NPDES permit limitations: Evaporation and/or Mixing and/or Filtration and/or Carbon Absorption and/or Ion Exchange and/or Neutralization and/or Reuse/Recycle or treated Effluent. All processing in the Radwaste Treatment System is done on a batch basis except steam generator blowdown. After monitoring for radioactive content, release rates are controlled administratively to ensure radioactive discharge criteria are met.

**ALPS - Advanced Liquid Processing System** is a permanently installed vendor provided skid used for treatment of liquid radioactive waste. This skid consists of six vessels and a filter housing. These components may contain various resin mixtures, charcoal adsorption media and/or filter media to provide optimum treatment for the specific wastewater being processed.

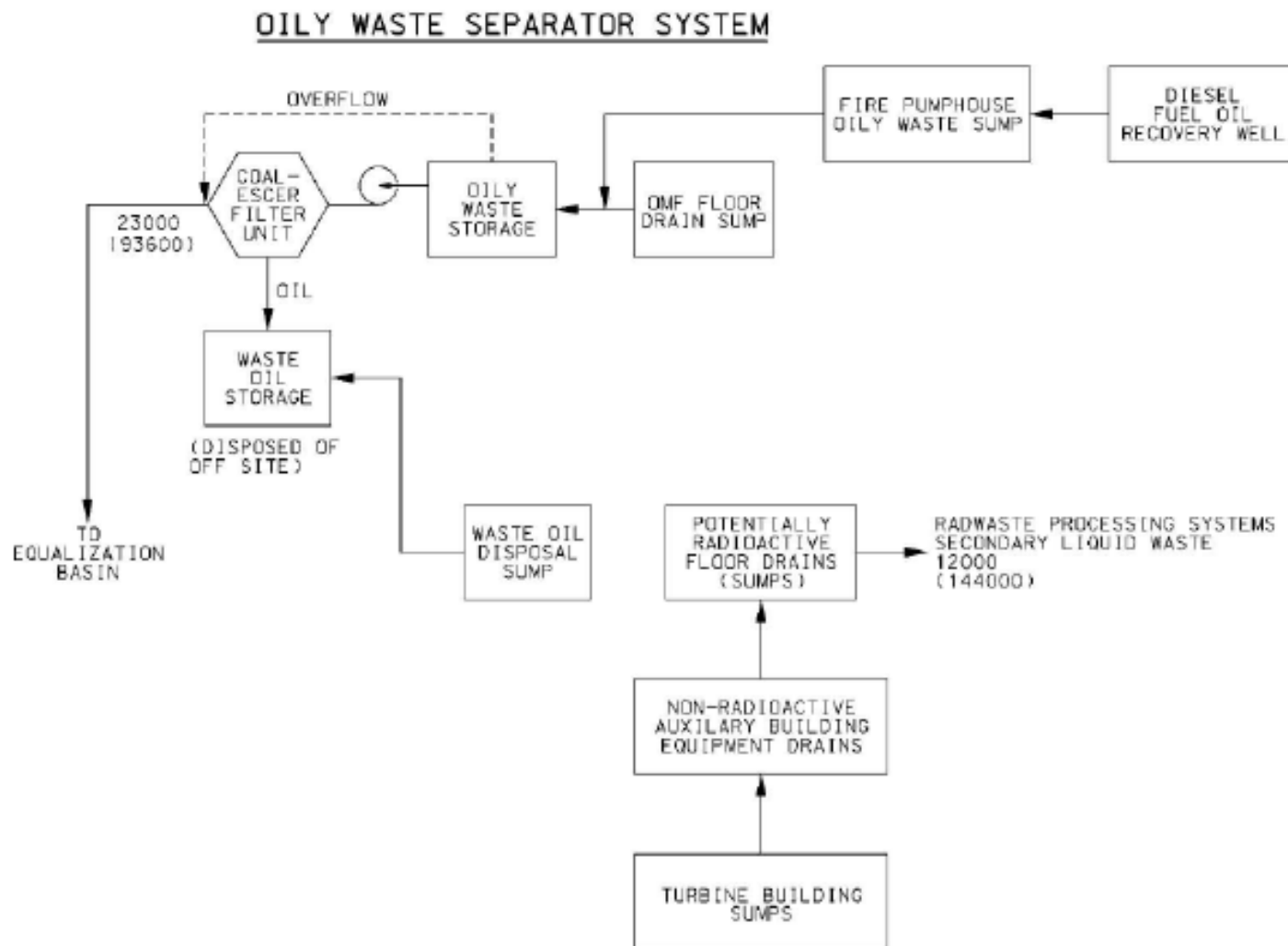
The **Oily Waste Processing System** receives effluent from an oil recovery well used to remediate a historic on-site release. During plant outages, it is necessary to drain many systems for inspections and maintenance. In order to ensure this water is of the same quality as water discharged during operation, some additional/alternate monitoring is performed. When the cooling tower basin, and/or associated lines (between the basin and the power block) are drained, a single grab sample is obtained and analyzed to verify compliance with outfall #002 permit limits prior to discharge. This alternate monitoring will be performed since continuous monitoring is not possible at all times during the draining of these systems. Various non-radioactive systems in the Auxiliary Building are drained in the past to floor drains in the Auxiliary Building to allow for inspection and maintenance. The floor drains from the Auxiliary Building are routed to the Radwaste System for processing and treatment. Since it is not necessary to process these non-radioactive liquid wastes through the Radwaste System, at times Ameren diverts these non-radioactive drains to the Oily Waste Processing System for treatment prior to being recycled. Recycling of this water also results in trace amounts of chemical in outfalls #002, #003, and #016.

### RTS FLOW DIAGRAM:





## OILY WASTE PROCESSING SYSTEM:



### OUTFALL #002: COOLING TOWER BLOWDOWN

A cooling tower is utilized to dissipate excess heat to the atmosphere from the Circulating and Service Water Systems. Outfall #002 is designed as the cooling tower blowdown discharge. Slowdown from the cooling tower is necessary to maintain dissolved solids concentration in the recirculating water within acceptable operating limits. The facility discharges only blowdown, but this system recycles up to 550,000 gallons per minute for cooling.

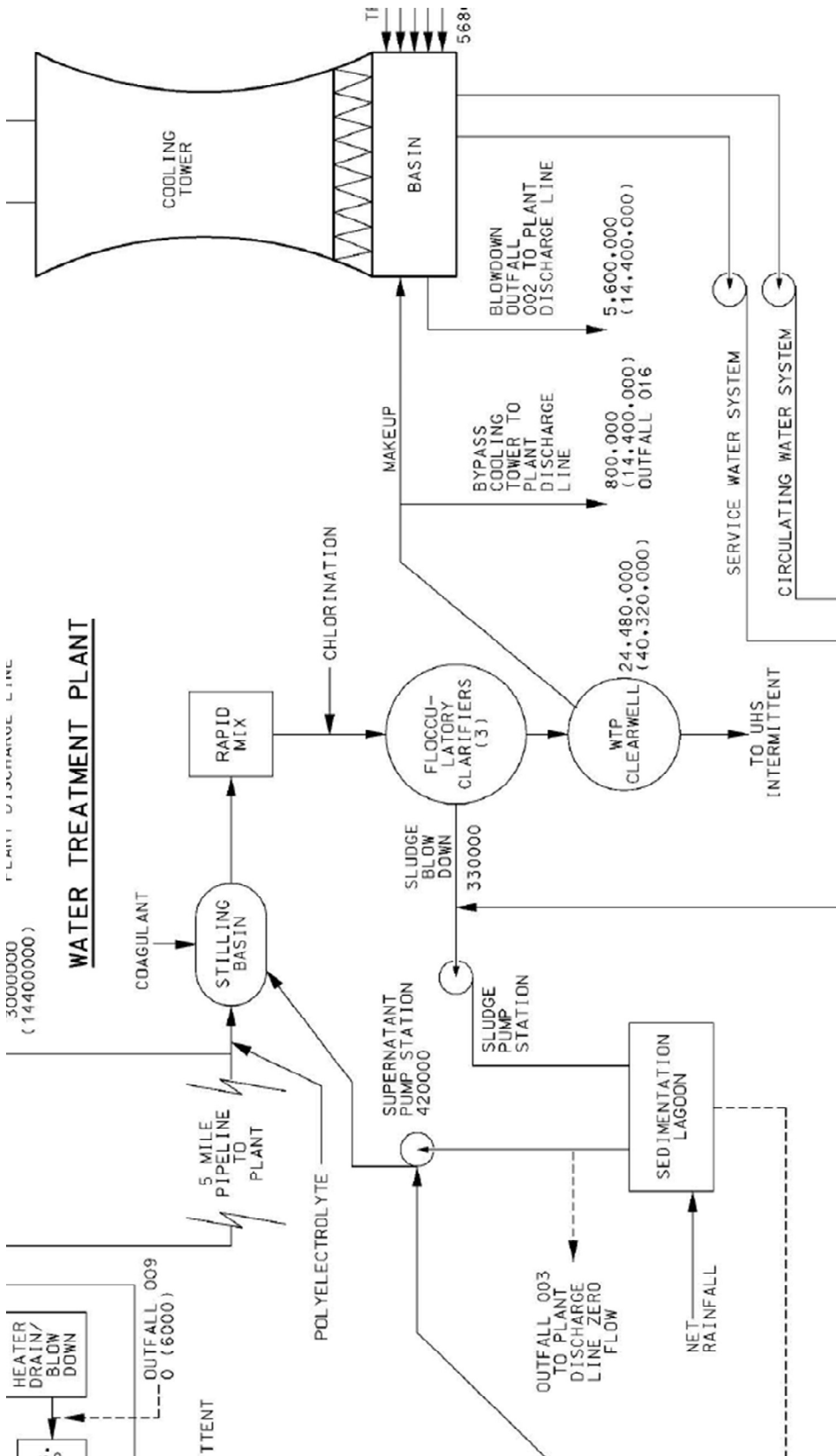
### OUTFALL #003: WATER TREATMENT PLANT WASTES

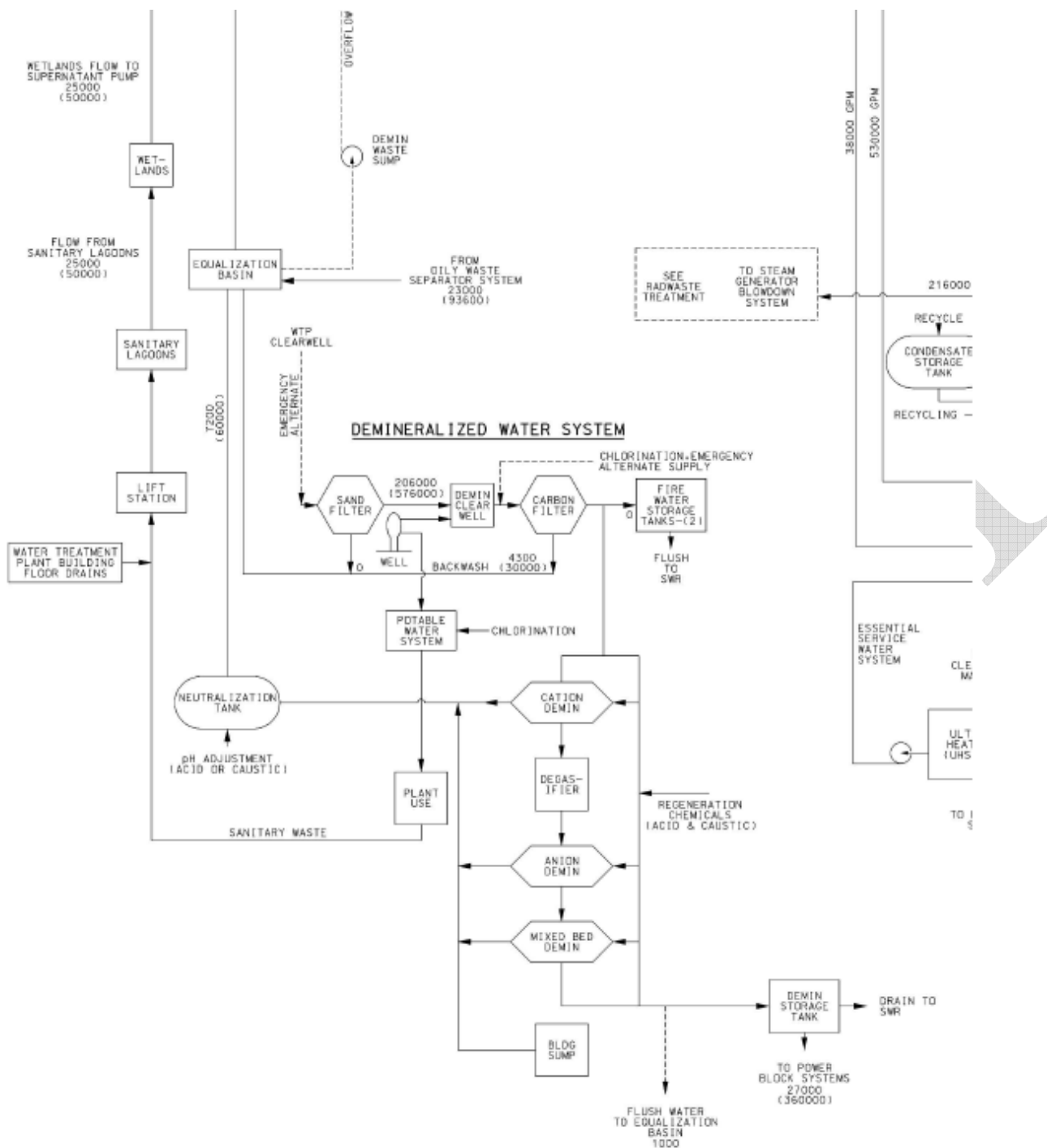
The water treatment plant (WTP) supplies clarified river water for cooling tower makeup and other plant cooling water systems. The suspended material removed from the river water is drawn from the bottom of the clarifiers as sludge. This sludge is routed through a sedimentation lagoon for solids removal. A single sedimentation lagoon is utilized; sedimentation lagoon #5 was constructed in the fall of 2016. Demineralizer system waste streams and oil separator discharges are also routed to sedimentation lagoon #5. Sedimentation lagoon #5 receives water from the demineralizer waste sump with this flow cascading to lagoon #6. The demineralizer system waste stream (previously a separate discharge point, Outfall 004, which was eliminated during previous permitting) consists of wastes generated from resin regeneration, sand and carbon filter backwash, miscellaneous wastes from floor drainage, and wet well overflows. Finally, this lagoon also receives effluent from the Oily Waste Processing System (which also receives effluent from an oil recovery well used to remediate a historic on-site release).

The supernatant from the sedimentation lagoon is designated as outfall #003. Outfall #003 has been recycled for more than 20 years by routing it back to the head of the water treatment plant via a supernatant pump station and has not discharged in this time. Sludge is maintained in the basins.

The facility has a three-cell sequential system (A through C) and a 6 lagoon/wetland treatment system as shown below; lagoons 1 and 2 were converted to wetlands. The facility has disclosed this system is used to provide polishing treatment for the domestic wastewater effluent. The first and second lagoons were filling then were converted to constructed wetlands and are currently used for polishing domestic wastewater (outfall #007) as the last treatment stage. Sedimentation lagoons #3 and #4 are approaching full therefore the

fifth and sixth lagoons were constructed in 2015. Cells A through C are used for decanting water treatment plant solids in addition to the clarifiers located to the north of the lagoons.

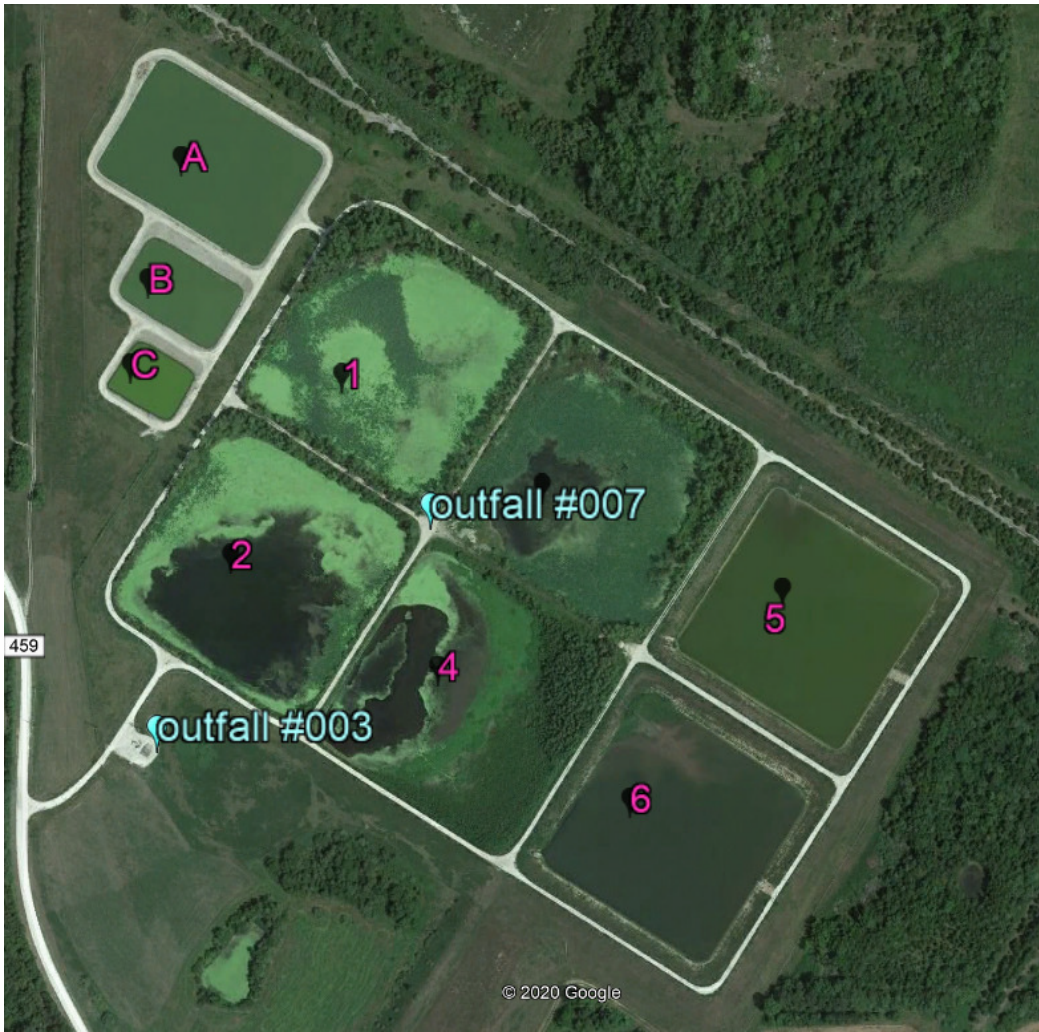




#### OUTFALL #007: DOMESTIC (SANITARY) AND LABORATORY WASTEWATER TREATMENT LAGOONS

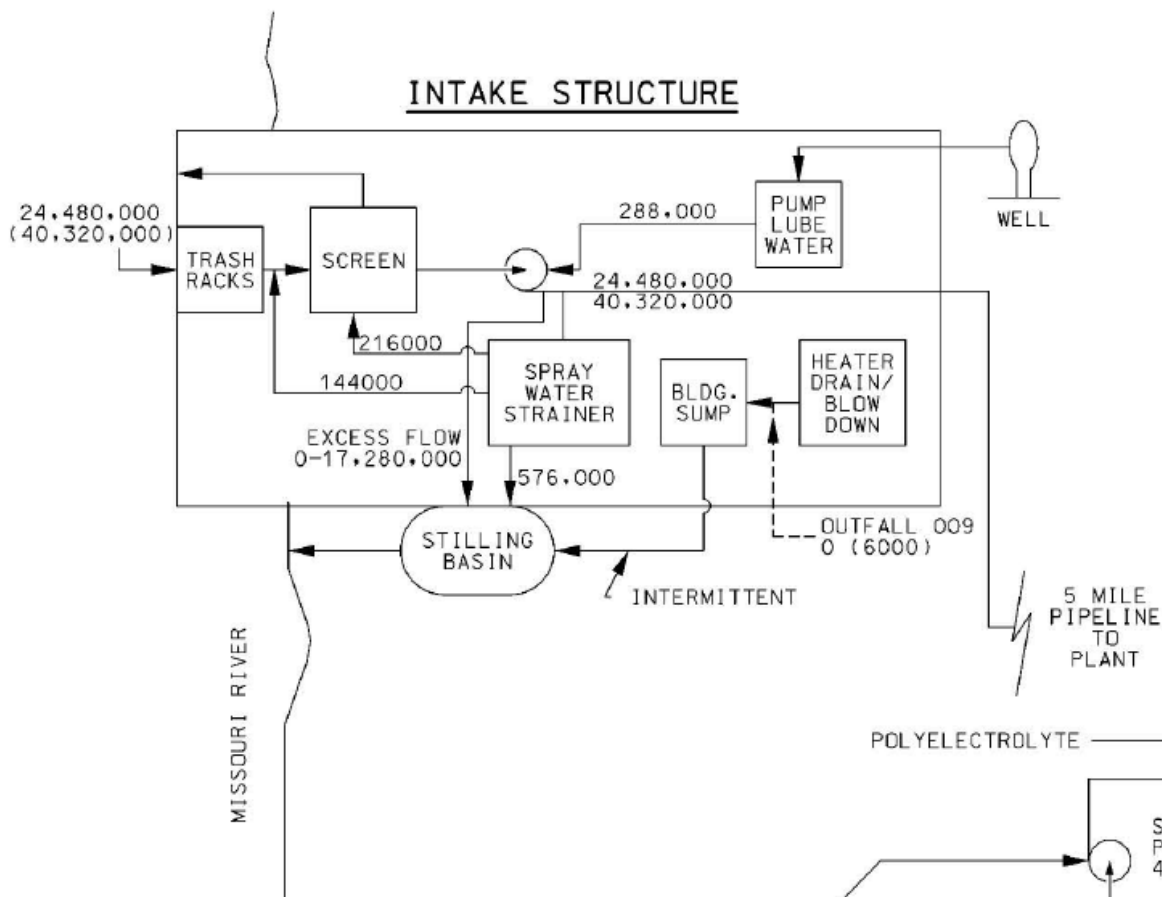
Outfall #007 is domestic and laboratory wastewater treatment system discharge. Primary treatment is provided in a conventional three-cell stabilization pond. Effluent from the final cell is routed (in series) to two wetland basins. Both are "artificial" (constructed) wetlands created by conversion of filled WTP (sludge) sedimentation lagoons.

The supernatant from the third stabilization pond is designated as outfall #007 which is typically recycled and does not discharge. The effluent then flows through two constructed wetlands (labeled #1 and 2). The connection from discharge of the final wetland to the supernatant pump station was made in conjunction with the construction of an additional WTP sedimentation lagoon (as described in a previous NPDES Permit reapplication and in the construction permit application). The stabilization ponds are recycled by routing the wastewater back to the head of the water treatment plant (outfall #003) via the WTP supernatant pump station and the Department has determined recycling is the best technology available for this waste stream.



#### OUTFALL #009: INTAKE HEATER BLOWDOWN

The river intake structure contains two recirculating electric heaters, which are used to prevent ice formation on the intake bar screen during the winter months. Outfall #009 consists of discharges from the infrequent blowdown or drainage of these boilers. Ameren has not discharged from this outfall in the past thirty years. Utilizing the intake heater is not a requirement of this permit. The boilers are currently kept in a dry lay-up condition. This outfall is also designated as the intake for the facility for makeup cooling water. Monitoring of the flow for the makeup water is implemented.



#### OUTFALL #010: STORMWATER RUNOFF SETTLING POND

The drainage area for the outfall #010 settling pond encompasses a total of 108 acres. Only 20% of the drainage area consists of impervious plant site area. These areas include the cooling water chemical control building, the quality control building, the former Unit #2 area and an area of the plant west of the radwaste building. The remaining drainage area consists of grassy areas within the plant boundary and areas leased to the Missouri Department of Conservation (MDC). The pond has a retention time greater than 24 hours. Two 48-inch square overflow boxes are located at the north side of the settling pond. Flow enters the overflow boxes and goes under the earthen pond dam to the actual discharge/sampling location. Metal louvers have been installed on the top opening of the concrete overflow box to prevent large debris from entering stormwater discharge.

#### OUTFALL #011: STORMWATER RUNOFF SETTLING POND

The drainage area for outfall #011 settling pond encompasses a total of 425 acres. Only 2% of the drainage area consists of the impervious area on the plant site. These areas include the water treatment plant, radwaste building, operation support facility, demineralizer potable water building and the circulating and service water pump houses. The remaining drainage area consists of grassy areas, excavation surplus storage, and areas leased to the MDC. The pond has a retention time of less than 24 hours. Two 48-inch square overflow boxes are located on the north side of the settling pond. Flow enters these overflow boxes and goes under the earthen pond dam to the actual discharge/sampling location. Metal louvers have been installed on the top opening of the concrete overflow box to prevent large debris from entering the stormwater discharge.

#### OUTFALL #012: STORMWATER RUNOFF SETTLING POND

The drainage area for outfall #012 settling pond encompasses a total of 87 acres. Approximately 25% of the total drainage area consists of impervious area on the plant site. This outfall collects storm water runoff from most of the plant area including the parking lots, office buildings, part of the switchyard, the turbine building, the outage maintenance facility and the Stores I building. The remaining areas consist of grassy areas. This outfall also contains the discharge from the nearby basin formerly identified as outfall #013. The outfall #012 pond has a retention time of less than 24 hours, but additional settling occurs in the pond formerly known as outfall #013. A concrete spillway has been constructed at the south side of the settling pond where the actual sampling point is located.



#### OUTFALL #014: STORMWATER RUNOFF SETTLING POND

The drainage area for the outfall #014 settling pond encompasses a total of 100 acres. Only 4% of the drainage area consists of impervious areas on the plant site. These areas include half of the construction parking lot, the Stores II building and the maintenance shop annex. The remaining drainage area consists of grassy areas and the land leased to the MDC. The pond has a retention time of less than 24 hours. A concrete spillway has been constructed on the north side of the pond where the actual sampling point is located.

#### OUTFALL #015: STORMWATER RUNOFF SETTLING POND

The drainage area for the outfall #015 settling pond encompasses a total of 60 acres. Only one percent of the drainage area consists of impervious areas, which are paved roadways. The remaining area consists of grassy areas and land leased to the MDC. The pond has a retention time greater than 24 hours. A concrete spillway has been constructed on the north side of the pond where the actual sampling point is located. The MDC uses a minor portion of the leased land for farming and the remaining land is left in its native state for wildlife habitat.

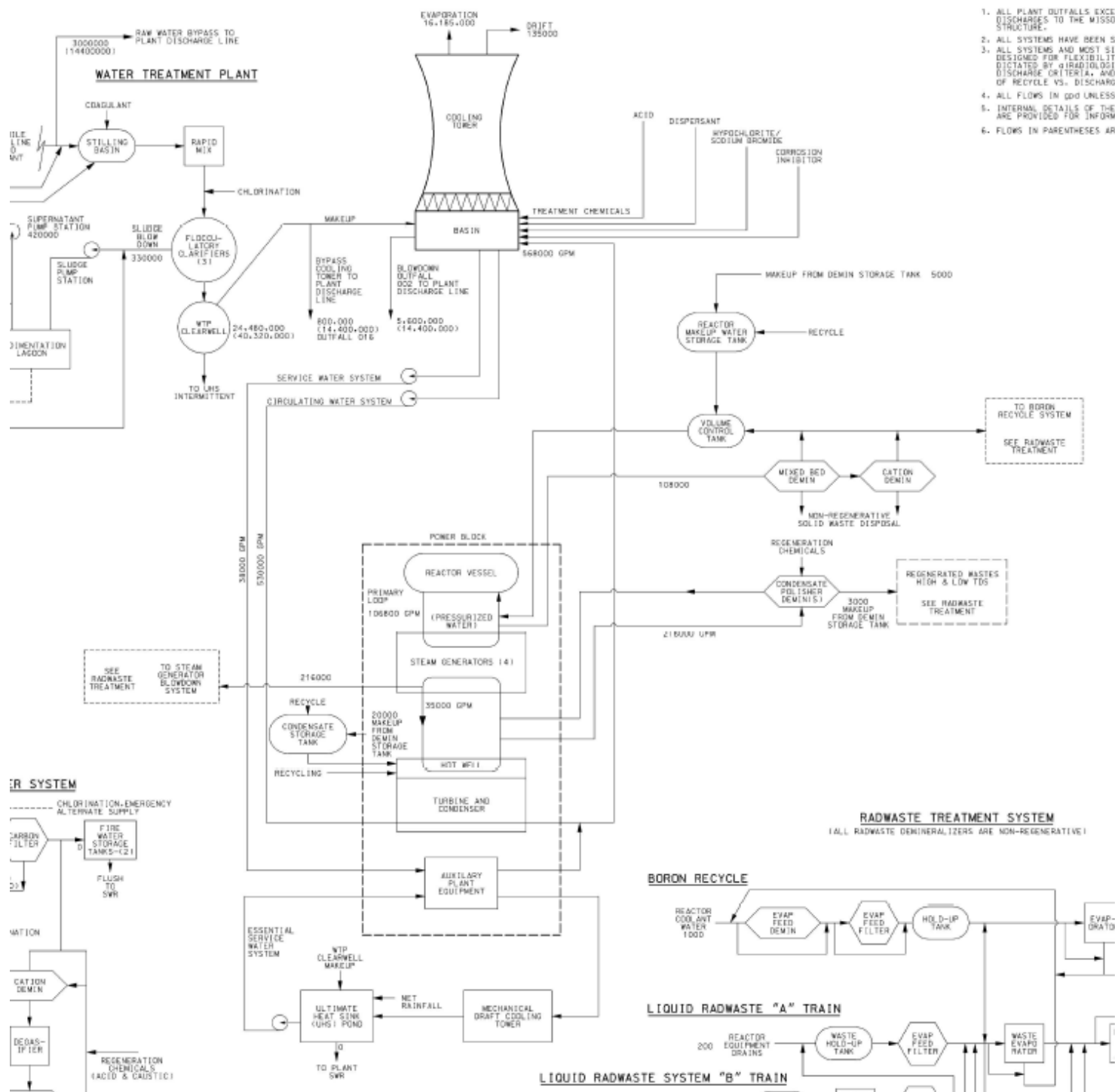
#### OUTFALL #016: COOLING TOWER BYPASS

The facility has requested one major change in the permit for outfall #016 from the previous permit conditions. Outfall #016 was moved from the eastern-most settling basin near the water treatment plant to a location near the pumps for the cooling water (VDB1140). This change was made due to piping constraints and the inability to effectively bypass or sequester the cooling tower during chemical treatment. In the past when the cooling tower was isolated, the service water piping was cutoff thereby creating down time for the service water line. Upon this change, the facility can continue to operate the service water and other systems and continue to bypass the cooling towers. The facility noted: "In 2017, Callaway Energy Center implemented a change in the addition of biocides to the Cooling Water System, for greater microbiological control. The new treatment scheme allows continual addition of biocides, which are subsequently dechlorinated prior to discharge. The NPDES permit modification issued in 2017 restricted discharges from Cooling Tower Bypass (Outfall #016) while adding the new continuous biocide due to the inability to sample Outfall 016 downstream of the dechlorination point. After the current permit was issued Callaway installed a new sample point downstream of the dechlorination point. The sampling location allows CEC to collect a representative sample of either Outfall #016 or Outfall #002 from a common sample valve (VDB1140) Callaway Energy Center requests a change in the re-issued NPDES permit to state plant personnel may operate Cooling Tower Bypass with the continuous biocide system in service and verify permit compliance by sampling outfall #016 from either VDB1140 or Manhole 86-2 when outfall #002 is isolated. After discussions and consent from Missouri DNR, a 1 hour pilot project was effectively carried out on November 13th, 2019 to show TRC requirement compliance per the current NPDES permit. The pilot project consisted of sampling at VDB1140 with cooling tower bypass open and cooling tower blowdown isolated. Ameren personnel believes sample point VDB1140, with cooling tower bypass open and Cooling Tower Slowdown isolated is a viable sample location for outfall #016." At this renewal, the sample point for outfall #016 was moved to this location. A special condition alleviates the federal requirement of a maximal 2 hour chlorination regime due to dechlorination being implemented in the treatment train.

Chlorine dioxide is generated on-site at the water treatment plant by the reaction of sodium chlorate and hydrogen peroxide with sulfuric acid. Chlorine dioxide is fed continuously at the water treatment plant to achieve a target concentration of 0.5 to 1.0 µg/L at the clearwell. After reacting in the service water, circulating water systems, and in the cooling tower, the remaining byproduct chlorite will be consumed by feeding sodium bisulfite or ferrous chloride to the screen wash basin. This ensures Callaway meets the NPDES permitting requirements for discharges of chlorine byproducts.

Ammonium bromide (Fuzzicide Solution) is utilized as a biocide for cooling water treatment systems. Ammonium bromide is combined with sodium hypochlorite (1:2; AMBr:HOCl) to convert bromide activated chloramine. The combination is expected to be fed intermittently (once per hour or twice per day) at the water treatment plant.

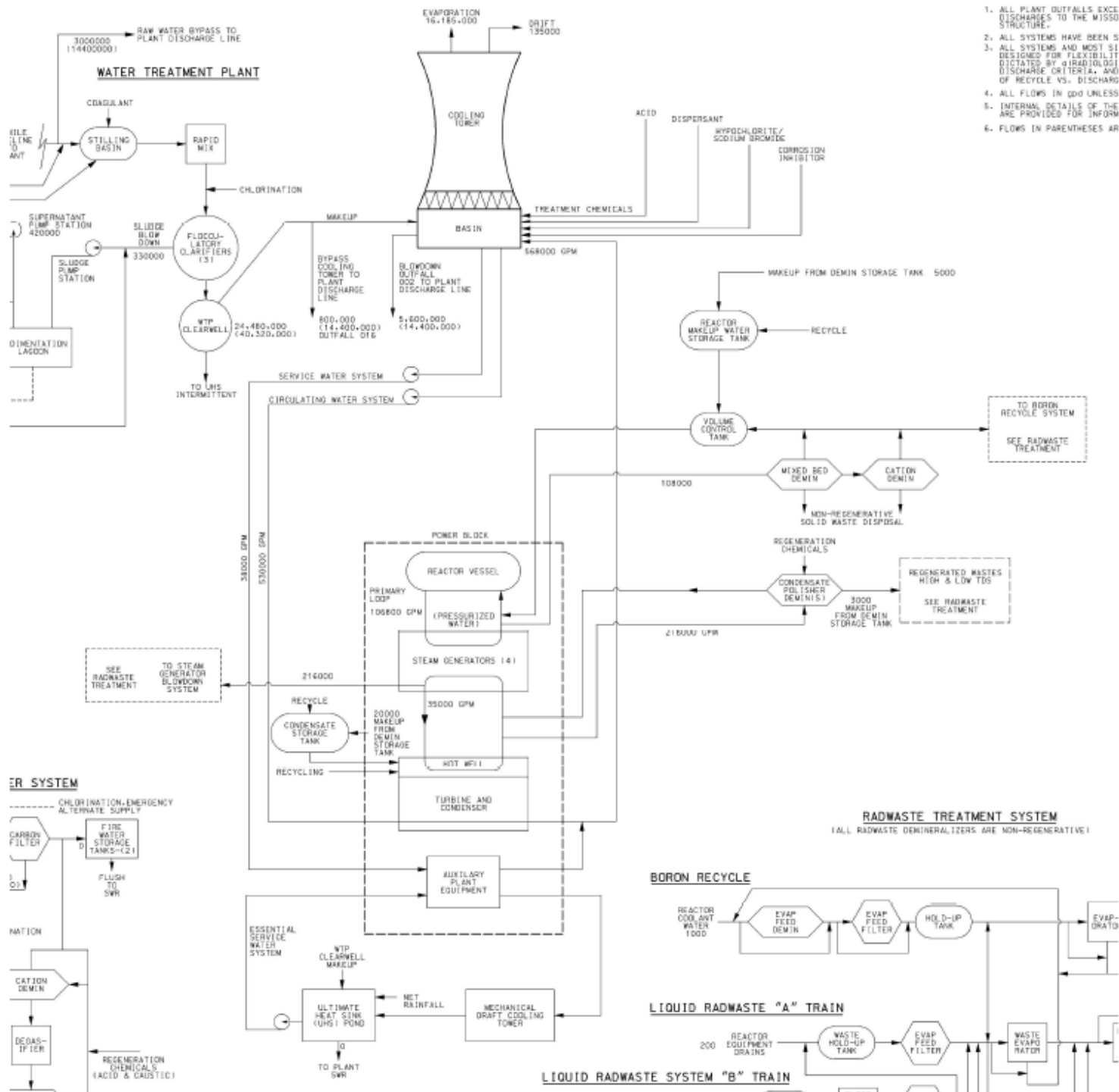
Monochloramine (MCA) is formed by the reaction of hypochlorous acid and ammonia [ $\text{NH}_3 + \text{HOCl} \rightarrow \text{NH}_2\text{Cl} + \text{H}_2\text{O}$ ]. Despite being a weaker oxidant than chlorine and other mixed amines, MCA has a number of benefits when compared to these compounds. The dosage requirement is not impacted by high demand (both organic and inorganic) in either the makeup water or from system contaminants, thus reducing overall oxidant requirement for good microbial control. MCA is very effective in removing biofilms, as MCA does not react with and is not consumed by the extracellular polymeric substances (EPS) such as polysaccharide or protein layers. The MCA can then reach the living bacterial cells for a greater kill. Unlike chlorine and bromine chemistry, MCA is not subject to pH dissociation effect, therefore making it suitable for high pH systems. Ameren has ceased using sodium hypochlorite, sodium bromine, triazine and molluscicide at the Water Treatment Plant (WTP) and will gradually reduce or eliminate the addition of sodium hypochlorite and sodium bromine to the circulating and service waters.



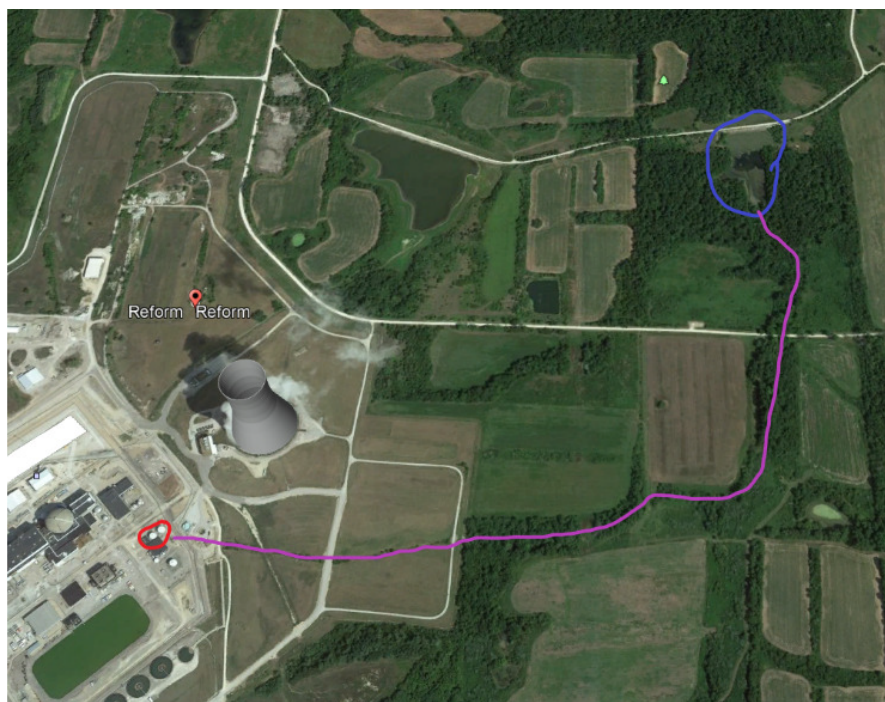
1. ALL PLANT OUTFALLS EXCEPT DISCHARGES TO THE MISSOURI RIVER.
2. ALL SYSTEMS HAVE BEEN DESIGNED FOR FLEXIBILITY IN DISCHARGE CRITERIA, AND OF RECYCLE VS. DISCHARGE.
3. ALL SYSTEMS AND MOST SYSTEMS HAVE BEEN DESIGNED FOR FLEXIBILITY IN DISCHARGE CRITERIA, AND OF RECYCLE VS. DISCHARGE.
4. ALL FLOWS IN GPM UNLESS OTHERWISE NOTED.
5. INTERNAL DETAILS OF THE SYSTEMS ARE PROVIDED FOR INFORMATION.
6. FLOWS IN PARENTHESES ARE RECYCLED FLOWS.

#### OUTFALL #018: FIRE PROTECTION TEST WATER

New outfall, 2020 permit. This permit implements testing requirements and effluent limits for the intermittent fire protection test water discharges. To continue to maintain outfall #011 as stormwater, effluent limits for outfall #018 must be met prior to entry into the stormwater basin. Every other year (the application says every three years but was revised 2/5/2020 in an email), the facility is required to completely release all of the fire protection water from the identified tank. Annual test discharges are 80,000 gallons total, every two years is 300,000 gallons total. Chemical additions are stopped 60 days prior to the release date. Because this permit implements limits upstream on the fire protection test water, outfall #011 can continue to be considered stormwater.







#### OUTFALL #100: COMBINED DISCHARGE

In an email dated 1/28/2020 the facility indicated there were no sampling points where the combined discharges could be physically sampled together, therefore, water quality will be assessed at each outfall as designated. It is the opinion of the permit writer the facility should work toward installing a sampling point at a place where combined effluent can be sampled, particularly to ensure the combined loading of nutrients and total whole effluent toxicity. Wastewater outfalls #001, #002, and #016 discharge to the Missouri river through a common man-made conveyance. Because there is no common or mixed sampling point, nutrient monitoring is established at each individual outfall as appropriate at this time. This is a new outfall for the purposes of location identification and total flow only; the facility is not required to obtain qualitative samples from this outfall or the combined discharges unless desired and this option becomes feasible.

#### **FACILITY PERFORMANCE HISTORY & COMMENTS:**

The electronic discharge monitoring reports were reviewed for the last permit term. No exceedances were noted. The facility underwent an inspection conducted by the NRC in June 2019. No notable negative findings were found. <https://www.nrc.gov/docs/ML1921/ML19214A094.pdf> The last inspection completed by the Department was in 2013; a record review inspection (no site visit was conducted) was completed in June 2017. The Department's Regional Office obtained environmental samples on 6/13/2017 during an inspection for outfall #016 at the clearwell; no permit exceedances were noted. On 11/5/2018 the facility contacted the Department's Emergency Response Spill line to report an approximate 260 gallon hydraulic fluid release, of which approximately 200 gallons reached the Missouri River. The facility's notification was determined adequate; reporting requirements remain for spills. The Oil Pollution Act (OPA) of 1990 covers petroleum spills. Petroleum and hazardous substances are covered under RSMo 260.

In an email dated December 9, 2016, the facility affirmed Callaway Energy Center does not utilize zinc or chromium containing treatment products in cooling water systems discharging from outfall #002 (cooling tower blowdown) or from outfall #016 (cooling tower bypass). A special condition exempts the facility from testing chromium and zinc.

This permit does not contain permitting requirements for outfall #013; this is a historic stormwater outfall but flows into the basin serving outfall #012, therefore only outfall #012 will be required to have monitoring.

Outfall #004 is inactive, the demineralizer system wastewater was routed to outfall #003 prior to 1996.

In an email dated 1/28/2020 the facility corrected the units on methylmercury for outfalls #002, #003, #007, and #016. These data were corrected to <0.058 ng/L, 0.160 ng/L, 0.322 ng/L, and <0.0578 ng/L respectively.

In an email dated February 4, 2020, the facility confirmed outfalls #003 and #007, if not recycled, will discharge to the surface as a tributary to Logan Creek, not piped to the Missouri River as indicated in the previous permit. The effluent limitations were

recalculated for these outfalls based on the corrected information; see Part IV, EFFLUENT LIMITS DETERMINATIONS for further information; total residual chlorine limits were lowered to protect the receiving stream.

Outfalls #003, #007, and #009 were maintained as unscheduled reporting in this renewal.

The last permit required the facility to obtain a sample from outfall #002 and #016 and mix them together for a WET test. However, these two outfalls are not exclusive and may not discharge at the same time. However, as was confirmed by Ameren personnel in a phone call on 2/13/2020, outfall #001 and #016 are mixed to provide dilution (ie. carrier water) to outfall #001's radwaste system. These are minimum technological standards the facility adheres to ensure compliance with NRC and CWA regulations; additionally, this permit requires blending of wastewater from #001 with carrier water identified as outfall #016 for calculated technology compliance at outfall #100. Instantaneous flow monitoring is included for each of these outfalls. In the 2013 permit renewal, the permit writer removed requirements for WET testing at outfall #001 because the effluent was radiologic and required special handling. However, when flow-proportional samples are taken from outfall #001 and #016 (such as what is actually discharged), the radiological elements are minimized and no longer pose a hazard to laboratory personnel. This renewal manages WET testing with how effluents are actually discharged by using flow-weighted samples for collection of WET testing.

Ameren frequently provides documentation and concurrence requests for new chemical usage at the plant. The Department's publication regarding chemical changes or additives can be reviewed at: <https://dnr.mo.gov/pubs/pub2653.htm>

Annual operating reports are found online at the NRC's webpage, <https://www.nrc.gov/info-finder/reactors/call.html>

The NRC also has several informative papers on tritium, radiation protection limits, and drinking water standards at <https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/tritium-radiation-fs.html>

Data for outfall #001 was submitted and accepted on 2/14/2020; beta radiation analytical values were submitted via an email dated 3/2/2020; and was not detected at <0.541 pCi/L.

#### STORMWATER

The previous permit granted benchmarks for the stormwater outfalls #010, #011, #012, #014, and #015. However, as noted in the application and the previous permit, these stormwater outfalls are not solely stormwater; they also could contain non-stormwater components. While the expected composition of these outfalls has not changed, it is noted they are not stormwater-only outfalls therefore up-stream monitoring requirements (new outfall #018) and land application requirements are implemented in this permit to achieve and continue the stormwater-only status for these outfalls. Fire protection test water is discharged quarterly which contains additives for scale and microbial inhibitors to control microbiologically influenced corrosion. Additionally, eye-wash and emergency showers (which must be periodically tested) discharge overland but do not reach to the stormwater outfalls. Air conditioning condensate is also discharged overland. These discharges soak in to the ground, it is expected these discharges contain chlorine from the water purification process but do have the capacity to enter waters of the state due to infiltration. It is not expected these infrequent or minimal-volume discharges will cause in-stream exceedances of any water quality standard, the facility's request to continue to allow these discharges is granted. The following were described in the application. This renewal adds protections for these wastewaters while considering the primary discharge as stormwater.

1. Potable water: infrequent flushing and/or drainage of potable water lines for repairs or maintenance to the system in the original application. However, in an email dated February 5, 2020, the facility provided updates and clarification to the application disclosures. Potable water is never flushed to the ground.
2. Firewater: quarterly flushing from 40 connections required for testing and maintenance of the firewater system. Ameren treats the firewater system with a bio stat, a bio penetrant and a scale inhibitor. This treatment program is designed to control microbiologically influenced corrosion to ensure integrity as required by the American Nuclear Insurers and the Nuclear Regulatory Commission. Quarterly flushes will discharge less than 50,000 gallons total. Based on the expected concentrations and aquatic toxicity data, we do not believe there are any significant effects on the storm water runoff settling ponds from these releases. Once per three years, the entire system including the tanks, must be flushed which releases 700,000 to 800,000 gallons. Treatment chemicals are not added for a time prior to these flushes in order to ensure that residual pollutants are very low (due to consumption within the system).
3. Manhole Pump-Outs: numerous manholes (providing access to instrumentation, piping, cables, etc.) at the plant are periodically pumped out to remove accumulated stormwater. In order to address questions regarding possible contamination due to galvanized metal corrosion, a testing program was conducted and the analytical results were reviewed. The testing indicated zinc concentrations were reduced significantly by maintaining water levels below galvanized supports (i.e. routine pump outs). During 2012 Ameren notified the Department automatic pumping capability would be installed in several electrical access manholes. Water is not pumped out if an oil sheen exists or if the pH is not between 6 and 9 (which would be indicative of a spill or leak).
4. Eye Wash/Safety Shower Discharges: releases are made from routine testing and/or emergency use of these outdoor facilities.



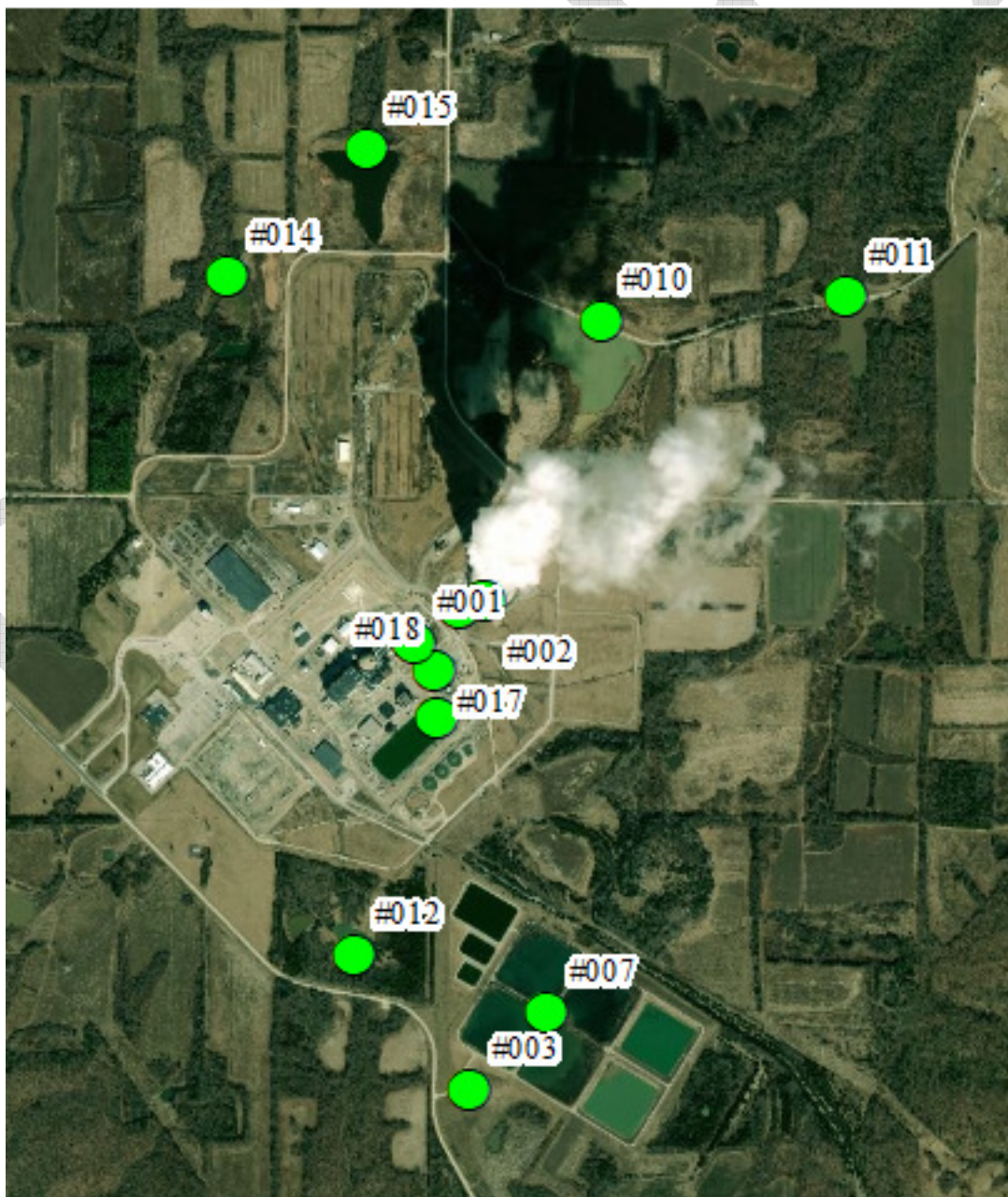
5. Demineralizer Water/Essential Service Water (ESW): during outages and other equipment maintenance activities it is sometimes necessary to provide temporary hoses to supply water to equipment. When these hoses are dissembled, residual water is released locally.

6. Air Conditioning Condensate: condensate from various building intake air cooling units is routed to building roof drains and/or to local surfaces which in turn could contribute flow to various storm water outfalls.

Outfall	Authorized Non-Stormwater Sources*
#010	fire water test (100 gal/qtr); manhole discharges (10,000 gal/mo); eye wash/showers (~5 gallon per item tested); ESW (<500 gal/event)
#011	fire water test (24,000 gal/qtr); fire water tank drain (80,000 gal/3 yrs); manhole discharges (15,000 gal/mo) eye wash/shower (~5 gallon per item tested); air conditioning condensate; ESW (<500 gal/event)
#012	fire water test (11,000 gal/qtr); manhole discharges (70,000 gal/mo); air conditioning condensate; ESW (<500 gal/event)
#014	fire water test (17,000 gal/qtr); air conditioning condensate
#015	none

\* Given the volume and distances to the stormwater retention basins, these outfalls are maintained as stormwater-only outfalls. Non-stormwater discharges other than those explicitly authorized by this permit are considered a violation of the permit

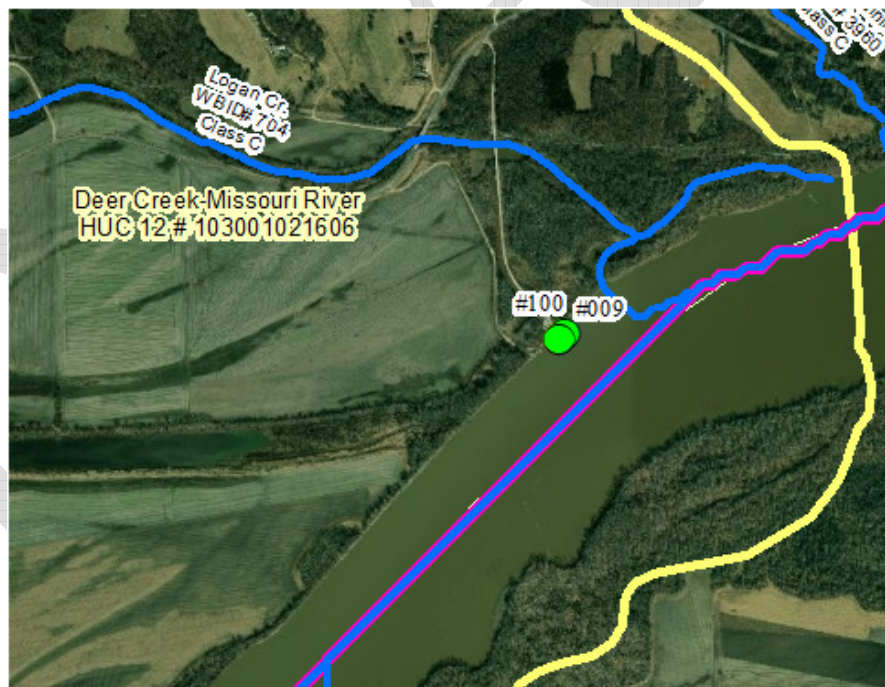
#### FACILITY MAPS:



**INSET:**



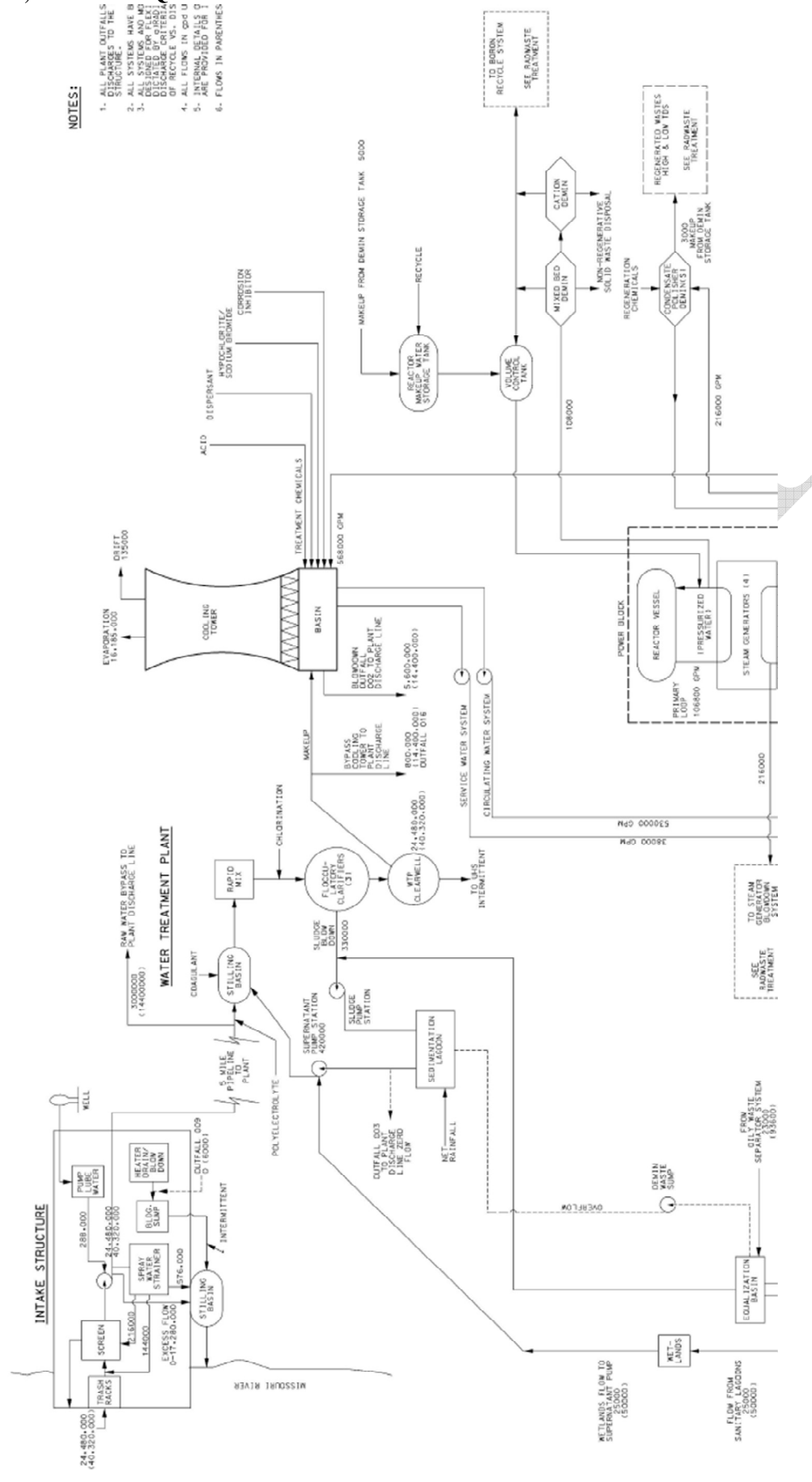
**RIVER PERMITTED FEATURES:**





## NOTES:

1. ALL PLANT OUTFALLS DISCHARGES TO THE STRUCTURE.
2. ALL SYSTEMS HAVE B
3. ALL SYSTEMS AND M3  
DESIGNED FOR FLEXI  
DICTED BY GUARD)  
DISCHARGE CRITERIA  
OF RECYCLE VS. DIS
4. ALL FLOWS IN GOD U
5. INTERNAL DETAILS Q  
ARE PROVIDED FOR I
6. FLOWS IN PARENTIES



# WATER BALANCE DIAGRAM; UPPER RIGHT QUADRANT:

REV.	DATE
A	09/21/15
DESIGN	CHG. SUPP.
MAINT.	FLW. DME.
INITIAL	ISSUE
PER	
CAR	201504698

## NOTES:

1. ALL PLANT OUTFALLS EXCEPT OUR TIE INTO A SINGLE PIPELINE WHICH DISCHARGES TO THE MISSOURI RIVER JUST DOWN STREAM OF THE INTAKE STRUCTURE.
2. ALL SYSTEMS HAVE BEEN SIMPLIFIED FOR CLARITY.
3. ALL SYSTEMS AND MOST SIGNIFICANTLY, RADWASTE TREATMENT, ARE DESIGNED FOR FLEXIBILITY. IN RADWASTE, THE TREATMENT LEVEL IS DESIGNED TO BE ADJUSTED TO MEET THE NEEDS OF THE DISCHARGE CRITERIA, AND OF THE NEED, FEASIBILITY AND ECONOMICS OF RECYCLE VS. DISCHARGE.
4. ALL FLOWS IN GPM UNLESS OTHERWISE SPECIFIED.
5. INTERNAL DETAILS OF THE RADWASTE TREATMENT SYSTEM ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.
6. FLOWS IN PARENTHESES ARE DAILY MAXIMUM.

100

ACID  
DISPENSANT  
HYPOCHLORITE/  
SODIUM BROMIDE  
CORROSION  
INHIBITOR

PLANT CHEMICALS

20 GPM

REACTOR MAKEUP WATER STORAGE TANK 5000

RECYCLE

VOLUME CONTROL TANK

100000

MIXED BED DEMIN

CATION DEMIN

NON-REGENERATIVE  
SOLID WASTE DISPOSAL

REGENERATION  
CHEMICALS

CONCENTRATE  
COLLIER DEMIN

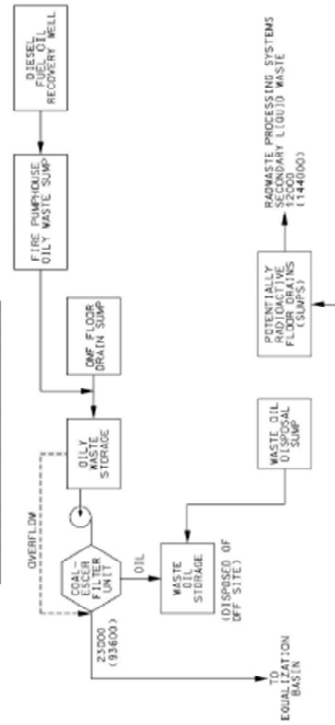
3000  
MAKEUP  
FROM DEMIN  
STORAGE TANK

216000 GPM

TO BODIN  
RECYCLE SYSTEM  
SEE RADWASTE  
TREATMENT

REGENERATED WASTES  
HIGH & LOW TDS  
SEE RADWASTE  
TREATMENT

## OILY WASTE SEPARATOR SYSTEM



**DEMINERALIZED WATER SYSTEM**

Flow from Sanitary Lagoons (52000) → Equalization Basin → WTP Clearwell → Sand Filter → Demin Clearwell → Carbon Filter → Fire Water Storage Tanks (121) → Chlorination → Potable Water System → Plant Use

**LIQUID RADWASTE SYSTEM "A" TRAIN**

Flow from Sanitary Lagoons (52000) → Equalization Basin → WTP Clearwell → Sand Filter → Demin Clearwell → Carbon Filter → Fire Water Storage Tanks (121) → Chlorination → Potable Water System → Plant Use

**LIQUID RADWASTE SYSTEM "B" TRAIN**

Flow from Sanitary Lagoons (52000) → Equalization Basin → WTP Clearwell → Sand Filter → Demin Clearwell → Carbon Filter → Fire Water Storage Tanks (121) → Chlorination → Potable Water System → Plant Use

**SECONDARY LIQUID WASTE**

Flow from Sanitary Lagoons (52000) → Equalization Basin → WTP Clearwell → Sand Filter → Demin Clearwell → Carbon Filter → Fire Water Storage Tanks (121) → Chlorination → Potable Water System → Plant Use

**STEAM GENERATOR BLOWDOWN**

Flow from Sanitary Lagoons (52000) → Equalization Basin → WTP Clearwell → Sand Filter → Demin Clearwell → Carbon Filter → Fire Water Storage Tanks (121) → Chlorination → Potable Water System → Plant Use

[illegible]



## PART II. RECEIVING WATERBODY INFORMATION

RECEIVING WATERBODY TABLE:

OUTFALL	WATERBODY NAME	CLASS	WBID	DESIGNATED USES	DISTANCE TO SEGMENT	12-DIGIT HUC
#001*	discharges through outfall #100; Missouri River	P	0701	DWS, GEN, HHP, IND, IRR, LWW, SCR, WBC-B, WWH (ALP)	0 mi.	Deer Creek-Missouri River 10300102-1606
#002*	discharges through outfall #100; Missouri River	P	0701	DWS, GEN, HHP, IND, IRR, LWW, SCR, WBC-B, WWH (ALP)	0 mi.	Deer Creek-Missouri River 10300102-1606
#003** and #007**	tributary to Mud Creek	n/a	n/a	GEN	0 mi	Deer Creek-Missouri River 10300102-1606
	100K extent-remaining stream	C	3960	GEN, HHP, IRR, LWW, SCR, WBC-B, WWH (ALP)	3.0 mi	
#009	Missouri River	P	0701	DWS, GEN, HHP, IND, IRR, LWW, SCR, WBC-B, WWH (ALP)	0 mi.	Deer Creek-Missouri River 10300102-1606
#010	tributary to Logan Creek	n/a	n/a	GEN	0 mi	Logan Creek 10300102-1605
	100K extent-remaining stream	C	3960	GEN, HHP, IRR, LWW, SCR, WBC-B, WWH (ALP)	0.9 mi	
#011	100K extent-remaining stream	C	3960	GEN, HHP, IRR, LWW, SCR, WBC-B, WWH (ALP)	0 mi	Logan Creek 10300102-1605
#012	100K Extent-Remaining Stream	C	3960	GEN, HHP, IRR, LWW, SCR, WBC-B, WWH (ALP)	0 mi	Deer Creek-Missouri River 10300102-1606
#014	tributary to Auxvasse Creek	n/a	n/a	GEN	0 mi	Cow Creek 10300102-1504
	100K Extent-Remaining Stream;	C	3960	GEN, HHP, IRR, LWW, SCR, WBC-B, WWH (ALP)	1.0 mi	
	100K Extent Remaining Lake; Canyon Lake	L3	7630	GEN, HHP, IRR, LWW, SCR, WBC-B, WWH (ALP)	2.0 mi	
#015	100K Extent-Remaining Stream	C	3960	GEN, HHP, IRR, LWW, SCR, WBC-B, WWH (ALP)	0 mi	Cow Creek 10300102-1504
	100K Extent Remaining Lake; Canyon Lake	L3	7630	GEN, HHP, IRR, LWW, SCR, WBC-B, WWH (ALP)	1.9 mi	
#016*	discharges through outfall #100; Missouri River	P	0701	DWS, GEN, HHP, IND, IRR, LWW, SCR, WBC-B, WWH (ALP)	0 mi.	Deer Creek-Missouri River 10300102-1606
#017 and #018	tributary to Logan Creek	n/a	n/a	GEN	0 mi	Logan Creek 10300102-1605
	100K extent-remaining stream; locally known as Logan Creek	C	3960	GEN, HHP, IRR, LWW, SCR, WBC-B, WWH (ALP)	1.3 mi	
#100	combined outfall; Missouri River	P	0701	DWS, GEN, HHP, IND, IRR, LWW, SCR, WBC-B, WWH (ALP)	0 mi	Deer Creek-Missouri River 10300102-1606

\* compliance monitoring point; discharges through man-made conveyance to outfall #100 at the Missouri River

\*\* normally recycled, discharge permissible but rare

n/a not applicable

Classes are hydrologic classes as defined in 10 CSR 20-7.031(1)(F). L1: Lakes with drinking water supply - wastewater discharges are not permitted to occur to L1 watersheds per 10 CSR 20-7.015(3)(C); L2: major reservoirs; L3: all other public and private lakes; P: permanent streams; C: streams which may cease flow in dry periods but maintain pools supporting aquatic life; E: streams which do not maintain surface flow; and W: wetland. Losing streams are defined in 10 CSR 20-7.031(1)(O) and are designated on the Losing Stream dataset or determined by the Department to lose 30% or more of flow to the subsurface.

WBID = Waterbody Identification: Missouri Use Designation Dataset per 10 CSR 20-7.031(1)(Q) and (S) as 100K Extant-Remaining Streams or newer; data can be found as an ArcGIS shapefile on MSDIS at [http://msdis.missouri.edu/pub/Inland\\_Water\\_Resources/MO\\_2014\\_WQS\\_Stream\\_Classifications\\_and\\_Use.shp.zip](http://msdis.missouri.edu/pub/Inland_Water_Resources/MO_2014_WQS_Stream_Classifications_and_Use.shp.zip); New C streams described on the dataset per 10 CSR 20-7.031(2)(A)3. as 100K Extent Remaining Streams.

Per 10 CSR 20-7.031, the Department defines the Clean Water Commission's water quality objectives in terms of "water uses to be maintained and the criteria to protect those uses." The receiving stream and 1<sup>st</sup> classified receiving stream's beneficial water uses are to be maintained in the receiving streams in accordance with [10 CSR 20-7.031(1)(C)]. Uses which may be found in the receiving streams table, above:

10 CSR 20-7.031(1)(C)1.: **ALP** = Aquatic Life Protection (formerly AQL); current uses are defined to ensure the protection and propagation of fish shellfish and wildlife, further subcategorized as: **WWH** = Warm Water Habitat; **CLH** = Cool Water Habitat; **CDH** = Cold Water Habitat; **EAH** = Ephemeral Aquatic Habitat; **MAH** = Modified Aquatic Habitat; **LAH** = Limited Aquatic Habitat. This permit uses ALP effluent limitations in 10 CSR 20-7.031 Table A1-A2 for all habitat designations unless otherwise specified.

10 CSR 20-7.031(1)(C)2.: Recreation in and on the water

**WBC** = Whole Body Contact recreation where the entire body is capable of being submerged;

**WBC-A** = whole body contact recreation supporting swimming uses and has public access;

**WBC-B** = whole body contact recreation not supported in WBC-A;

**SCR** = Secondary Contact Recreation (like fishing, wading, and boating)

10 CSR 20-7.031(1)(C)3. to 7.:

**HHP** (formerly HHF) = Human Health Protection as it relates to the consumption of fish and drinking of water;

**IRR** = irrigation for use on crops utilized for human or livestock consumption

**LWW** = Livestock and Wildlife Watering (current narrative use is defined as LWP = Livestock and Wildlife Protection);

**DWS** = Drinking Water Supply

**IND** = industrial water supply

10 CSR 20-7.031(1)(C)8-11.: Wetlands (10 CSR 20-7.031 Tables A1-B3 currently does not have corresponding habitat use criteria for these defined uses): **WSA** = storm- and flood-water storage and attenuation; **WHP** = habitat for resident and migratory wildlife species; **WRC** = recreational, cultural, educational, scientific, and natural aesthetic values and uses; **WHC** = hydrologic cycle maintenance.

10 CSR 20-7.031(6): **GRW** = Groundwater

### RECEIVING WATERBODY'S WATER QUALITY:

There is no relevant water quality data available for Logan Creek, Mud Creek or Auxvasse Creek. The USGS has data available for the Missouri River. Please visit USGS.gov to download the applicable data.

### 303(d) LIST:

Section 303(d) of the federal Clean Water Act requires each state identify waters not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock, and wildlife. The 303(d) list helps state and federal agencies keep track of impaired waters not addressed by normal water pollution control programs. <http://dnr.mo.gov/env/wpp/waterquality/303d/303d.htm>

✓ Not applicable; this facility does not discharge to an impaired segment of a 303(d) listed stream.

### TOTAL MAXIMUM DAILY LOAD (TMDL):

A TMDL is a calculation of the maximum amount of a given pollutant a water body can absorb before its water quality is affected; hence, the purpose of a TMDL is to determine the pollutant loading a specific waterbody can assimilate without exceeding water quality standards. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan or TMDL may be developed. The TMDL shall include the WLA calculation. <http://dnr.mo.gov/env/wpp/tmdl/>

✓ Applicable; The Missouri River is associated with the 2006 EPA approved TMDL for PCBs and chlordane. This facility is not considered to be a source of the above listed pollutant(s) or considered to contribute to the impairment.

### UPSTREAM OR DOWNSTREAM IMPAIRMENTS:

The permit writer has reviewed upstream and downstream stream segments of this facility for impairments.

✓ The permit writer has noted downstream of the facility the stream has a TMDL, see above; this facility is located at the top of three watersheds therefore no upstream exists of this facility.

### APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:

Per Missouri's Effluent Regulations [10 CSR 20-7.015(1)(B)], waters of the state are divided into seven categories. This facility is subject to effluent limitations derived on a site specific basis which are presented in each outfall's effluent limitation table and further discussed in Part IV: Effluents Limits Determinations.

✓ Missouri or Mississippi River

✓ All Other Waters

### LAKE NUMERIC NUTRIENT CRITERIA:

Water quality standards per 10 CSR 20-7.031(5)(N) describe nutrient criteria requirements assigned to lakes (which include reservoirs) in Missouri, equal to or greater than 10 acres during normal pool conditions. The Department's Nutrient Criteria Implementation Plan (NCIP) may be reviewed at: <https://dnr.mo.gov/env/wpp/rules/documents/nutrient-implementation-plan-final-072618.pdf> Discharges of wastewater in to lakes or lake watersheds designated as L1 (drinking water use) are prohibited per 10 CSR 20-7.015(3)(C).

✓ Not applicable; this facility does not discharge in a lake watershed or the lake is less than 10 acres.

### RECEIVING WATERBODY MONITORING REQUIREMENTS:

Receiving water and upstream monitoring is required under this permit. See special conditions.

#### MIXING CONSIDERATIONS:

For outfalls #003, #007, #010, #011, #012, #014, #015, and #017, mixing zone and zone of initial dilution are not allowed per 10 CSR 20-7.031(5)(A)4.B.(I)(a) and (b), as the base stream flow does not provide dilution to the effluent and/or stormwater.

#### RECEIVING STREAM LOW-FLOW VALUES:

OUTFALL	RECEIVING STREAM	LOW-FLOW VALUES (CFS)				
		GAGING STATION	1Q10	7Q10	30Q10	60Q10
#001, #002, #009, #016	Mississippi River	Hermann #06934500	23,413.7 cfs	24,089.3 cfs	26,207.2 cfs	28,211.0 cfs

The gaging station at Jefferson City Missouri only has data going back to 10/1/2014, therefore a complete dataset was unavailable making the flow data artificially high at Jefferson City. Data were obtained for the last 20 years for the gaging station at Hermann and were calculated using a Department developed spreadsheet (available upon request). While this gaging station is downstream of the facility, the data used are protective of the stream and toxic mixing is further described in Part IV EFFLUENT LIMITS DERIVATION.

#### MIXING CONSIDERATIONS TABLE: MISSOURI RIVER

OUTFALL	MIXING ZONE (CFS) (CHRONIC) [10 CSR 20-7.031(5)(A)5.A.4.B.(III)(a)]				ZONE OF INITIAL DILUTION (CFS) (ACUTE) [10 CSR 20-7.031(5)(A)4.B.(III)(b)]			
	1Q10	7Q10	30Q10	60Q10	1Q10	7Q10	30Q10	60Q10
#001	5853.4 cfs	6022.3 cfs	6551.8 cfs	7052.8 cfs	2.94 cfs	2.94 cfs	2.94 cfs	2.94 cfs
#002 & #016	5853.4 cfs	6022.3 cfs	6551.8 cfs	7052.8 cfs	222.8 cfs	222.8 cfs	222.8 cfs	222.8 cfs
#009	5853.4 cfs	6022.3 cfs	6551.8 cfs	7052.8 cfs	0.09 cfs	0.09 cfs	0.09 cfs	0.09 cfs

ZID cannot be more than 10x the outfall's design flow (unless a mixing study has been completed) therefore the ZID is established for each individual outfall as shown above.

#### THERMAL MIXING CONSIDERATIONS:

Thermal mixing is calculated differently than mixing for toxics above. Temperature data is compared to instantaneous temperature and flow of the facility and the river. See Part IV EFFLUENT LIMITS DERIVATION for more information. Missouri's Water Quality Standards establish temperature criteria to provide several forms of protection from the impacts of heat energy on receiving water bodies. If at any time the permittee has reason to believe the discharge may exceed water quality standards or if the permittee does exceed the water quality standards, the permittee may determine it necessary to take action that may include, but is not limited to, seeking a 316(a) variance, a mixing zone study, or by conducting a model to ensure compliance with WQS. If action is taken by the permittee warranting a modification to this operating permit, then the permittee will need to submit an application for a permit modification. Submitting an application for permit modification does not guarantee approval of said action and does not directly indicate the result of said action will be implemented into an operating permit. A Quality Assurance Project Plan (QAPP) must be submitted for any alternative compliance approach.

Temperature monitoring is being maintained. The results of the RPD demonstrate there is currently not reasonable potential to exceed the water quality standard of 90°F or the  $\pm\Delta$  5°F at the edge of the mixing zone due to the large volume of the river. However as this is an energy center discharging water up to 89.6°F prior to mixing, the monitoring requirement will remain; see outfall specific derivation below.

### PART III. RATIONALE AND DERIVATION OF PERMIT CONDITIONS

#### ALTERNATIVE EVALUATIONS FOR NEW FACILITIES:

As per [10 CSR 20-7.015(4)(A)], discharges to losing streams shall be permitted only after other alternatives including land application, discharges to a gaining stream and connection to a regional wastewater treatment facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

✓ Not applicable; the facility is an existing facility.

#### ANTIBACKSLIDING:

Federal Regulations [CWA §303(d)(4); CWA §402(c); 40 CFR Part 122.44(l)] require a reissued permit to be as stringent as the previous permit with some exceptions. Backsliding (a less stringent permit limitation) is only allowed under certain conditions.

✓ Limitations in this operating permit for the reissuance conform to the anti-backsliding provisions of Section 402(o) of the Clean Water Act, and 40 CFR Part 122.44.

- ✓ Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) which would have justified the application of a less stringent effluent limitation.
  - Sampling for settleable solids were removed for outfalls #010, #011, #012, #014, and #015. Data indicate settleable solids are not of concern at this site. Total suspended solids were used as a compliance metric instead because this facility implements settling basins for stormwater treatment.
- ✓ The Department determined technical mistakes or mistaken interpretations of law were made in issuing the permit under section 402(a)(1)(b).
  - Biochemical Oxygen Demand, 5 day (BOD<sub>5</sub>) monitoring was established approximately 20 years ago in the permit at outfall #001 for unknown reasons; and subsequent permits continued the monitoring requirements for unknown reasons as well. Continuing monitoring of a parameter is not required when the Department has no reason to establish an effluent limit. While technology limits for BOD are established in 10 CSR 20-7.015, these are solely for wastewater treatment facilities treating domestic waste. Outfall #001 has no domestic wastewater component and the effluent characteristics have no reasonable expectation to be similar to domestic wastewater. The facility reported from non-detect to 168.4 mg/L for this parameter during the last permit cycle; no numeric water quality effluent limits exist for this parameter and no demonstrations have been made of this facility's discharge to cause narrative water quality exceedances for BOD<sub>5</sub>. The data supplied is not expected to cause a water quality issue due to the large mixing zone afforded by the Missouri River.
  - This permit revises the specific environmental sampling as previously outlined in special condition #22. The permit reiterated the requirements which are due annually by May 1 each year for the previous calendar year. The requirements outlined by the federal government through the Nuclear Regulatory Commission are robust and were copied in the previous permit for water and sediment sampling. The Department does not expect Ameren to cease to conduct these activities upon removal of the NPDES special condition as it is still required by the NRC, but Ameren continues to be required to submit the "Annual Radiological Environmental Operating Report" as is required by Section 5.6.2 of the Callaway Plant Technical Specifications and Appendix B to the Callaway Plant [NRC] operating license. Duplicative explanation of the sampling requirements is not necessary as the Department has reviewed the sampling procedures and finds them wholly appropriate to classify the radiological impact of the water environment at this site.
  - The previous permit indicated Ameren was required to continue operating the makeup water intake structure to minimize impingement and entrainment per the Department's approval letter dated April 15, 1987. However, this permit condition was updated to provide specific requirements instead of referral to a historical letter. Additionally, this permit implements monitoring and reporting of the actual volume of cooling water removed from the river.
  - The previous permit special conditions contained a specific set of prohibitions related to general criteria (GC) found in 10 CSR 20-7.031(4); however, there was no determination as to whether the discharges have reasonable potential to cause or contribute to excursion of those general water quality criteria in the previous permit. This permit assesses each general criteria as listed in the previous permit's special conditions. Federal regulations 40 CFR 122.44(d)(1)(iii) requires instances where reasonable potential (RP) to cause or contribute to an exceedance of a water quality standard exists, a numeric limitation must be included in the permit. Rather than conducting the appropriate RP determination, the previous permit simply placed the prohibitions in the permit. These conditions were removed from the permit. Appropriate reasonable potential determinations were conducted for each general criterion listed in 10 CSR 20-7.031(4)(A) through (I) and effluent limitations were placed in the permit for those general criteria where it was determined the discharge had reasonable potential to cause or contribute to excursions of the general criteria. Specific effluent limitations were not included for those general criteria where it was determined the discharges will not cause or contribute to excursions of general criteria. Removal of the prohibitions does not reduce the protections of the permit or allow for impairment of the receiving stream. The permit maintains sufficient effluent limitations, monitoring requirements and best management practices to protect water quality while maintaining permit conditions applicable to permittee disclosures and in accordance with 10 CSR 20-7.031(4) where no water contaminant by itself or in combination with other substances shall prevent the water of the state from meeting the following conditions:
    - (A) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
      - For outfall #007, there is RP for putrescent bottom deposits preventing full maintenance of beneficial uses because this effluent is domestic wastewater. However, the facility maintains this outfall as no-discharge by recycling to the treatment headworks. If discharge occurs, limitations for *E. coli* are found to control slimes and putrescent discharges. For all other outfalls, there is no RP for putrescent bottom deposits preventing full maintenance of beneficial uses because nothing disclosed by the permittee indicates putrescent wastewater would be discharged from the facility.
      - For outfalls #002, #003, #007, #009, #016 there is RP for unsightly or harmful bottom deposits preventing full maintenance of beneficial uses; TDS or TSS, a representation of solids, has been identified at these outfalls as having the potential to contribute to bottom deposits; limitations will protect this beneficial use. For all other outfalls, there is no RP for unsightly or harmful bottom deposits preventing full maintenance of beneficial uses because nothing disclosed by the permittee indicates unsightly or harmful bottom deposits would be discharged from the facility.

- (B) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses.
- For outfalls #001, #002, #003, #007, #009, and #016, there is RP for oil in sufficient amounts to be unsightly preventing full maintenance of beneficial uses therefore effluent limits for oil and grease were implemented or continued. Outfalls #001, #002, #003, and #016 were described as possibly receiving wastewater from the Oily Waste Treatment System due to recycling of wastewater. Outfall #009 has no data therefore limits were continued; until proven oil and grease is not present, the historical limit was likely implemented due to the possible presence of oils. For all other stormwater outfalls, there is no RP for oil in sufficient amounts to be unsightly preventing full maintenance of beneficial uses because nothing disclosed by the permittee indicates oil will be present in sufficient amounts to impair beneficial uses.
  - For all outfalls, there is no RP for scum and floating debris in sufficient amounts to be unsightly preventing full maintenance of beneficial uses because nothing disclosed by the permittee indicates scum and floating debris will be present in sufficient amounts to impair beneficial uses. Outfalls #003 and #007 have settling; outfalls #001, #002, #009 and #016 are afforded significant mixing by the Missouri River; outfalls #010, #011, #012, #014, and #015 are stormwater outfalls where settling basins provide a decrease in scum and floating debris.
- (C) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.
- For outfalls #002, #003, #007, #009, and #016, there is RP; TDS or TSS has been identified at these outfalls as possibly contributing to unsightly color or turbidity in sufficient amounts, although TDS and TSS have not been directly correlated to a turbidity value. TDS and TSS limits are therefore imposed in place of turbidity limits. For all other outfalls, there is no RP for unsightly color or turbidity in sufficient amounts preventing full maintenance of beneficial uses because nothing disclosed by the permittee indicates unsightly color or turbidity will be present in sufficient amounts to impair beneficial uses.
  - For all outfalls, there is no RP for offensive odor in sufficient amounts preventing full maintenance of beneficial uses because nothing disclosed by the permittee indicates offensive odor will be present in sufficient amounts to impair beneficial uses.
- (D) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life.
- The permit writer considered specific toxic pollutants when writing this permit. Numeric effluent limitations are included for those pollutants could be discharged in toxic amounts. These effluent limitations are protective of human health, animals, and aquatic life. This facility has numeric effluent limitations for WET testing where appropriate.
- (E) Waters shall maintain a level of water quality at their confluences to downstream waters that provides for the attainment and maintenance of the water quality standards of those downstream waters, including waters of another state.
- This criteria was not assessed for antibacksliding as this is a new requirement, approved by the EPA on July 30, 2019 and was not found in the previous permit.
- (F) There shall be no significant human health hazard from incidental contact with the water.
- This criterion is very similar to (D) above. See Part IV, Effluent Limits Derivation below.
- (G) There shall be no acute toxicity to livestock or wildlife watering.
- This criterion is very similar to (D) above. See Part IV, Effluent Limits Derivation below.
- (H) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.
- It has been established any chemical changes are covered by the specific numeric effluent limitations established in the permit.
  - Physical changes are identified as temperature or pH; see individual outfalls for further information.
  - Hydrologic changes do not appear to be caused by this facility.
- (I) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.
- There are no solid waste disposal activities or any operation which has reasonable potential to cause or contribute to the materials listed above being discharged through any outfall. Trash racks on the intake prevent trash from being drawn up into the plant.
- The previous permit's special conditions required sampling of total petroleum hydrocarbons (TPH) under the decision model to discharge stormwater having a sheen in secondary containment. The special condition has been revised in all permits beginning in 2015 to remove TPH as 40 CFR 136 does not contain any approved methods for the TPH parameter nor are there water quality standards for TPH. This permit requires oil and grease and BTEX (benzene, toluene, ethylbenzene, and xylene) sampling of the potentially contaminated stormwater in secondary containment. The facility need only sample for these constituents prior to release when a sheen or petroleum odor is present.

- The previous permit special condition stated: “Any pesticide discharge from any point source shall comply with the requirements of Federal Insecticide, Fungicide and Rodenticide Act, as amended (7 U.S.C. 136 et. seq.) and the use of such pesticides shall be in a manner consistent with its label.”  
The permit writer has determined this special condition was outside the scope of NPDES permitting and was removed.
- The previous permit special condition indicated spills from hazardous waste substances must be reported to the department. However, this condition is covered under standard conditions therefore was removed from special conditions.

#### **ANTIDEGRADATION REVIEW:**

Process water discharges with new, altered, or expanding flows, the Department is to document, by means of antidegradation review, if the use of a water body’s available assimilative capacity is justified. In accordance with Missouri’s water quality regulations for antidegradation [10 CSR 20-7.031(3)], degradation may be justified by documenting the socio-economic importance of a discharge after determining the necessity of the discharge. Facilities must submit the antidegradation review request to the Department prior to establishing, altering, or expanding discharges. See <http://dnr.mo.gov/env/wpp/permits/antideg-implementation.htm>

- ✓ Not applicable; the facility has not submitted information proposing expanded or altered process water discharge; no further degradation proposed.

While the limits established in this permit were not part of a formal antidegradation review (unless specified), the permit writer established the limitations in the permit to continue to ensure no further degradation will occur in accordance with 10 CSR 20-7.031(3); i.e. the facility will not discharge in excess of the proposed parameter’s value as provided in the application for permit renewal or other disclosures as supplied by the permittee. Statistical procedures used to derive the effluent limitations take into account the magnitude, frequency, and duration of discharges using site specific data to determine site specific limitations based on many factors. Numeric or narrative effluent limitations derived in this permit could be more restrictive than water quality limitations but are appropriate to the methods used for controlling the pollutant discharge. Maintaining proper operational controls is requirement as found at 40 CFR 122.41(e). These procedures are used frequently by permitting authorities to determine site specific technological limits, benchmarks, or target values. See Section 5.2.3.5 (page 5-47) of the EPA permit writer’s manual [https://www.epa.gov/sites/production/files/2015-09/documents/pwm\\_chapt\\_05.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/pwm_chapt_05.pdf). Best professional judgment limitations are technology effluent limits used to apply and ensure effective wastewater controls are maintained per 10 CSR 20-7.031(3).

This permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) which must include an alternative analysis (AA) of the BMPs. The SWPPP must be developed, implemented, updated, and maintained at the facility. Failure to implement and maintain the chosen alternative, is a permit violation. The AA is a structured evaluation of BMPs to determine which are reasonable and cost effective. Analysis should include practices designed to be 1) non-degrading, 2) less degrading, or 3) degrading water quality. The chosen BMP will be the most reasonable and cost effective while ensuring the highest statutory and regulatory requirements are achieved and the highest quality water attainable for the facility is discharged. The analysis must demonstrate why “no discharge” or “no exposure” are not feasible alternatives at the facility. Existing facilities with established SWPPPs and BMPs need not conduct an additional alternatives analysis unless new BMPs are established to address BMP failures or benchmark exceedances. This structured analysis of BMPs serves as the antidegradation review, fulfilling the requirements of 10 CSR 20-7.015(9)(A)5 and 7.031(3). For stormwater discharges with new, altered, or expanding discharges, the stormwater BMP chosen for the facility, through the AA performed by the facility, must be implemented and maintained at the facility. Failure to implement and maintain the chosen BMP alternative is a permit violation; see SWPPP.

- ✓ Applicable; the facility must review and maintain stormwater BMPs as appropriate.

#### **BEST MANAGEMENT PRACTICES:**

Minimum site-wide best management practices are established in this permit to ensure all permittees are managing their sites equally to protect waters of the state from certain activities which could cause negative effects in receiving water bodies. While not all sites require a SWPPP because the SIC codes are specifically exempted in 40 CFR 122.26(b)(14), these best management practices are not specifically included for stormwater purposes. These practices are minimum requirements for all industrial sites to protect waters of the state. If the minimum best management practices are not followed, the facility may violate general criteria [10 CSR 20-7.031(4)]. Statutes are applicable to all permitted facilities in the state, therefore pollutants cannot be released unless in accordance with RSMo 644.011 and 644.016 (17).

#### **CHANGES IN DISCHARGES OF TOXIC POLLUTANT:**

This special condition reiterates the federal rules found in 40 CFR 122.44(f) and 122.42(a)(1). In these rules, the facility is required to report changes in amounts of toxic substances discharged. Toxic substances are defined in 40 CFR 122.2 as “...any pollutant listed as toxic under section 307(a)(1) or, in the case of “sludge use or disposal practices,” any pollutant identified in regulations implementing section 405(d) of the CWA.” Section 307 of the clean water act then refers to those parameters found in 40 CFR 401.15. The permittee should also consider any other toxic pollutant in the discharge as reportable under this condition.



#### **CHEMICAL STORAGE AND USAGE:**

The facility has supplied the Department with a comprehensive list of all bulk chemicals stored on site, significant materials storage areas, laboratory reagents used at the site, and other chemicals used for treating or maintaining systems at the site. After careful review, only sodium hypochlorite, sodium bisulfite, and monochloramine (ammonia byproduct) usage is considered possibly significant in the discharge. These chemicals are monitored and controlled for in the applicable systems and are maintained technologically to ensure the discharges are constrained. This permit, through limits and required BMPs, ensure the discharges will prevent receiving waterbody toxicity under this permit. Many chemicals listed have high or low pH therefore pH limits throughout the permit protect for excessive or toxic discharge of these materials. Dechlorination is provided when necessary in the cooling systems. For storage tanks without pH (oils and fuels), the permit contains oil and grease limits where appropriate and visual monitoring of the stormwater for sheen prior to discharge. The facility also has a Spill Prevention, Control, and Countermeasure (SPCC) plan for petroleum stored on site.

12% sodium hypochlorite is used to clean the intake well periodically. At times, the facility uses 20% hydrochloric acid to clean scale in the well. Less than 1000 gallons of 12% sodium hypochlorite and 20% hydrochloric acid are used annually for intake well cleaning. These are not discharged.

#### **COMPLIANCE AND ENFORCEMENT:**

Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance.

✓ Not applicable; the permittee/facility is not currently under Water Protection Program enforcement action.

#### **COOLING WATER INTAKE STRUCTURE; CWA 316(b):**

Clean Water Act (CWA) Section 316(b) applies to new or existing facilities operating a cooling water intake structure (CWIS). Section 316(b) requires location, design, construction, and capacity of CWISs reflect the best technology available (BTA) for minimizing adverse environmental impacts (AEI). Under current regulations, existing facilities are subject to CWA 316(b) conditions reflecting BTA for minimizing impingement (and entrainment if over 125 MGD) and on a case-by-case, best professional judgment (BPJ) basis. The Federal Water Pollution Control Act Amendments of 1972 require cooling water intake structures to reflect the best technology available for minimizing adverse environmental impact. Best technology available must consider intake design, location, construction, and capacity. The EPA has finalized the 316(b) standards and they became effective on October 16, 2014 (<http://water.epa.gov/lawsregs/lawguidance/cwa/316b/index.cfm>).

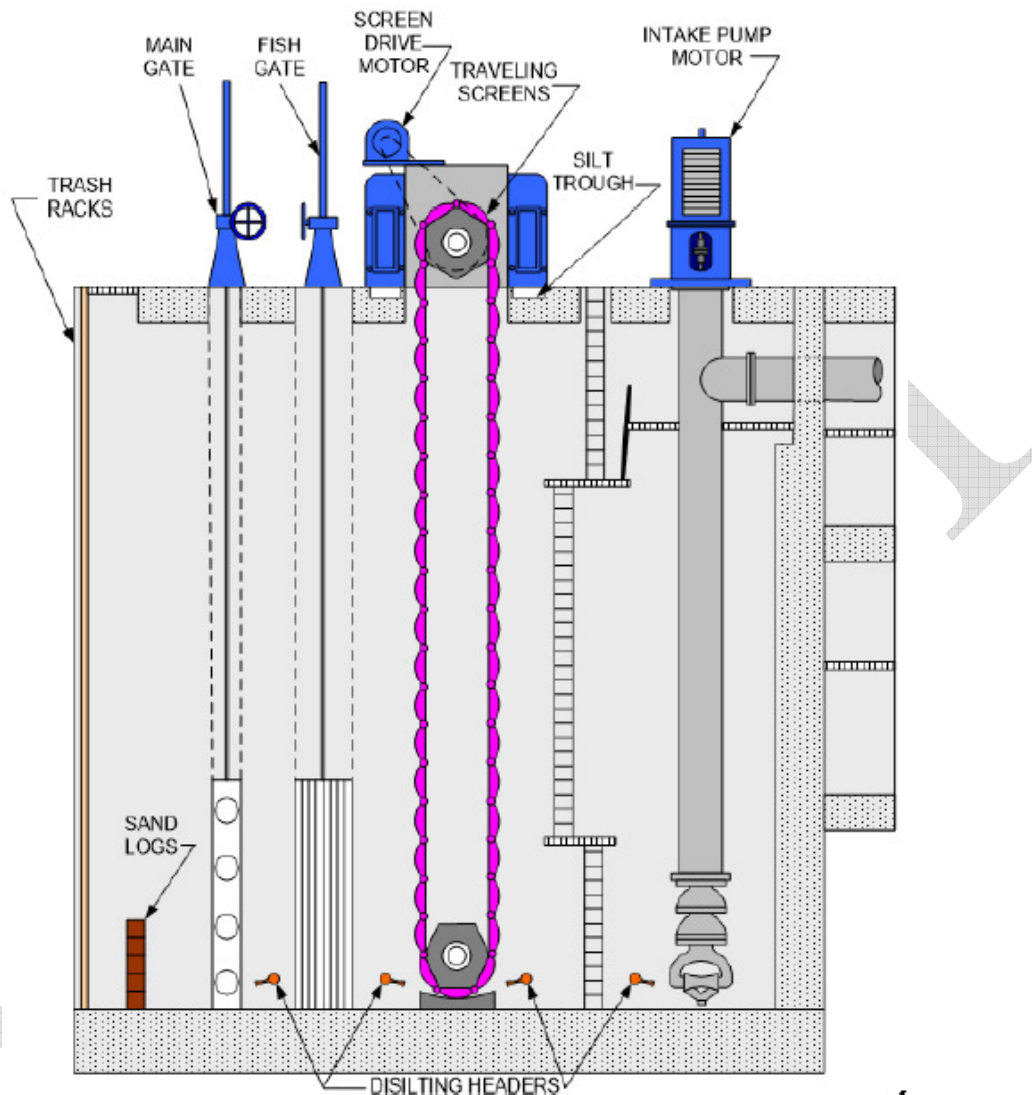
The Ameren Callaway Energy Center is located about 5 miles inland with an intake structure on the north bank of the Missouri River at river mile 115.4. The intake structure is located directly on the bank of the river and is labeled outfall #009. The main channel and greatest depth of the river occur immediately offshore of the intake structure. The maximum intake flow is 24.5 MGD therefore only impingement is required to be considered under 40 CFR 122.21(r)(1)(ii)(A). However, because the facility has installed closed cycle cooling, a BTA decision for entrainment can be made, but the studies required under 40 CFR 122.21(r)(1)(ii)(B) are waived.

When Callaway was built, the technology decision in 1984 established closed cycle cooling as the best achievable technology. In the 2014, final 316(b) rules, closed cycle cooling is considered the best technology under the new 316(b) regulations, 40 CFR 122.21(r) and 40 CFR 125 for both impingement and entrainment. The original CWA 316(b) demonstration for Callaway Energy Center was approved by the Department by letter from August 1987 as “Best Technology Available”; although this letter was not able to be found in the records. The 1986 report concluded the estimated annual number of fish lost to impingement had no impact on the ecology or sport fishery of the Missouri River with respect to maintaining a balanced indigenous fish population (BIP). One reason for the relatively low numbers of fish collected during the impingement study was the location of the plant intake structure (i.e., main channel). This area of the river is characterized by swift current and shifting substratum which does not present a preferred fish habitat. Because the intake structure equipment and operation are essentially the same as the time of the original study, Ameren and the Department believes the 1984 and 1986 studies are still valid.

CEC is designed with a closed-cycle cooling system that obtains makeup water from the Missouri River. The cooling system includes a 555-foot-high hyperbolic natural draft cooling tower. Makeup river water is pumped to the plant’s water treatment facility before being fed into the cooling tower basin. CEC has one cooling water makeup intake structure (CWMIS) located on the left descending shoreline of the Missouri River at river mile (RM) 115.4. The Missouri River is a navigable waterway and is frequently used by barge and recreational boat traffic.

The facility disclosed employees visually inspect the CWMIS twice daily while the minimum requirement per 40 CFR 125.96(e) is weekly. The facility has asked if the report required under this rule can be a certified statement showing the CWMIS is inspected. The permit writer has revised the language in special condition 7.(c) to allow for a certification statement in place of a full inspection report. Regardless, if significant deficiencies are reported, the statement should include such deficiency and rectification procedures for the deficiency.

The CWMIS is an enclosed cast-in-place concrete well structure constructed near the bank of the river. The base elevation is 486.0 feet (ft) above mean sea level (AMSL). The operating floor of the CWMIS is 541.5 ft AMSL. Normal water level is reported as 16 ft above the base elevation at 502.0 ft AMSL. Minimum design water level is reported as 495.0 ft AMSL. Maximum design water level is reported as 539.0 ft AMSL.

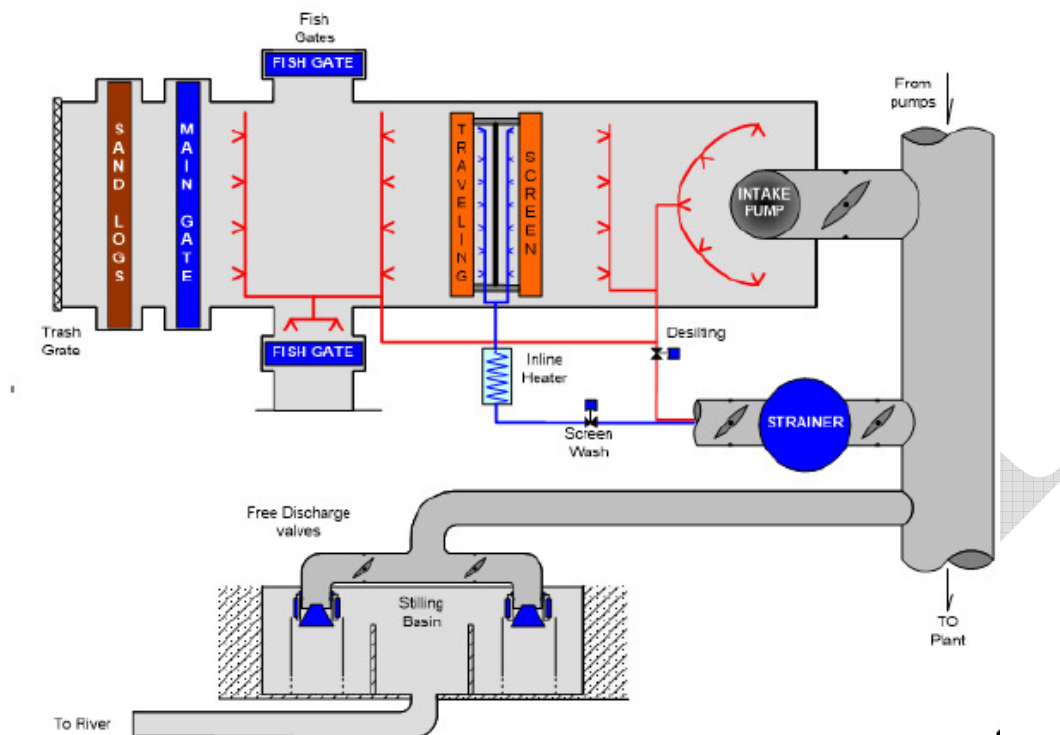


The CWMIS is divided into three identical intake bays that each consist of a trash rack at the river face of the intake. The trash racks have vertical 1/2-inch steel bars at 3 inches on center for an approximate percent open area of 88 percent. Behind the trash racks are sand logs installed to prevent sand from migrating into the bay or can be removed to maximize intake flow. The sand logs are typically in place during spring, summer, and fall, and are usually removed during winter when river elevations and flows are lower. The main closure gates downstream of the sand logs are 10 ft tall and 8 ft wide. Behind the main closure gates are low velocity fish gates in the sides of the walls of each intake bay. These fish gates allow fish to escape the intake structure.

Downstream of the fish gates, each intake bay has a standard 6-ft-wide through-flow traveling water screen (TWS) with 1/8-inch-square stainless steel mesh. There is a screen wash system for removing debris and organisms trapped on the mesh and sprays the debris into a trough to be returned to the river. The screens are typically rotated on an 8-hour timer with a run duration of 30 minutes. During periods with high debris load in the river the screens may operate more frequently. For instance, the screens have pressure differential sensors on each side, and if a pressure difference is detected the screens will automatically rotate. Similarly, during periods of inclement weather, the plant staff may anticipate a high debris load and turn the screens on to run continuously for several days. The screen spray wash system must operate at greater than 100 pounds per square inch gauge (psig) to ensure the TWSs are cleaned as they rotate. If pressure falls below 100 psig, the screens will stop rotating to prevent carryover of debris into the pumping system. The approach velocity of the TWS is 0.32 feet per second (fps) at the maximum pump flow of 14,000 gallons per minute (gpm) and a normal water level of 16 ft in the intake bay. The spray wash water system is fed from the intake pump header. The spray water is strained to remove small debris before being used as TWS spray wash water and desilting spray water. There are desilting spray heads located near the invert of the CWMIS at the main gates, the fish gates, the TWS, and the pump suction tube. These spray heads keep



silt from accumulating near the elements. The spray heads typically operate on a 12-hour timer. The desilting spray pressure is approximately 175 psig. The spray wash system also includes inline water heaters to provide warm spray water during cold seasons; however, according to plant staff, these heaters are rarely used.



Note: One intake bay is shown; three intake bays are present.

The CEC has replaced one intake pump and TWS in 2019; there is a plan to replace one pump and one TWS in 2020, and one pump and one TWS in 2021. The replacement units are of the same type and capacity as the existing pumps and TWSs. Upstream from the CWMIS are multi-pile steel dolphins installed to protect the intake from large debris and ice flow. CEC performs dredging operations near the front of the intake as needed to maintain reasonable flow into the CWMIS.

This facility utilizes three intake pumps to supply makeup water to the plant's water treatment plant via a 5.5-mile pipeline. The three pumps (A, B, and C) each withdraw river water from an intake bay. The intake bays are each equipped with a single vertical three-stage centrifugal pump with a maximum rating of 14,000 gpm. The pipeline system includes two discharge valves to control transient surge pressure of water being pumped into the system. The valves regulate pressure and divert excess water to a discharge box downstream of the CWMIS and then back to the river. Generally, CEC operates two of the three pumps continuously to supply makeup water to the plant. The third pump is held as a backup. Operation of individual pumps is frequently rotated to prevent overuse of an individual. During favorable conditions and during plant outages, CEC can supply makeup water with a single intake pump. Due to a change in plant management software, CEC does not have daily intake flow volumes for a complete five year period. The plant has supplied daily intake volumes for a portion of 2016 through August of 2019. The total plant design intake flow (DIF) is 24.5 million gallons per day (MGD) at a river elevation of approximately 502 ft AMSL. The average intake flow (AIF) rate over the past four years has been 18.1 MGD.

The facility has evaluated the area of influence (AOI) of the CWMIS. The definition of AOI is site-specific and can be determined by factors such as vulnerability of aquatic organisms based on species life history, swimming speed, intake velocity, pumping rate, intake structure configuration, river stage and other local factors. For CEC, the AOI of the Missouri River CWMIS may be evaluated using the design flow velocities at multiple locations through the structure. These locations include: approach velocity at the trash rack, through velocity at the trash rack, approach velocity at the curtain wall opening, approach velocity at the traveling screen, and through velocity at the traveling screen.

In order to address the requirement to determine the AOI, Ameren elected to calculate water velocities based on the design pumping capacity of the CWMIS. Specifically, this approach uses existing intake design flow data, surface areas of the intakes, and source water hydrology (e.g., river stage) for calculations. The analysis consists of a numeric flow analysis to determine the velocity of water near the CWMIS with the one pump operating fully. Assumptions include:

1. The velocity threshold for AOI associated with impingement is 0.5 feet per second (fps). This is the velocity threshold used by USEPA in the Rule under Compliance Option 2—0.5 fps through-screen design velocity. It is the assumed velocity, if not exceeded, would allow a fish to escape the influence of the CWMIS.
2. The approach and flow-through velocities of the CWMIS were calculated using the maximum design flow.
3. A normal water level (NWL) of 502.0 ft per National Geodetic Vertical Datum (NGVD).
4. Approach velocities were calculated at two locations:

Through-Screen Velocity is calculated according to the following equation:

$$\text{Through-Screen Velocity} = Q / (BW * WS * CPOA)$$

Where

Q is flow rate in cfs

BW is the screen width in feet

WS is the screen depth from bottom of screen to the water surface elevation

CPOA is the “calculated percent open area” of the screen

Calculated Percent Open Areas were: 83.3 percent for the trash rack; and 21.4 percent for travelling-water screen.

At normal water levels, only through-screen velocity at the curtain wall and travelling-water screen (i.e., 0.52 and 1.52 fps, respectively) are above the impingement velocity threshold. All other calculated velocity values are less than the 0.5 fps threshold. Therefore, under normal water levels there is no effective AOI associated with the CWMIS. For those fish entering the intake structure, fish passage gates in the side walls of each pump bay allow fish to escape at the downstream side of the intake. Each fish passage gate is normally open when the bay’s intake pump is operating.

Velocities are based on flow area at a normal water level (NWL) of 502.0 ft NGVD.			Each Pump (separate intake bays)
			14,000 gpm
			20 MGD
			31.2 cfs
Location	Water Level	Flow Area (ft²)	Velocity (fps)
Trash Rack (approach)	NWL	101	0.31
Trash Rack (through bars)		84	0.37
Curtain Wall Opening (through)		60	0.52
Traveling Screen (approach)		96	0.32
Traveling Screen (through screen)		21	1.52
Structure dimensions and elevations:			
Trash Rack:	Top elevation: 541.0 ft; Bottom elevation: 486.0 ft; Effective height: 55.0 ft; Width: 6.4 ft; Net clean open area: 83.3%		
Curtain Wall Opening:	Top elevation: 496.0 ft; Bottom elevation: 486.0 ft; Actual height: 10 ft; Width: 6.0 ft; Open gate / stop logs		
Traveling Screen:	Top elevation: 541.0 ft; Bottom elevation: 486.0 ft; Effective height: 16.0 ft; Width: 6.0 ft; Net clean open area: 21.4%		

Within a 1-mi radius of the CEC MWIS, the river channel gradually bends, but habitat remains relatively uniform. Under normal river stage, channel width is approximately 1,630 ft. The main channel bends toward the north shore directly in front of the MWIS. Multiple wing dykes along the far shore upstream of the MWIS provide structure and direct flow into the navigation channel. Channel depths are between 18 and 30 ft at normal flows (ASA 2017). The far shore is a shallower, depositional area that has exposed sandbars at low flows. Logan Creek flows into the Missouri River 650 ft directly downstream of the MWIS. A variable riparian zone from 50 to 300 ft wide exists upstream and downstream of the MWIS. A larger, more consistent riparian zone greater than 500 ft wide is established along the far shore. Land use in the area is 40% forest and wetlands, followed by 35% crop land, 18% open water, 6% developed, and 2% herbaceous shrub.

The required source water baseline biological characterization data are used by the Director to characterize the biological community in the vicinity of the CWIS and to characterize the operation of the CWIS. This information includes species and life stages (including threatened and endangered [T&E] species) most susceptible to IM&E by the facility’s CWIS. Additionally, information is provided regarding the primary period of reproduction, larval recruitment, and abundance for relevant taxa.

Both historic and recent IM&E sampling has been conducted at CEC's MWIS to determine the fish species and life stages most susceptible to IM&E (UEC 1986; Amec Foster Wheeler 2017; ASA 2017). In addition, previous studies of the ichthyoplankton community are available from the lower Missouri River that can be used to assess the susceptibility of species to entrainment (Schrunk et al. 2001; Reeves 2006; Reeves and Galat 2010). These publications and others provide valuable information on the current composition of adult and larval fishes present in the Missouri River and will be used along with IM&E surveys conducted at CEC to assess the likelihood that specific species could be impinged or entrained at CEC.

The most recent fisheries surveys at CEC were conducted from 2007-2008, and a total of 4,128 fish representing 45 distinct species were collected during this effort. Samples were numerically dominated by gizzard shad (*Dorosoma cepedianum*; 39.5 percent of total), red shiner (*Cyprinella lutrensis*; 22.5 percent), and emerald shiner (*Notropis atherinoides*; 20.1 percent), which together represented 82.0 percent of the total catch. Other common large-river species sampled included channel catfish (*Ictalurus punctatus*), shoal chub (*Macrhybopsis hyostoma*), freshwater drum (*Aplodinotus grunniens*), shovelnose sturgeon (*Scaphirhynchus platyrhynchus*), goldeye (*Hiodon alosoides*), and bullhead minnow (*Pimephales vigilax*). Nearly all species that were encountered in historical collections from this reach of the Missouri River were collected during the 2007 – 2008 survey (UEC 1974, 1976; CDM 1981, 1982). Exceptions included highfin carpsucker (*Carpiodes velifer*) and white crappie (*Pomoxis annularis*). Species richness and catch-per-unit-effort (CPUE) rates were greatest in electrofishing and seining samples, substantially lower in gill net samples, and extremely low in hoop net samples (Table 3-2). However, gill netting resulted in the collection of two species, lake sturgeon (*Acipenser fulvescens*) and paddlefish (*Polyodon spathula*), that were not collected by any other method. Similarly, black crappie (*Pomoxis nigromaculatus*) was only collected while hoop netting.

The Pallid Sturgeon Population Assessment Project (PSPAP) is an ongoing, collaborative monitoring program of the Missouri River that was initiated in 2003 under the Missouri River Recovery Program (MRRP) led by the USACE and U.S. Fish and Wildlife Service (USFWS), with full implementation beginning in 2006, and includes members representing both federal and state agencies and university researchers. The main objectives of the PSPAP are to evaluate annual and long-term trends of abundance, distribution, habitat usage, and population structure of the federally endangered pallid sturgeon. In addition, the PSPAP seeks to evaluate annual results and long-term trends of population abundance, geographical distribution, and habitat usage of native target and non-target species. Native target species of the PSPAP include the shovelnose sturgeon, plains minnow, western silvery minnow (*Hybognathus argyritis*), sand shiner, sturgeon chub, sicklefin chub (*Macrhybopsis meeki*), shoal chub, blue sucker (*Cycleptus elongatus*), and sauger. Annual surveys are conducted in the upper basin (segments 1 – 4) above Garrison Dam and the lower basin (segments 5 – 10, and 13 – 14) below Fort Randall Dam (Herman et al. 2014; Herman and Wrasse 2015, 2016). River segment 14, which begins at the confluence of the Osage River (RM 130.2) and ends at the confluence with the Mississippi River (RM 0.0), is where CEC is located. Annual surveys are divided into two seasons, sturgeon season and fish community season. The sturgeon season begins in the fall of the previous calendar year when water temperatures fall below 12.8 °C and concludes at the end of June, and the fish community season occurs from July through October. Results from recent annual surveys (2013 - 2015) conducted within river segment 14 using five gear types (gill nets, otter trawls, trammel nets, mini-fyke nets, and trotlines) are summarized below.

EPA consulted with the US Fish and Wildlife Service and the National Marine Fisheries Service under the Endangered Species Act rules. In 2013, the Services concluded the new 316(b) rule is not likely to jeopardize the continued existence of listed species or result in adverse modification of designated critical habitat. However the Services added a number of conditions to the final rule. The rules require facilities to identify all federally-listed threatened and endangered species and designated critical habitat present in the zone of influence of the intake. This condition includes all listed species, not just fish and shellfish. Additional control measures, monitoring, or reporting requirements may be established to minimize incidental take. The previous permit addressed these concerns.

This operating permit contains language indicating the permit may be reopened and modified, or alternatively revoked and reissued to: incorporate new or modified requirements applicable to existing cooling water intake structures under Section 316(b) of the Clean Water Act consistent with any standard established pursuant to section 1311 or section 1316 of 33 USC 1326. In the event that, it is necessary for this permit to be reopened and modified, or alternatively revoked and reissued, permittee shall comply with any such new or modified requirements or standards applicable to existing cooling water intake structures under 316(b) of the Clean Water Act.

To meet the 316(b) requirements, Ameren will be required to conduct some of the studies required under 40 CFR 122.21(r). As the intake is less than 125 MGD, the entrainment decision is a best professional judgment decision not requiring all the studies. For impingement, Callaway has already installed one of the approved technologies, cooling towers. With the installed cooling towers, that is one of the approved methods for showing compliance with the Impingement Mortality requirements in 40 CFR 122.21(r).

As part of the request for NRC license renewal under the Environmental Impact Section, Ameren agreed to conduct impingement and entrainment studies for 52 weeks. The report, submitted March 2017, was reviewed. This study focused on the possible effects of impingement and entrainment on pallid sturgeon (*Scaphirhynchus albus*).

The study consisted of three components: impingement sampling, entrainment sampling, and in-river ichthyoplankton sampling. Impingement samples were collected from the MWIS traveling screens for 52 consecutive weeks (October 2015 - September 2016) during representative plant generation and operation of the screen-wash system. Entrainment sampling was conducted from March

through September of 2016 to coincide with the spawning period for pallid sturgeon and other Missouri River fish species, using a pump and net system deployed by boat immediately in front of the MWIS's intake trash racks. In-river sampling was conducted over four weeks in May 2016 to document the occurrence and spatial distribution of pallid sturgeon larvae drifting in the Missouri River as it flows past the Callaway MWIS. In-river sampling used an epibenthic sled for sampling at a depth near the river bottom and a 1-m plankton net for near-surface and midwater depths, within three lateral zones (channel border near intake, main channel, channel border opposite intake) just upriver from the MWIS.

No pallid sturgeon were collected in impingement, entrainment, or in-river samples. No other Federal or State-listed threatened and endangered species or State-listed species of concern were found in impingement or entrainment samples. Young gizzard shad dominated impingement samples, comprising 50.6% of all fish collected, followed by larval or early juvenile common carp (12.7%). The estimated total annual impingement for all species combined ranged from 1,833 fish to 2,427 fish and total biomass ranged from 2.3 to 3.1 kg. The low biomass total (average 1.27 g per fish) reflected the relative abundance of small fish, i.e., larvae, young of year, or yearling. The low estimated total numbers and biomass impinged would be expected given the design of Callaway's closed-cycle cooling system.

Asian carp species of the genus *Hypophthalmichthys* (bighead carp and silver carp) dominated entrainment samples, comprising nearly two-thirds (64.9%) of all fish collected. Most were larvae but 163 eggs were collected beginning in early May and continuing until early August, indicating a prolonged spawning period. Another non-native Asian carp species, the grass carp, was second in abundance. Eggs and larvae of this species accounted for 11.8% of all entrained fishes, which together with silver carp and bighead carp resulted in over three out of four collected fishes (76.7%) identified as Asian carp. Without these species, the total annual entrainment estimates would range from 1,650,571 to 2,200,763 eggs or larvae. From in-river sampling, a total of six larvae were confirmed as shovelnose sturgeon (a congener of the endangered pallid sturgeon) and one egg was identified as a sturgeon egg. No pallid sturgeon or pallid/shovelnose sturgeon hybrid larvae were collected. Four of the shovelnose sturgeon larvae were collected in bottom tows from the main channel/thalweg zone. Densities of shovelnose sturgeon larvae were less than 0.014 per m<sup>3</sup>.

The USNRC concluded in the 2014 Generic Environmental Impact Statement (GEIS) for Callaway that any impingement and/or entrainment of pallid sturgeon larvae and juveniles would be small and discountable. This conclusion was based largely on the small size of the Callaway action area, the minimal amount of water withdrawn by the Callaway MWIS, and the lack of pallid sturgeon eggs and/or larvae in historical impingement, entrainment, and in-river samples collected at and near Callaway. Based on the results of the present study and available information, the egg, juvenile, and adult life stages of the pallid sturgeon in good health should have a very low risk of impingement or entrainment at the Callaway MWIS. While free-drifting pallid sturgeon larvae may be vulnerable to impingement or entrainment, several factors including their benthic distribution, the use of stop logs at the bottom portion of the intake opening, the small percentage of river water withdrawn (< 1%), and the low densities of pallid sturgeon larvae in the lower Missouri River help to minimize the risk of being impinged or entrained at the Callaway MWIS. This conclusion is borne out by the absence of pallid sturgeon in impingement and entrainment samples to date and confirms the conclusion drawn by the USNRC in the GEIS. The Department supports the USNRC's decision and after review of the report, have no concerns.

Based on the results of the studies conducted, and the additional studies required under 40 CFR 122.21(r), no operational changes are recommended at this permit renewal for protection of aquatic life.

Under 40 CFR 122.21(r), application requirements for cooling water intake structures, the required studies at Callaway include:

- i. Source Water Physical Data Report, 40 CFR 122.21(r)(2): This report requires a description and scaled drawings showing the physical configuration of the water body, including areal dimensions, depths, and temperature regimes, identification and characterization of the source waterbody's hydrological and geomorphological features, estimate the intake's area of influence within the waterbody and locational maps.
- ii. Cooling Water Intake Structure Data Report, 40 CFR 122.21(r)(3): This report requires information on the design of the intake structure and its location in the water column. It includes design intake flows, daily hours of operation, number of days of the year in operation and seasonal changes, if applicable; a flow distribution and water balance diagram including all sources of water to the facility, recirculating flows, and discharges, and engineering drawings of the cooling water intake structure.
- iii. Source Water Baseline Biological Characterization Data Report, 40 CFR 122.21(r)(4): This report characterizes the biological community in the vicinity of the cooling water intake structure. Historic data may be used as long as the facility attests the stream characteristics have not changed.
- iv. Cooling Water System Data Report, 40 CFR 122.21(r)(5): This report provides information on the operation of the cooling water system including descriptions of reductions in water withdrawals, recycled water, proportion of the source waterbody withdrawn.
- v. Chosen (or Continued) Method of Compliance with Impingement Mortality Standard, 40 CFR 122.21(r)(6): the facility will need to indicate the impingement mortality standard (enumerated at 40 CFR 125.94(c)) chosen for this facility. This can be a continued, or newly chosen method. This facility currently utilizes 1) closed cycle cooling per 40 CFR 125.94(c)(1) and 2) traveling screens per 40 CFR 125.94(c)(5).
- vi. The facility has not yet provided an optimization study for the modified traveling screens to the Department. However, the Department has determined closed-cycle cooling is more stringent than traveling screens therefore an optimization study is not

required at this time. Should the facility decide to complete an optimization study, the study shall be submitted with the next application for renewal.

- vii. Operational Status, 40 CFR 122.21(r)(8): The operational status report includes descriptions of each unit's operating status including age of the unit, capacity utilization for the previous 5 years, and any major upgrades completed within the last 15 years, including boiler replacement, condenser replacement, turbine replacement, and fuel change.

While the facility has submitted (r)(2), (r)(3), (r)(4), (r)(5), and (r)(8) in the past, there were no allowances in the rule for the Department to no longer to require these studies. The rule stipulates that the facility shall submit these with each renewal and must supply additional data if collected.

#### **COST ANALYSIS FOR COMPLIANCE (CAFCOM):**

Pursuant to Section 644.145, RSMo, when incorporating a new requirement for discharges from publicly owned facilities, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., pertaining to any portion of a publicly owned facility, the Department of Natural Resources shall make a "finding of affordability" on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the Federal Water Pollution Control Act. This process is completed through a cost analysis for compliance. Permits not including new requirements may be deemed affordable.

- ✓ The Department is not required to complete a cost analysis for compliance because the facility is not publicly owned.

#### **DOMESTIC WASTEWATER, SLUDGE, AND BIOSOLIDS:**

Domestic wastewater is defined as wastewater (i.e., human sewage) originating primarily from the sanitary conveyances of bathrooms and kitchens. Domestic wastewater excludes stormwater, animal waste, process waste, and other similar waste.

- ✓ Applicable; this facility uses a lagoon system which the Department of Natural Resources must authorize in accordance with 19 CSR 20-3.060(6)(D) as Department of Health and Senior Services rules only provide for the use of a lagoon for single residences.

Sewage sludge is solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works. Biosolids are solid materials resulting from domestic wastewater treatment meeting federal and state criteria for productive use (i.e. fertilizer) and after having pathogens removed.

Additional information: <http://extension.missouri.edu/main/DisplayCategory.aspx?C=74> (WQ422 through WQ449).

- ✓ Applicable, sludge/biosolids/septage are stored in the lagoon. The permitted management strategy must be followed, see FACILITY DESCRIPTION in the permit. If the described management strategy cannot be followed, the permittee must obtain a permit modification. See Standard Conditions Part III.
- ✓ Standard conditions Part III is incorporated into this permit.

#### **EFFLUENT LIMITATIONS:**

Effluent limitations derived and established for this permit are based on current operations of the facility and applied per 10 CSR 20-7.015(9)(A). Any flow through the outfall is considered a discharge and must be sampled and reported as provided in the permit. Future permit action due to facility modification may contain new operating permit terms and conditions which supersede the terms and conditions, including effluent limitations, of this operating permit. Daily maximums and monthly averages are required per 40 CFR 122.45(d)(1) for continuous discharges (not from a POTW).

#### **EFFLUENT LIMITATION GUIDELINE:**

Effluent Limitation Guidelines, or ELGs, are found at 40 CFR 400-499. These are limitations established by the EPA based on the SIC code and the type of work a facility is conducting. Most ELGs are for process wastewater and some address stormwater. All are technology based limitations which must be met by the applicable facility at all times.

- ✓ The facility has an associated Effluent Limit Guideline (ELG) at 40 CFR 423 applicable to certain wastewater discharges at this site, and is applied under 40 CFR 125.3(a). Should Reasonable Potential be established for any particular parameter, and water-quality derived effluent limits are more protective of the receiving water's quality, the WQS will be used as the limiting factor in accordance with 40 CFR 122.44(d) and 10 CSR 20-7.015(9)(A). See Part IV: EFFLUENT LIMITS DETERMINATION.

#### **ELECTRONIC DISCHARGE MONITORING REPORT (EDMR) SUBMISSION SYSTEM:**

The U.S. Environmental Protection Agency (EPA) promulgated a final rule on October 22, 2015, to modernize Clean Water Act reporting for municipalities, industries, and other facilities by converting to an electronic data reporting system. The final rule requires regulated entities and state and federal regulators to use information technology to electronically report data required by the National Pollutant Discharge Elimination System (NPDES) permit program instead of filing paper reports. To comply with the federal rule, the Department is requiring all permittees to begin submitting discharge monitoring data and reports online.



Per 40 CFR 127.15 and 127.24, permitted facilities may request a temporary waiver for up to 5 years or a permanent waiver from electronic reporting from the Department. To obtain an electronic reporting waiver, a permittee must first submit an eDMR Waiver Request Form: <http://dnr.mo.gov/forms/780-2692-f.pdf>. A request must be made for each facility. If more than one facility is owned or operated by a single entity, then the entity must submit a separate request for each facility based on its specific circumstances. An approved waiver is not transferable.

The Department must review and notify the facility within 120 calendar days of receipt if the waiver request has been approved or rejected [40 CFR 124.27(a)]. During the Department review period as well as after a waiver is granted, the facility must continue submitting a hard-copy of any reports required by their permit. The Department will enter data submitted in hard-copy from those facilities allowed to do so and electronically submit the data to the EPA on behalf of the facility.

To assist the facility in entering data into the eDMR system, the permit describes limit sets in each table in Part A of the permit. The data entry personnel should use these identifiers to ensure data entry is being completed appropriately.

✓ The permittee/facility is currently using the eDMR data reporting system.

#### **GENERAL CRITERIA CONSIDERATIONS:**

In accordance with 40 CFR 122.44(d)(1), effluent limitations shall be placed into permits for pollutants determined to cause, have reasonable potential to cause, or to contribute to, an excursion above any water quality standard, including narrative water quality criteria. In order to comply with this regulation, the permit writer has completed a reasonable potential determination on whether discharges have reasonable potential to cause, or contribute to an excursion of the general criteria listed in 10 CSR 20-7.031(4). In instances where reasonable potential exists, the permit includes limitations within the permit to address the reasonable potential. In discharges where reasonable potential does not exist, the permit may include monitoring to later determine the discharge's potential to impact the narrative criteria. Additionally, RSMo 644.076.1, as well as Section D – Administrative Requirements of Standard Conditions Part I of this permit state it shall be unlawful for any person to cause or allow any discharge of water contaminants from any water contaminant or point source located in Missouri in violation of sections 644.006 to 644.141 of the Missouri Clean Water Law or any standard, rule, or regulation promulgated by the commission. See Part IV for specific determinations.

#### **GROUNDWATER MONITORING:**

Groundwater is a water of the state according to RSMo 644.016(27), is subject to regulations at 10 CSR 20-7.015(7) and 10 CSR 20-7.031(6), and must be protected accordingly.

✓ Groundwater Monitoring at Callaway is covered by the NRC environmental plans. Callaway Energy Center has an extensive groundwater monitoring network meeting the industry standard established in *Industry Ground Water Protection Initiative – Final Guidance Document* (NEI 07-07; August 2007) <http://pbadupws.nrc.gov/docs/ML0726/ML072610036.pdf>. Numerous groundwater monitoring wells have been installed surrounding the power block area to monitor plant systems, structures, and components. In addition, monitoring wells have been installed along the discharge line and elsewhere on the plant site. Monitoring wells are sampled for tritium and gamma emitters. Additional information about groundwater monitoring at Callaway is available online through the NRC: <http://pbadupws.nrc.gov/docs/ML0831/ML083150703.pdf>

#### **INTAKE WATER CREDITS (NET LIMITS):**

In accordance with federal regulation 40 CFR 122.45(g), technology-based effluent limitations or standards shall be adjusted to reflect credit for pollutants in the discharge's intake water if: (1) The applicable effluent limitations and standards contained in 40 CFR subchapter N specifically provide that they shall be applied on a net basis; or (2) The discharger demonstrates that the control system it proposes or uses to meet applicable technology-based limitations and standards would, if properly installed and operated, meet the limitations and standards in the absence of pollutants in the intake waters. Additionally, credit for conventional pollutants such as biochemical oxygen demand (BOD) or total suspended solids (TSS) should not be granted unless the permittee demonstrates the constituents of the generic measure in the effluent are substantially similar to the constituents of the generic measure in the intake water or unless appropriate additional limits are placed on process water pollutants either at the outfall or elsewhere. Credit shall be granted only to the extent necessary to meet the applicable limitation or standard, up to a maximum value equal to the influent value. Additional monitoring may be necessary to determine eligibility for credits and compliance with permit limits. Credit (Net Limits) do not apply to the discharge of raw water clarifier sludge generated from the treatment of intake water. As Ameren continuously recycles water through the system, net intake credits are not being granted. The facility can meet the effluent limits established without intake credit provisions.

#### **LAND APPLICATION:**

Land application, or surficial dispersion of wastewater and/or sludge, is performed by facilities to maintain a basin or wastewater flow as no-discharge. Requirements for these types of operations are found in 10 CSR 20-6.015; authority to regulate these activities is from RSMo 644.026.

✓ Not applicable, this facility is not authorized to land apply for other than dust suppression.  
✓ This permit does not authorize land disposal or the application of hazardous waste.

#### LAND DISTURBANCE:

Land disturbance, sometimes called construction activities, are actions which cause disturbance of the root layer or soil; these include clearing, grading, and excavating of the land. 40 CFR 122.26(b)(14) and 10 CSR 20-6.200(3) requires permit coverage for these activities. Coverage is not required for facilities when only providing maintenance of original line and grade, hydraulic capacity, or to continue the original purpose of the facility.

- ✓ Not applicable; this permit does not provide coverage for land disturbance activities. The facility may obtain a separate land disturbance permit (MORA) online at <https://dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm>; MORA permits do not cover disturbance of contaminated soils, however, site specific permits such as this one can be modified to include appropriate controls for land disturbance of contaminated soils by adding site-specific BMP requirements and additional outfalls.

#### MAJOR WATER USER:

Any surface or groundwater user with a water source and the equipment necessary to withdraw or divert 100,000 gallons (or 70 gallons per minute) or more per day combined from all sources from any stream, river, lake, well, spring, or other water source is considered a major water user in Missouri. All major water users are required by law to register water use annually (Missouri Revised Statutes Chapter 256.400 Geology, Water Resources and Geodetic Survey Section). <https://dnr.mo.gov/pubs/pub2236.htm>

- ✓ Applicable; this facility is a major water user and is registered with the state.

#### OIL/WATER SEPARATORS:

Oil water separator (OWS) tank systems are frequently found at industrial sites where process water and stormwater may contain oils and greases, oily wastewaters, or other immiscible liquids requiring separation. Food industry discharges typically require pretreatment prior to discharge to municipally owned treatment works. Per 10 CSR 26-2.010(2)(B), all oil water separator tanks must be operated according to manufacturer's specifications and authorized in NPDES permits per 10 CSR 26-2.010(2) or may be regulated as a petroleum tank.

- ✓ Not applicable; the permittee has not disclosed the use of any oil water separators they wish to include under the NPDES permit at this facility and therefore oil water separator tanks are not authorized by this permit. The facility uses an oily waste treatment system which is not an oil/water separator contained in an above or below ground tank structure.

#### PRETREATMENT:

This permit does not regulate pretreatment requirements for facilities discharging to an accepting permitted wastewater treatment facility. If applicable, the receiving entity (the publically owned treatment works - POTW) is to ensure compliance with any effluent limitation guidelines for pretreatment listed in 40 CFR Subchapter N per 10 CSR 20-6.100. Pretreatment regulations per RSMo 644.016 are limitations on the introduction of pollutants or water contaminants into publicly owned treatment works or facilities.

- ✓ Not applicable, this facility does not discharge wastewater to a POTW.

#### REASONABLE POTENTIAL (RP):

Federal regulation [40 CFR Part 122.44(d)(1)(i)] requires effluent limitations for all pollutants which are (or may be) discharged at a level causing or have the reasonable potential to cause (or contribute to) an in-stream excursion above narrative or numeric water quality standards. Per 10 CSR 20-7.031(4), general criteria shall be applicable to all waters of the state at all times; however, acute toxicity criteria may be exceeded by permit in zones of initial dilution, and chronic toxicity criteria may be exceeded by permit in mixing zones. If the permit writer determines any given pollutant has the reasonable potential to cause or contribute to an in-stream excursion above the WQS, the permit must contain effluent limits for the pollutant per 40 CFR Part 122.44(d)(1)(iii) and the most stringent limits per 10 CSR 20-7.031(9)(A). Permit writers may use mathematical reasonable potential analysis (RPA) using the Technical Support Document for Water Quality Based Toxics Control (TSD) methods (EPA/505/2-90-001) as found in Section 3.3.2, or may also use reasonable potential determinations (RPD) as provided in Sections 3.1.2, 3.1.3, and 3.2 of the TSD.

- ✓ Applicable; an RPA was conducted on appropriate parameters and was conducted as per (TSD Section 3.3.2). A more detailed version including calculations of this RPA is available upon request. See Wasteload Allocations (WLA) for Limits in this section.

#### Outfall #001:

Parameter:	Units	CMC Acute	CCC Chronic	Listing	Daily Max	Monthly Average	n#	CV	n Max	MF	RWC Acute	RWC Chronic	RP
Boron, TR	µg/L	n/a	2000	IRR	67,306,555	33,549,456	2	0.600	1760000	7.39	1,182,762	635	No

Units are (µg/L) unless otherwise noted.

n/a Not Applicable

n number of samples; if the number of samples is 10 or greater, then the CV value must be used in the WQBEL for the applicable constituent.

CV Coefficient of Variation (CV) is calculated by dividing the Standard Deviation of the sample set by the mean of the same sample set.

CCC continuous chronic concentration

CMC continuous maximum concentration

RWC Receiving Water Concentration: concentration of a toxicant or the parameter in the receiving water after mixing (if applicable)

MF Multiplying Factor; 99% confidence level and 99% probability basis

RP Reasonable Potential: an effluent is projected or calculated to cause an excursion above a water quality standard based on a number of factors including, as a minimum, the four factors listed in 40 CFR 122.44(d)(1)(ii).



- ✓ Applicable; the permit writer conducted an RPD on applicable parameters within the permit for all outfalls. See Part IV: Effluent Limits Determinations below, and the RPA table above.
- ✓ This permit establishes permit limits and benchmarks for stormwater at outfalls #010, #011, #012, #014, and #015. The Department has determined stormwater is not a continuous discharge and is therefore not necessarily dependent on mathematical RPAs. However, the permit writer completed an RPD, a reasonable potential determination, using best professional judgment for all of the appropriate parameters in this permit. An RPD consists of reviewing application data and/or discharge monitoring data for the last five years and comparing those data to narrative or numeric water quality criteria.
- ✓ Permit writers use the Department's permit writer's manual (<http://dnr.mo.gov/env/wpp/permits/manual/permit-manual.htm>), the EPA's permit writer's manual (<https://www.epa.gov/npdes/npdes-permit-writers-manual>), program policies, and best professional judgment. For each parameter in each permit, the permit writer carefully considers all applicable information regarding: technology based effluent limitations, effluent limitation guidelines, water quality standards, stream flows and uses, and all applicable site specific information and data gathered by the permittee through discharge monitoring reports and renewal (or new) application sampling. Best professional judgment is based on the experience of the permit writer, cohorts in the Department and resources at the EPA, research, and maintaining continuity of permits if necessary. For stormwater permits, the permit writer is required per 10 CSR 6.200(6)(B)2 to consider: A. application and other information supplied by the permittee; B. effluent guidelines; C. best professional judgment of the permit writer; D. water quality; and E. BMPs. Part IV provides specific decisions related to this permit.

#### **SAMPLING FREQUENCY JUSTIFICATION:**

Sampling and reporting frequency was generally retained from previous permit. 40 CFR 122.45(d)(1) indicates all continuous discharges shall be permitted with daily maximum and monthly average limits. Minimum sampling frequency for all parameters is annually per 40 CFR 122.44(i)(2).

Sampling frequency for stormwater-only outfalls is typically quarterly even though BMP inspection occurs monthly. The facility may sample more frequently if additional data is required to determine if best management operations and technology are performing as expected.

#### **SAMPLING TYPE JUSTIFICATION:**

Sampling type was continued from the previous permit. The sampling types are representative of the discharges, and are protective of water quality. Discharges with altering effluent should have composite sampling; discharges with uniform effluent can have grab samples. Grab samples are usually appropriate for stormwater. Parameters which must have grab sampling are: pH, ammonia, *E. coli*, total residual chlorine, free available chlorine, hexavalent chromium, dissolved oxygen, total phosphorus, volatile organic compounds, and others.

#### **SCHEDULE OF COMPLIANCE (SOC):**

A schedule of remedial measures included in a permit, including an enforceable sequence of interim requirements (actions, effluent limits, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit. SOC's are allowed under 40 CFR 122.47 and 10 CSR 20-7.031(11) providing certain conditions are met.

A SOC is not allowed:

- For effluent limitations based on technology-based standards established in accordance with federal requirements, if the deadline for compliance established in federal regulations has passed. 40 CFR 125.3.
- For a newly constructed facility in most cases. Newly constructed facilities must meet applicable effluent limitations when discharge begins, because the facility has installed the appropriate control technology as specified in a permit or antidegradation review. A SOC is allowed for a new water quality based effluent limit not included in a previously public noticed permit or antidegradation review, which may occur if a regulation changes during construction.
- To develop a TMDL, UAA, or other study associated with development of a site specific criterion. A facility is not prohibited from conducting these activities, but a SOC may not be granted for conducting these activities.

In order to provide guidance in developing SOC's, and to attain a greater level of consistency, the Department issued a policy on development of SOC's on October 25, 2012. The policy provides guidance to permit writers on standard time frames for schedules for common activities, and guidance on factors to modify the length of the schedule.

- ✓ Not applicable; this permit does not contain a SOC.

#### **SPILLS, OVERFLOWS, AND OTHER UNAUTHORIZED DISCHARGE REPORTING:**

Per 260.505 RSMo, any emergency involving a hazardous substance must be reported to the Department's 24 hour Environmental Emergency Response hotline at (573) 634-2436 at the earliest practicable moment after discovery. The Department may require the submittal of a written report detailing measures taken to clean up a spill. These reporting requirements apply whether or not the spill results in chemicals or materials leaving the permitted property or reaching waters of the state. This requirement is in addition to the noncompliance reporting requirement found in Standard Conditions Part I. <http://dnr.mo.gov/env/esp/spillbill.htm>

Any other spills, overflows, or unauthorized discharges reaching waters of the state must be reported to the regional office during normal business hours, or after normal business hours, to the Department's 24 hour Environmental Emergency Response spill line at 573-634-2436.

#### **SLUDGE – INDUSTRIAL:**

Industrial sludge is solid, semi-solid, or liquid residue generated during the treatment of industrial process or non-process wastewater in a treatment works; including but not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment process; scum and solids filtered from water supplies and backwashed; and any material derived from industrial sludge.

- ✓ Applicable; water treatment plant sludge is stored in the lagoons and will be hauled to a permitted disposal site as necessary. Removal of sludge has not been necessary historically. The permitted management strategy must be followed, see permit under FACILITY DESCRIPTION. If the permitted management strategy cannot be followed, the permittee must obtain a permit modification.

#### **STANDARD CONDITIONS:**

The standard conditions Part I attached to this permit incorporate all sections of 40 CFR 122.41(a) through (n) by reference as required by law. These conditions, in addition to the conditions enumerated within the standard conditions should be reviewed by the permittee to ascertain compliance with this permit, state regulations, state statutes, federal regulations, and the Clean Water Act. Standard Conditions Part III, if attached to this permit, incorporate requirements dealing with domestic wastewater, sludge, and land application.

#### **STORMWATER PERMITTING: LIMITATIONS AND BENCHMARKS:**

Because of the fleeting nature of stormwater discharges, the Department, under the direction of EPA guidance, has determined monthly averages are capricious measures of stormwater discharges. The *Technical Support Document for Water Quality Based Toxics Control* (EPA/505/2-90-001; 1991) Section 3.1 indicates most procedures within the document apply only to water quality based approaches, not end-of-pipe technology-based controls. Hence, stormwater-only outfalls will generally only contain a maximum daily limit (MDL), benchmark, or monitoring requirement as dictated by site specific conditions, the BMPs in place, past performance of the facility, and the receiving water's current quality.

Sufficient rainfall to cause a discharge for one hour or more from a facility would not necessarily cause significant flow in a receiving stream. Acute Water Quality Standards (WQSs) are based on one hour of exposure, and must be protected at all times. Therefore, industrial stormwater facilities with toxic contaminants present in the stormwater may have the potential to cause a violation of acute WQSs if toxic contaminants occur in sufficient amounts. In this instance, the permit writer may apply daily maximum limitations.

Conversely, it is unlikely for rainfall to cause a discharge for four continuous days from a facility; if this does occur however, the receiving stream will also likely sustain a significant amount of flow providing dilution. Most chronic WQSs are based on a four-day exposure with some exceptions. Under this scenario, most industrial stormwater facilities have limited potential to cause a violation of chronic water quality standards in the receiving stream.

A standard mass-balance equation cannot be calculated for stormwater because stormwater flow and flow in the receiving stream cannot be determined for conditions on any given day or storm event. The amount of stormwater discharged from the facility will vary based on current and previous rainfall, soil saturation, humidity, detention time, BMPs, surface permeability, etc. Flow in the receiving stream will vary based on climatic conditions, size of watershed, area of surfaces with reduced permeability (houses, parking lots, and the like) in the watershed, hydrogeology, topography, etc. Decreased permeability may increase the stream flow dramatically over a short period of time (flash).

Numeric benchmark values are based on site specific requirements taking in to account a number of factors but cannot be applied to any process water discharges. First, the technology in place at the site to control pollutant discharges in stormwater is evaluated. The permit writer also evaluates other similar permits for similar activities. A review of the guidance forming the basis of Environmental Protection Agency's (EPA's) *Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity* (MSGP) may also occur. Because precipitation events are sudden and momentary, benchmarks based on state or federal standards or recommendations use the Criteria Maximum Concentration (CMC) value, or acute standard may also be used. The CMC is the estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed briefly without resulting in an unacceptable effect. The CMC for aquatic life is intended to be protective of the vast majority of the aquatic communities in the United States. If a facility has not disclosed BMPs applicable to the pollutants for the site, the permittee may not be eligible for benchmarks.

40 CFR 122.44(b)(1) requires the permit implement the most stringent limitations for each discharge, including industrially exposed stormwater; and 40 CFR 122.44(d)(1)(i) and (iii) requires the permit to include water-quality based effluent limitations where reasonable potential has been found. However, because of the non-continuous nature of stormwater discharges, staff are unable to perform statistical Reasonable Potential Analysis (RPA) under most stormwater discharge scenarios. Reasonable potential determinations (RPDs; see REASONABLE POTENTIAL above) using best professional judgment are performed.

Benchmarks require the facility to monitor, and if necessary, replace and update stormwater control measures. Benchmark concentrations are not effluent limitations. A benchmark exceedance, therefore, is not a permit violation; however, failure to take corrective action is a violation of the permit. Benchmark monitoring data is used to determine the overall effectiveness of control measures and to assist the permittee in knowing when additional corrective actions may be necessary to comply with the conditions of the permit.

BMP inspections typically occur more frequently than sampling. Sampling frequencies are based on the facility's ability to comply with the benchmarks and the requirements of the permit. Inspections should occur after large rain events and any other time an issue is noted; sampling after a benchmark exceedance may need to occur to show the corrective action taken was meaningful.

When a permitted feature or outfall consists of only stormwater or stormwater where wastewater is already being monitored or controlled, or at land application sites, a benchmark may be implemented at the discretion of the permit writer, if there is no RP for water quality excursions.

✓ Applicable; this facility has stormwater outfalls where wastewater is comingled but measured and controlled upstream.

#### **STORMWATER POLLUTION PREVENTION PLAN (SWPPP):**

In accordance with 40 CFR 122.44(k), Best Management Practices (BMPs) must be used to control or abate the discharge of pollutants when: 1) Authorized under section 304(e) of the Clean Water Act (CWA) for the control of toxic pollutants and hazardous substances from ancillary industrial activities; 2) Authorized under section 402(p) of the CWA for the control of stormwater discharges; 3) Numeric effluent limitations are infeasible; or 4) the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA. In accordance with the EPA's *Developing Your Stormwater Pollution Prevention Plan, A Guide for Industrial Operators*, (EPA 833-B-09-002) published by the EPA in 2015 [https://www.epa.gov/sites/production/files/2015-11/documents/swppp\\_guide\\_industrial\\_2015.pdf](https://www.epa.gov/sites/production/files/2015-11/documents/swppp_guide_industrial_2015.pdf), BMPs are measures or practices used to reduce the amount of pollution entering waters of the state from a permitted facility. BMPs may take the form of a process, activity, or physical structure. Additionally in accordance with the Stormwater Management, a SWPPP is a series of steps and activities to 1) identify sources of pollution or contamination, and 2) select and carry out actions which prevent or control the pollution of storm water discharges. Additional information can be found in *Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices* (EPA 832-R-92-006; September 1992).

A SWPPP must be prepared by the permittee if the SIC code is found in 40 CFR 122.26(b)(14) and/or 10 CSR 20-6.200(2). A SWPPP may be required of other facilities where stormwater has been identified as necessitating better management. The purpose of a SWPPP is to comply with all applicable stormwater regulations by creating an adaptive management plan to control and mitigate stream pollution from stormwater runoff. Developing a SWPPP provides opportunities to employ appropriate BMPs to minimize the risk of pollutants being discharged during storm events. The following paragraph outlines the general steps the permittee should take to determine which BMPs will work to achieve the benchmark values or limits in the permit. This section is not intended to be all encompassing or restrict the use of any physical BMP or operational and maintenance procedure assisting in pollution control. Additional steps or revisions to the SWPPP may be required to meet the requirements of the permit.

Areas which should be included in the SWPPP are identified in 40 CFR 122.26(b)(14). Once the potential sources of stormwater pollution have been identified, a plan should be formulated to best control the amount of pollutant being released and discharged by each activity or source. This should include, but is not limited to, minimizing exposure to stormwater, good housekeeping measures, proper facility and equipment maintenance, spill prevention and response, vehicle traffic control, and proper materials handling. Once a plan has been developed the facility will employ the control measures determined to be adequate to achieve the benchmark values discussed above. The facility will conduct monitoring and inspections of the BMPs to ensure they are working properly and re-evaluate any BMP not achieving compliance with permitting requirements. For example, if sample results from an outfall show values of TSS above the benchmark value, the BMP being employed is deficient in controlling stormwater pollution. Corrective action should be taken to repair, improve, or replace the failing BMP. This internal evaluation is required at least once per month but should be continued more frequently if BMPs continue to fail. If failures do occur, continue this trial and error process until appropriate BMPs have been established.

For new, altered, or expanded stormwater discharges, the SWPPP shall identify reasonable and effective BMPs while accounting for environmental impacts of varying control methods. The antidegradation analysis must document why no discharge or no exposure options are not feasible. The selection and documentation of appropriate control measures shall serve as an alternative analysis of technology and fulfill the requirements of antidegradation [10 CSR 20-7.031(3)]. For further guidance, consult the antidegradation implementation procedure (<http://dnr.mo.gov/env/wpp/docs/AIP050212.pdf>).

Alternative Analysis (AA) evaluation of the BMPs is a structured evaluation of BMPs which are reasonable and cost effective. The AA evaluation should include practices designed to be: 1) non-degrading; 2) less degrading; or 3) degrading water quality. The glossary of AIP defines these three terms. The chosen BMP will be the most reasonable and effective management strategy while ensuring the highest statutory and regulatory requirements are achieved and the highest quality water attainable for the facility is discharged. The AA evaluation must demonstrate why "no discharge" or "no exposure" is not a feasible alternative at the facility. This

structured analysis of BMPs serves as the antidegradation review, fulfilling the requirements of 10 CSR 20-7.031(3) Water Quality Standards and *Antidegradation Implementation Procedure* (AIP), Section II.B.

If parameter-specific numeric benchmark exceedances continue to occur and the permittee feels there are no practicable or cost-effective BMPs which will sufficiently reduce a pollutant concentration in the discharge to the benchmark values established in the permit, the permittee can submit a request to re-evaluate the benchmark values. This request needs to include 1) a detailed explanation of why the facility is unable to comply with the permit conditions and unable to establish BMPs to achieve the benchmark values; 2) financial data of the company and documentation of cost associated with BMPs for review and 3) the SWPPP, which should contain adequate documentation of BMPs employed, failed BMPs, corrective actions, and all other required information. This will allow the Department to conduct a cost analysis on control measures and actions taken by the facility to determine cost-effectiveness of BMPs. The request shall be submitted in the form of an operating permit modification, which includes an appropriate fee; the application is found at: <https://dnr.mo.gov/forms/#WaterPollution>

- ✓ Applicable; a SWPPP shall be developed and implemented for this facility. This is a continued requirement from the previous permit.

#### **SUFFICIENTLY SENSITIVE ANALYTICAL METHODS:**

Please review Standard Conditions Part 1, section A, number 4. The analytical and sampling methods used shall conform to the reference methods listed in 10 CSR 20-7.015 and/or 40 CFR 136 unless alternates are approved by the Department. The facility shall use sufficiently sensitive analytical methods for detecting, identifying, and measuring the concentrations of pollutants. The facility shall ensure the selected methods are able to quantify the presence of pollutants in a given discharge at concentrations low enough to determine compliance with Water Quality Standards in 10 CSR 20-7.031 or effluent limitations unless provisions in the permit allow for other alternatives. A method is “sufficiently sensitive” when; 1) the method quantifies the pollutant below the level of the applicable water quality criterion or; 2) the method minimum level is above the applicable water quality criterion, but the amount of pollutant in a facility’s discharge is high enough the method detects and quantifies the level of pollutant in the discharge, or 3) the method has the lowest minimum level of the analytical methods approved under 10 CSR 20-7.015 and or 40 CFR 136. These methods are also required for parameters listed as monitoring only, as the data collected may be used to determine if numeric limitations need to be established. A permittee is responsible for working with their contractors to ensure the analysis performed is sufficiently sensitive. 40 CFR 136 lists the approved methods accepted by the Department. Tables A1-B3 at 10 CSR 20-7.031 shows water quality standards.

#### **TECHNOLOGY-BASED EFFLUENT LIMITATIONS (TBEL):**

One of the major strategies of the Clean Water Act (CWA) in making “reasonable further progress toward the national goal of eliminating the discharge of all pollutants” is to require effluent limitations based on the capabilities of the technologies available to control those discharges. Technology-based effluent limitations (TBELs) aim to prevent pollution by requiring a minimum level of effluent quality attainable using demonstrated technologies for reducing discharges of pollutants or pollution into the waters of the United States. TBELs are developed independently of the potential impact of a discharge on the receiving water, which is addressed through water quality standards and water quality-based effluent limitations (WQBELs). The NPDES regulations at Title 40 of the Code of Federal Regulations (CFR) 125.3(a) require NPDES permit writers to develop technology-based treatment requirements, consistent with CWA § 301(b) and § 402(a)(1), represent the minimum level of control that must be imposed in a permit. The regulation also indicates that permit writers must include in permits additional or more stringent effluent limitations and conditions, including those necessary to protect water quality. Regardless of the technology chosen to be the basis for limitations, the facility is not required to install the technology, only to meet the established TBEL.

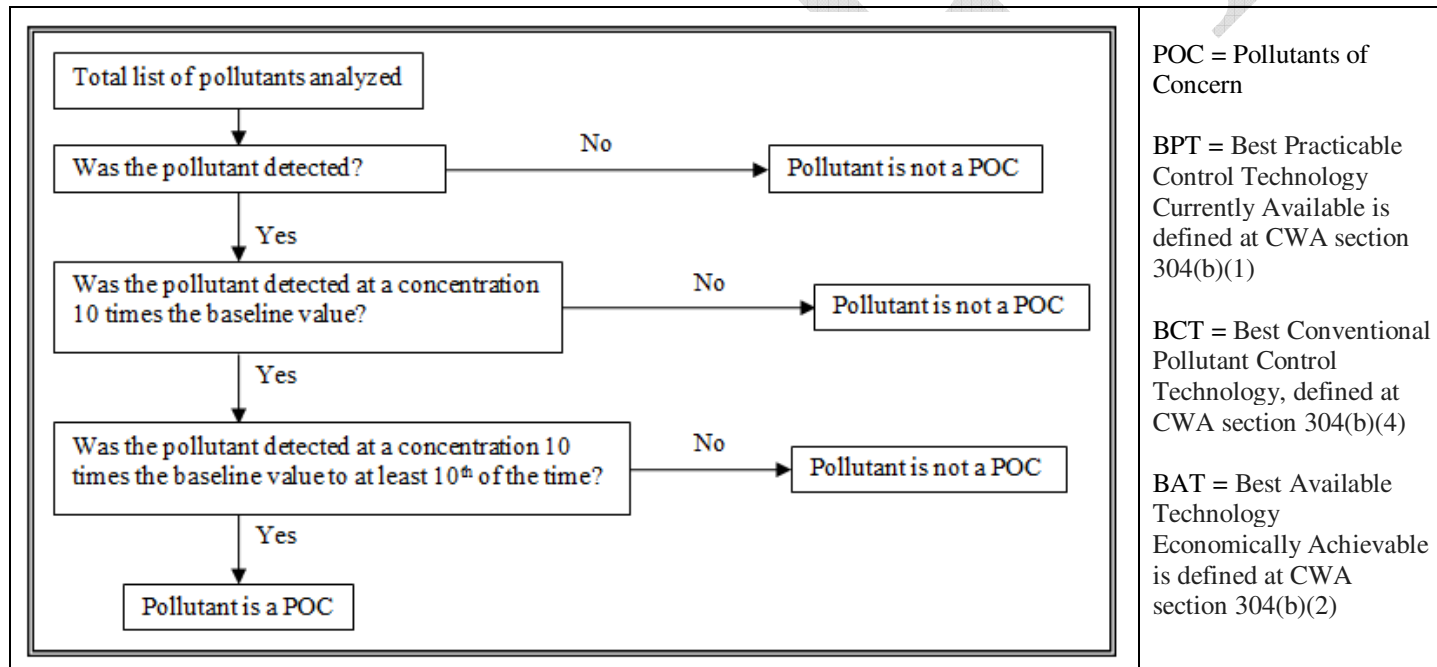
Case-by-case TBELs are developed pursuant to CWA section 402(a)(1), which authorizes the administrator to issue a permit meeting either, 1) all applicable requirements developed under the authority of other sections of the CWA (e.g., technology-based treatment standards, water quality standards) or, 2) before taking the necessary implementing actions related to those requirements, “such conditions as the administrator determines are necessary to carry out the provisions of this Act.” The regulation at §125.3(c)(2) specifically cite this section of the CWA, stating technology-based treatment requirements may be imposed in a permit “on a case-by-case basis under section 402(a)(1) of the Act, to the extent that EPA-promulgated effluent limitations are inapplicable.” Further, 40 CFR 125.3(c)(3) indicates “where promulgated effluent limitations guidelines only apply to certain aspects of the discharger’s operation, or to certain pollutants, other aspects or activities are subject to regulation on a case-by-case basis to carry out the provisions of the act.” When establishing case-by-case effluent limitations using best professional judgment, the permit writer should cite in the fact sheet or statement of basis both the approach used to develop the limitations, discussed below, and how the limitations carry out the intent and requirements of the CWA and the NPDES regulations.

Effluent limitations in this permit may be developed using mathematical representations of site specific data. 40 CFR 125.3 requires permit writers to establish effluent limitations for parameters of concern. While not all parameters are found in the centralized waste treatment document, best professional judgment effluent limits as specified in Part IV ensure additional pollutants will not adversely affect the receiving stream, ensure the facility is operating the system optimally, and excessive pollutants are not discharged in accordance with CWA §301(b)(1)(A). Additional information can be found regarding the development of site-specific limitations in Chapter 5 of the EPA’s permit writer’s manual at [https://www.epa.gov/sites/production/files/2015-09/documents/pwm\\_chapt\\_05.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/pwm_chapt_05.pdf)

40 CFR 122.41(e) indicates the permittee shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.

Baselines to determine contaminants of concern are found in the *Development Document for Effluent Limitations Guidelines and Standards for the Centralized Waste Treatment Industry – Final* (EPA 821-R-00-020; August 2000). The baselines found in this guidance document represent the treatable concentration of model technology which would effectually treat the pollutant. Chapter 6 Table 6-1 directs the permit writer to multiply the baseline by ten to determine if the parameter is a pollutant of concern. The following table determines the parameters for which a TBEL must be considered; baseline values are retrieved from chapter six unless noted otherwise. The CWA and supporting regulations have no exclusion preventing permitting authorities from using more than one effluent limit category; but instead 40 CFR 125.3 indicates all types of treatment for all discharges must be considered, and the technologies implemented are minimum technologies.

This guidance describes the applicability to the centralized waste treatment category as any facility treating any hazardous or nonhazardous industrial waste received from off-site by tanker truck, trailer/roll-off bins, drums, barge or other forms of shipment." Facilities proposed for regulation included both stand-alone waste treatment and recovery facilities that treat waste received from off-site as well as those facilities that treat on-site generated process wastewater with wastes received from off-site. While this facility's standard industrial classification (SIC) code is not specified for treating received wastes, the wastes generated at this facility have need for treatment prior to discharge. In lieu of performing the Department's own costly studies to determine treatment baselines and technologies, the Department has determined using the information obtained in the development document for this category to be applicable across a broad range of industries treating industrial wastewaters.



When developing TBELs for industrial facilities, the permit writer must consider all applicable technology standards and requirements for all pollutants discharged above baseline level. Without applicable effluent guidelines for the discharge or pollutant, permit writers must identify any needed TBELs on a case-by-case basis, in accordance with the statutory factors specified in CWA sections 301(b)(2) and 304(b). The site-specific TBELs reflect the BPJ of the permit writer, taking into account the same statutory factors EPA would use in promulgating a national effluent guideline regulation, but they are applied to the circumstances relating specifically to the applicant. The permit writer also should identify whether state laws or regulations govern TBELs and might require more stringent performance standards than those required by federal regulations. In some cases, a single permit could have TBELs based on effluent guidelines, best professional judgment, state law, and WQBELs based on water quality standards.

For BPT Requirements (all pollutants)

1. Age of equipment and facilities involved
2. Process(es) employed
3. Process changes
4. Engineering aspects of the application of various types of control techniques
5. Non-water quality environmental impact including energy requirements
6. Total cost of application of technology in relation to the effluent reduction benefits to be achieved from the technology

For BCT requirements (conventional pollutants)

- Items 1 through 5 in BPT; and
- Reasonableness of the relationship between the costs of attaining a reduction in effluent and the derived effluent reduction benefits
- Comparison of the cost and level of reduction of such pollutants from the discharge of POTWs to the cost and level of reduction of such pollutants from a class or category of industrial sources

For BAT requirements (toxic and non-conventional pollutants)

- Items 1 through 5 in BPT; and
- The cost of achieving such effluent reduction

Best Practicable Control Technology Currently Available (BPT) is the first level of technology-based effluent controls for direct dischargers and it applies to all types of pollutants (conventional, nonconventional, and toxic). The Federal Water Pollution Control Act (FWPCA) amendments of 1972 require when EPA establishes BPT standards, it must consider the industry-wide cost of implementing the technology in relation to the pollutant-reduction benefits. EPA also must consider the age of the equipment and facilities, the processes employed, 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 [CWA §304(b)(1)(B)]. Traditionally, EPA establishes BPT effluent limitations on the basis of the average of the best performance of well-operated facilities in each industrial category or subcategory. 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 the technology can be practically applied. See CWA sections 301(b)(1)(A) and 304(b)(1)(B). Because the EPA has not promulgated TBELs for the pollutants identified as POCs, the permit writer follows the same format to establish site-specific TBELs. Although the numerical effluent limitations and standards are based on specific processes or treatment technologies to control pollutant discharges, EPA does not require dischargers to use any specified technology. Individual facilities may meet the numerical requirements using whatever types of treatment technologies, process changes, and waste management practices they choose.

The following table provides the numerical values of the wastewater present at the site and determination of pollutants of concern at outfalls #001, #002, #003, and #016. Outfall #007 was not considered because technology based effluent limitations are provided by 10 CSR 20-7.015 for domestic wastewater. Outfall #009 was also not addressed as the intake heater has not run for a considerable amount of time. A special condition requires the facility to collect data sufficient for application and TBEL analysis should this outfall ever discharge. Fire protection test water was also not evaluated as it is non-process wastewater.

#### TBEL POC TABLE:

This method of analysis is one of several and is only implemented to assist the permit writer in determining possible contaminants of concern and does not indicate actual effluent limitations the permit writer will establish in the permit. POCs may also be determined using other methods explained further in the outfall effluent limits determinations below in Part IV. The data below are the maximum values reported by the facility either in the application or in the DMRs.

PARAMETER	units/ outfall	#001	#002	#003	#016	Baseline	Baseline x 10	POC
<i>FORM C OF APPLICATION FOR PERMIT RENEWAL: PART A</i>								
Biochemical Oxygen Demand <sub>5</sub>	mg/L	<5	<6	7.1	<6	2	20	no
Chemical Oxygen Demand	mg/L	7.6	34	31	20	5	50	no
Total Organic Carbon	mg/L	2.3	10	8.2	5.2	1	10	no
Total Suspended Solids	mg/L	<4	13	9.6	6.4	4	40	no
<i>NUTRIENTS:</i>								
Ammonia as N	mg/L	9.7	<0.3	<0.3	<0.3	0.05	0.5	#001
Nitrate + Nitrite as N	mg/L	n/a	2.6	0.26	1.2	0.05	0.5	#002
Kjeldahl Nitrogen, TKN	mg/L	8.3	<1.0	<1.0	<1.0	none	none	no
Nitrogen, Total N	mg/L	<1	<1.3	<1.3	<1.3	none	none	no
Phosphorus, Total P	mg/L	0.053	0.45	0.13	0.12	0.01	0.1	#002, #003, #016
<i>FORM C OF APPLICATION FOR PERMIT RENEWAL: OTHER</i>								
Bromide	mg/L	<1	<0.5	<0.5	<0.5	none	none	no
Chloride	mg/L	1.8	43	25	25	1000 <sup>†</sup>	10,000	no



PARAMETER	units/ outfall	#001	#002	#003	#016	Baseline	Baseline x 10	POC
Chlorine, Total Residual	µg/L	<1000	<50	<50	<50	none	none	no
Cyanide, Total	µg/L	<5	<2.5	<2.5	<2.5	20	200	no
Fecal Coliform or E. coli	#/100 mL	<10	41	<10	20	none	none	no
Fluoride	mg/L	n/a	<0.5	<0.5	<0.5	0.1	1	no
Oil and Grease	mg/L	13	<5	<5.3	<5.1	5	50	no
Phenols, Total	mg/L	<0.005	<0.050	<0.050	<0.050	50	500	no
Sulfate as SO <sub>4</sub> <sup>2-</sup>	mg/L	6.4	450	28	120	none	none	no
Sulfide as S <sup>2-</sup>	mg/L	<2.0	<2.0	<2.0	<2.0	1	10	no
Sulfite as SO <sub>3</sub> <sup>2-</sup>	mg/L	<2.0	<2.0	<2.0	<2.0	none	none	no
Surfactants	mg/L	n/a	0.20	0.18	<0.1	none	none	no
Trihalomethanes, Total	mg/L	n/a	<5	<5	<5	none	none	no
<i>METALS (AS TOTAL RECOVERABLE - UNLESS SPECIFIED):</i>								
Aluminum	µg/L	15	330	420	110	200	2,000	no
Antimony	µg/L	<0.6	0.94	<0.6	<0.6	20	200	no
Arsenic	µg/L	<0.2	7.1	8	2.6	10	100	no
Barium	µg/L	2.9	200	32	87	200	2,000	no
Beryllium	µg/L	<0.2	<0.2	<0.2	<0.2	5	50	no
Boron	µg/L	130,000	130	50	56	100	1,000	#001
Cadmium	µg/L	<0.2	<0.2	<0.2	<0.2	5	50	no
Chromium	µg/L	<5	<5.8	<5.8	<5.8	10	100	no
Cobalt	µg/L	<0.4	<0.4	<0.4	<0.4	50	500	no
Copper	µg/L	4.8	12	<0.6	2.1	25	250	no
Iron	µg/L	66	450	410	170	100	1,000	no
Lead	µg/L	0.34	0.35	0.28	<0.2	50	500	no
Magnesium	µg/L	410	35,000	12,000	15,000	5,000	50,000	no
Manganese	µg/L	4.7	27	53	79	15	150	no
Mercury	µg/L	n/a	<0.2	<0.2	<0.2	0.2	2	no
Molybdenum	µg/L	18	5.9	6	2.6	10	100	no
Nickel	µg/L	4.2	7.4	<1	2.6	40	400	no
Selenium	µg/L	<0.2	3.1	<0.2	1.2	5	50	no
Silver	µg/L	<1	<1	<1	<1	10	100	no
Thallium	µg/L	<0.2	<0.2	<0.2	<0.2	10	100	no
Tin	µg/L	<13 ▼	<60	<60	<60	30	300	no
Titanium	µg/L	<5	6.4	<5	<5	5	50	no
Zinc	µg/L	91	4.7	3.9	3.7	20	200	no
<i>RADIONUCLIDES</i>								
Alpha	pCi/L	<0.687	<0.782	<0.696	<0.786	15 <sup>†</sup>	150	no
Beta	pCi/L	<0.541	<0.609	<0.696	<0.654	0 <sup>†</sup>	0	no
Radium, or Ra226 + Ra228	pCi/L	<0.687	<0.782	<0.696	<0.786	5 <sup>†</sup>	50	no

\* Addressed by effluent limitation guideline at 40 CFR 423 or 10 CSR 20-7.015

† Addressed in the metals centralized sub-treatment category

< Reported below quantifiable analytical limits

n/a Data not submitted

▼ Data revised in email dated 2/18/2020



- ‡ Based on national drinking water standards; 0 was used for beta emitters because this is the national goal; the standard is 4 millirem/year (mrem/yr). However, the drinking water standard for beta is an exposure-based requirement; pCi/L cannot be converted to mrem/yr without specification of all beta emitters (such as Co, K, and I) and determining the ratio and sum of each. Data supplied to the Department indicate these pollutants are non-detect therefore a target of 0 pCi/L is appropriate.

#### TBEL DETERMINATION:

- ✓ Applicable; this operating permit has identified TBEL POCs. Additionally, the permittee is subject to an ELG and domestic wastewater effluent limitations therefore those technology limitations will be used instead of an individual TBEL POC analysis for those specified pollutants. For each parameter, group of parameters, or outfall treatment process, this permit will summarize the relevant factors in facility-specific, outfall specific, or waste-stream specific case-by-case TBEL development. The permittee will supply the required information to the Department so a technology based effluent limitation can be applied in the permit if applicable. See Part IV EFFLUENT LIMITS DETERMINATIONS.
- ✓ Phosphorus was identified at several outfalls as being a POC. However, until further data is collected, the Department is not establishing effluent limits at this time; while effluent limitations may be developed in the future, it is unlikely this facility is a significant contributor as studies show non-point sources are higher-volume contributors to nutrients. Phosphorus is not a toxic pollutant but is a nutrient therefore immediate toxicity or harm to wildlife or aquatic species has not been demonstrated. The Department is working on a Nutrient Reduction Strategy for the Missouri and Mississippi River, including work to provide downstream protections for the Gulf of Mexico. The Nutrient Reduction Strategy can be found at <https://dnr.mo.gov/env/wpp/mnrsc/index.htm>
- ✓ Nitrogenous nutrients were found to be POCs at several outfalls. See phosphorus above.

#### UNDERGROUND INJECTION CONTROL (UIC):

The UIC program for all classes of wells in the State of Missouri is administered by the Missouri Department of Natural Resources and approved by EPA pursuant to section 1422 and 1425 of the Safe Drinking Water Act (SDWA) and 40 CFR 147 Subpart AA. Injection wells are classified based on the liquids which are being injected. Class I wells are hazardous waste wells which are banned by RSMo 577.155; Class II wells are established for oil and natural gas production; Class III wells are used to inject fluids to extract minerals; Class IV wells are also banned by Missouri in RSMo 577.155; Class V wells are shallow injection wells; some examples are heat pump wells and groundwater remediation wells. Domestic wastewater being disposed of sub-surface is also considered a Class V well. In accordance with 40 CFR 144.82, construction, operation, maintenance, conversion, plugging, or closure of injection wells shall not cause movement of fluids containing any contaminant into Underground Sources of Drinking Water (USDW) if the presence of any contaminant may cause a violation of drinking water standards or groundwater standards under 10 CSR 20-7.031, or other health based standards, or may otherwise adversely affect human health. If the director finds the injection activity may endanger USDWs, the Department may require closure of the injection wells, or other actions listed in 40 CFR 144.12(c), (d), or (e). In accordance with 40 CFR 144.26, the permittee shall submit a Class V Well Inventory Form for each active or new underground injection well drilled, or when the status of a well changes, to the Missouri Department of Natural Resources, Geological Survey Program, P.O. Box 250, Rolla, Missouri 65402. The Class V Well Inventory Form can be requested from the Geological Survey Program or can be found at the following web address: <http://dnr.mo.gov/forms/780-1774-f.pdf> Single family residential septic systems and non-residential septic systems used solely for sanitary waste and having the capacity to serve fewer than 20 persons a day are excluded from the UIC requirements (40 CFR 144.81(9)).

- ✓ Not applicable; the permittee has not submitted materials indicating the facility will be performing UIC at this site.

#### VARIANCE:

Per the Missouri Clean Water Law §644.061.4, variances shall be granted for such period of time and under such terms and conditions as specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141.

- ✓ Not applicable; this permit is not drafted under premise of a petition for variance.

#### WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:

As per [10 CSR 20-2.010; definitions], the WLA is the amount of pollutant each discharger is allowed to discharge into the receiving stream without endangering water quality. Two general types of effluent limitations, technology-based effluent limits (TBELs) and water quality based effluent limits (WQBELs) are reviewed. If one limit does not provide adequate protection for the receiving water, then the other must be used per 10 CSR 20-7.015(9)(A). Total Maximum Daily Loads, if required for this facility, were also reviewed.

- ✓ Applicable; wasteload allocations for toxic parameters were calculated using water quality criteria or water quality model results and by applying the dilution equation below; WLAs are calculated using the *Technical Support Document For Water Quality-Based Toxics Control* or TSD EPA/505/2-90-001; 3/1991.

$$C = \frac{(Cs \times Qs) + (Ce \times Qe)}{(Qe + Qs)}$$

(EPA/505/2-90-001, Section 4.5.5)

Where C = downstream concentration  
Cs = upstream concentration  
Qs = upstream flow  
Ce = effluent concentration  
Qe = effluent flow

- ✓ Acute wasteload allocations designated as daily maximum limits (MDL) were determined using applicable water quality criteria (CMC: criteria maximum concentration) and stream volume of flow at the edge of the zone of initial dilution (ZID).
- ✓ Chronic wasteload allocations designated as monthly average limits (AML) were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow at the edge of the mixing zone (MZ).
- ✓ Number of Samples “n”: effluent quality is determined by the underlying distribution of daily values, which is determined by the Long Term Average (LTA) associated with a particular Wasteload Allocation (WLA) and by the Coefficient of Variation (CV) of the effluent concentrations. Increasing or decreasing the monitoring frequency does not affect this underlying assumption which should be, at a minimum, targeted to comply with the values dictated by the WLA. Therefore, it is recommended the actual planned frequency of monitoring be used to determine the value of “n” for calculating the AML. However, in situations where monitoring frequency is once per month or less, a higher value for “n” must be assumed for AML derivation purposes. Thus, the statistical procedure being employed using an assumed number of samples is “n = 4”. For total ammonia as nitrogen, “n = 30” is used.

#### **WASTELOAD ALLOCATION (WLA) MODELING:**

Permittees may submit site specific studies to better determine the site specific wasteload allocations applied in permits.

- ✓ Not applicable; a WLA study was either not submitted or determined not applicable by Department staff.

#### **WATER QUALITY STANDARD REVISION:**

In accordance with section 644.058, RSMo, the Department is required to utilize an evaluation of the environmental and economic impacts of modifications to water quality standards of twenty-five percent or more when making individual site-specific permit decisions.

- ✓ This operating permit does not contain requirements for a water quality standard that has changed twenty-five percent or more since the previous operating permit.

## **PART IV. EFFLUENT LIMITS DETERMINATIONS**

### **OUTFALL #001 – RADWASTE TREATMENT SYSTEM (RTS)**

#### **EFFLUENT LIMITATIONS TABLE:**

PARAMETERS	UNIT	DAILY MAX	MONTHLY AVG.	PREVIOUS PERMIT LIMITS	MINIMUM SAMPLING FREQUENCY	REPORTING FREQUENCY	SAMPLE TYPE
<b>PHYSICAL</b>							
FLOW, TOTAL	MGD	*	*	SAME	ALL	MONTHLY	TOTAL
FLOW, INSTANTANEOUS	cfs	*	*	NEW	DAILY WHEN FLOWING	MONTHLY	MEASURED
TEMPERATURE	°F	*	*	SAME	ONCE/MONTH	MONTHLY	MEASURED
<b>CONVENTIONAL</b>							
CHLORINE, TOTAL RESIDUAL	µg/L	200	104	SAME	ONCE/MONTH	MONTHLY	GRAB
OIL & GREASE	mg/L	15	10	QUARTERLY	ONCE/MONTH	MONTHLY	GRAB
pH †	SU	6.0 to 9.0	6.0 to 9.0	SAME	ONE/BATCH	MONTHLY	GRAB
TOTAL SUSPENDED SOLIDS (TSS)	mg/L	45	30	SAME	ONE/BATCH	MONTHLY	GRAB
<b>METALS</b>							
BORON, TR	mg/L	3690	*	NEW	ONE/BATCH	MONTHLY	GRAB
<b>NUTRIENTS</b>							
AMMONIA AS N	mg/L	*	*	NEW	ONCE/QUARTER	QUARTERLY	GRAB
KJELDAHL NITROGEN, TOTAL	mg/L	*	*	NEW	ONCE/QUARTER	QUARTERLY	GRAB
NITRATE PLUS NITRITE AS N	mg/L	*	*	NEW	ONCE/QUARTER	QUARTERLY	GRAB
PHOSPHORUS, TOTAL P (TP)	mg/L	*	*	NEW	ONCE/QUARTER	QUARTERLY	GRAB
<b>OTHER</b>							
WET TEST - ACUTE	TUa	SEE OUTFALL #016			ONCE/YEAR	ANNUALLY	GRAB

- \* monitoring and reporting requirement only  
† report the minimum and maximum pH values; pH is not to be averaged  
new parameter not established in previous state operating permit  
TR total recoverable

#### **DERIVATION AND DISCUSSION OF LIMITS:**

##### **PHYSICAL:**

##### **Flow**

In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to ensure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification. The facility will report the total flow in millions of gallons per day (MGD), daily monitoring continued from previous permit. Instantaneous flow is being added to the permit to determine mixing ratio of the radwaste system with carrier water from outfall #016.

##### **Temperature**

In accordance with 10 CSR 20-7.031(5)(D), water contaminant sources shall not cause or contribute to stream temperature in excess of ninety degrees Fahrenheit (90 °F) or change the stream temperature by more than 5 degrees Fahrenheit. Data reported by the facility ranged from 49 to 89.6 degrees Fahrenheit (°F). Given the large mixing zone afforded by the Missouri River, there is no reasonable potential due to the low flow of this outfall; the river's lowest flow in the last 20 years was 21,658 cfs, more than 100,000 times the facility's design flow. However, monthly monitoring is continued to provide site-wide temperature loading of the Missouri River. A sample is not required to be obtained from each batch, but one from one discharge per month.

## CONVENTIONAL:

### **Chlorine, Total Residual (TRC)**

200 µg/L daily maximum; 104 µg/L monthly average. Daily maximum limitations are governed by the effluent limitation guideline at 40 CFR 423.12(b) at 200 µg/L daily maximum for chlorine; total residual chlorine is more protective than freely available chlorine, therefore limitations for TRC will be continued from the previous permit. The technology limitations for daily maximum are more protective than the water quality daily maximum, therefore the technology based limits are applied. The monthly average, calculated based on water quality standards is 104 µg/L from the previous permit; the water quality limit for the monthly average is more protective than the technology limits; therefore, for the monthly average, water quality based limits are implemented. Antibacksliding regulations do not support the removal of these limits; therefore they will be maintained. The facility reported from 10 to 70 µg/L for this parameter.

### **Oil & Grease**

15 mg/L daily maximum; 10 mg/L monthly average; water quality based limits continued from previous permit. Technology based effluent regulations found at 140 CFR 423 are less stringent therefore will not be used to comply with antibacksliding regulations. The facility reported from non-detect to 13 mg/L. The permit writer completed an RPD on this parameter and found positive RP due to actual analytical values; mixing considerations are not provided for this parameter as it is considered a conventional pollutant. Oil and grease is a comprehensive test which measures for gasoline, diesel, crude oil, creosote, kerosene, heating oils, heavy fuel oils, lubricating oils, waxes, and some asphalt and pitch. The test can also detect some volatile organics such as benzene, toluene, ethylbenzene, or toluene, but these constituents are often lost during testing due to their boiling points. Oils and greases of different densities will possibly form sheen or unsightly bottom deposits at levels which vary from 10 mg/L. To protect the general criteria, it is the responsibility of the permittee to visually observe the discharge and receiving waters for sheen or bottom deposits. The previous permit required quarterly monitoring, however, data supplied indicate some results were above the monthly average limit therefore monitoring is increased to monthly.

AQL Chronic: 10 mg/L per 10 CSR 20-7.031 Table A1

Set chronic standard equal to chronic WLA per TSD §5.4.2 (EPA/505/2-90-001); multiply by 1.5 to obtain acute limit.

10 mg/L \* 1.5 = 15 mg/L

### **pH**

6.0 to 9.0 SU. Technology based limits per 40 CFR 423.12(b)(1) are applicable to this outfall, continued from previous permit. The permit writer has determined there is no reasonable potential to affect water quality due to the large buffering capacity of the Missouri River therefore technology limitations for wastewater are applied. The facility reported from 6.06 to 8.26 SU. pH is a fundamental water quality indicator. Additionally, metals leachability and ammonia availability in wastewater is dependent on pH.

### **Total Suspended Solids (TSS)**

45 mg/L daily maximum, 30 mg/L monthly average, continued from previous permit; one sample per batch. The facility reported from 1.6 to 37 mg/L for this parameter, no exceedances were noted. There is no numeric water quality standard for TSS; however, sediment discharges can negatively impact aquatic life habitat. TSS is also a valuable indicator parameter. TSS monitoring allows the permittee to identify incomplete process treatment or deviations which could cause in-stream exceedances of narrative criteria. Increased suspended solids in wastewater can lead to decreased available oxygen for aquatic life. Suspended solids can also be carriers of toxins, which can adsorb to the suspended particles; therefore, total suspended solids are a valuable indicator parameter for other pollution. The previous permit indicated the effluent limitation was from 40 CFR 423.13; this is incorrect. 40 CFR 423.12(b)(3) for low volume waste sources monthly average is 30 mg/L. The daily maximum for this type of wastewater is listed at 100 mg/L in 40 CFR 423.12(b)(3), however, because the technology employed on site can currently meet 45 mg/L, 45 mg/L will be retained per best professional judgment at to conform to antibacksliding regulations; see Part III, ANTIBACKSLIDING; there is no increased technological cost associated with maintaining this effluent limit; see Part III, TECHNOLOGY-BASED EFFLUENT LIMITATIONS.

## METALS:

Effluent limitations for total recoverable metals were developed using methods and procedures outlined in the *Technical Support Document For Water Quality-based Toxic Controls* (EPA/505/2-90-001) and *The Metals Translator: Guidance For Calculating a Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007). “Aquatic Life Protection” in 10 CSR 20-7.031 Tables A1 and A2, as well as general criteria protections in 10 CSR 20-7.031(4) apply to this discharge. The hardness value used for hardness-dependent metals calculations was based on the ecoregion’s 50<sup>th</sup> percentile, also known as the median per 10 CSR 20-7.015(1)(CC), and is reported in the calculations below. Per a memorandum dated August 6, 2019, the Director has determined permit writers should use the median of the Level III Ecoregion to calculate permit limits, or site specific data if applicable. Additional use criterion (HHP, DWS, GRW, IRR, or LWW) may also be used, as applicable, to determine the most protective effluent limit for the receiving waterbody’s class and uses.

### **Boron, Total Recoverable**

Daily maximum 8,000 mg/L; this pollutant was also identified as a technology pollutant of concern. This facility uses boron as a neutron mediator in the reactor. Boron levels are closely controlled and adjusted based on the age of the fuel and operating conditions. This permit continues monitoring because the Missouri River is an irrigation water source with numeric standards for boron in irrigation water. The facility reported from 1.9 to 1769 mg/L for this parameter. A reasonable potential analysis concluded there was no RP, primarily due to the low design flow of the outfall, 0.19 MGD (0.294 cfs), actual boron values, and mixing afforded by the Missouri River. If water quality limits were to be implemented, they would be 70,750 mg/L daily maximum and 22,844 mg/L monthly average. All considerations under BAT, 40 CFR 125.3(d)(3), are not applicable because no new technology is being required by the Department. Technology limits were not developed at this time based on the six elements required to establish technology limits; see Part III, TECHNOLOGY-BASED EFFLUENT LIMITATIONS; cost analysis for alternative technologies is not readily available. However, when the permit writer determines no new technology is required, effluent limits can be based on the available data in accordance with 40 CFR 125.3(c)(2)(ii); this facility is completely unique in the steam-electric point source category. Sufficient data exist to show discharge values over time allowing the permit writer to establish a limit consistent with actual facility operations in accordance with 40 CFR 122.41(e).

Data range from 1.9 to 1769 mg/L; the data set's average is 116.392; the data set's standard deviation is 242.77; the coefficient of variation (standard deviation divided by average) is 2.086. Multiplying the highest value of 1769 \* 2.086 yields 3690.134. The permit writer proposed a maximum technology limit for boron of 3690 mg/L. However, the facility proposed 8,000 mg/L boron as a technology limit. Because the limit proposed by the department did not factor in all TBEL requirements of 40 CFR 125.3(d), the facility's proposed technology value was accepted. Data show the facility can meet this limit 100% of the time; 8,000 mg/L is being established as a best professional judgment limitation to assure consistent facility operations. The permit writer believes this limit, as established, is appropriate under CWA §301(b)(2)(A) to further the national goal of elimination of all discharges of pollutants without requiring the permittee to install boron removal technology.

### **NUTRIENTS:**

During the preview comment period, the facility explained to the satisfaction of the permit writer monitoring for nutrients at this outfall was not appropriate at this time due to the radiological handling practices of the effluent required.

### **OTHER:**

#### **Whole Effluent Toxicity (WET) Test**

The previous permit indicated WET testing was removed as there was no laboratory to perform the study. Laboratories performing WET tests are not equipped to handle radiological samples. WET testing continues to be waived given the low flow of the discharge and negative potential to cause or contribute to toxicity in the receiving stream.

## OUTFALL #002 – COOLING TOWER BLOWDOWN

### EFFLUENT LIMITATIONS TABLE:

PARAMETERS	UNIT	DAILY MAX	MONTHLY AVG.	PREVIOUS PERMIT LIMITS	MINIMUM SAMPLING FREQUENCY	REPORTING FREQUENCY	SAMPLE TYPE
PHYSICAL							
FLOW	MGD	*	*	SAME	ONCE/DAY	MONTHLY	24 Hr. TOT
TEMPERATURE	°F	*	*	SAME	ONCE/DAY	MONTHLY	GRAB
CONVENTIONAL							
BIOCIDES, CONTINUOUS FEED ‡	µg/L	50	50	SAME	DAILY	MONTHLY	GRAB
CHLORINE, TOTAL RESIDUAL ‡	µg/L	200	104	SAME	DAILY	MONTHLY	GRAB
CHLORINE STANDARD TIME LIMIT ‡	min	120	*	SAME	DAILY	MONTHLY	GRAB
OIL & GREASE	mg/L	15	10	SAME	ONCE/QUARTER	QUARTERLY	GRAB
pH †	SU	6.0 TO 9.0	6.0 to 9.0	SAME	CONTINUOUS	MONTHLY	CONTINUOUS
pH – TIME †	minutes	60	446	SAME	CONTINUOUS	MONTHLY	CONTINUOUS
TOTAL DISSOLVED SOLIDS (TDS)	mg/L	5500	*	NEW	ONCE/WEEK	MONTHLY	GRAB
TOTAL SUSPENDED SOLIDS (TSS)	mg/L	*	*	SAME	ONCE/WEEK	MONTHLY	GRAB
NUTRIENTS							
AMMONIA AS N	mg/L	*	*	NEW	ONCE/MONTH	MONTHLY	GRAB
KJELDAHL NITROGEN, TOTAL	mg/L	*	*	NEW	ONCE/MONTH	MONTHLY	GRAB
NITRATE PLUS NITRITE AS N	mg/L	*	*	NEW	ONCE/MONTH	MONTHLY	GRAB
PHOSPHORUS, TOTAL P (TP)	mg/L	*	*	NEW	ONCE/MONTH	MONTHLY	GRAB
OTHER							
WET TEST - ACUTE	TUa	*	-	SAME	ONCE/YEAR **	ANNUALLY	GRAB

\* Monitoring and reporting requirement only

† Report the minimum and maximum pH values; pH is not to be averaged

new Parameter not established in previous state operating permit

interim Parameter requirements prior to end of SOC

final Parameter requirements at end of SOC

\*\* Annual wet test only needs to be completed once per year but should occur during biocide use. If no biocide use occurred in a given year, monitoring is still required. This is an unscheduled event in the eDMR system and will be reported by the 28<sup>th</sup> day of the month following testing.

### DERIVATION AND DISCUSSION OF LIMITS:

#### PHYSICAL:

##### Flow

In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to ensure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification. The facility will report the total flow in millions of gallons per day (MGD), daily monitoring continued from the previous permit.

##### Temperature

In accordance with 10 CSR 20-7.031(5)(D), water contaminant sources shall not cause or contribute to stream temperature in excess of ninety degrees Fahrenheit (90 °F) or change the stream temperature by more than 5 degrees Fahrenheit. Data reported by the facility ranged from 39 to 84.2 degrees Fahrenheit (°F). Given the large mixing zone afforded by the Missouri River, there is no reasonable potential. However, daily monitoring is continued to provide site-wide temperature loading of the Missouri River.



**CONVENTIONAL:**

**Biocides, Continuous Feed, Alternate TRC Compliance Method**

The facility has requested continuous chlorine feed because operation of the plant was hindered by biological growth which could not be effectively controlled with a simple two hour application of biocides. The Department has agreed using biocides more than two hours a day may be performed if the facility also dechlorinates the effluent. To achieve these goals, the facility may use the listed (or equivalent) biocides from the application in conjunction with a slight overfeed of dechlorinating agents. The daily monitoring was required in the January 2017 modification and continued in this permit when using continuous biocide feed. The 2017 limits were determined to be 50 µg/L based on the detection limit used by the facility at; any value above the detection limit is considered a discharge and traditional TRC limitations are then applicable. The facility will report <50 for non-detects. The facility will report 0 if traditional 2-hour chlorination is being used for the entire month.

**Chlorine, Total Residual (TRC)**

200 µg/L daily maximum; 104 µg/L monthly average. Daily maximum limitations are governed by the effluent limitation guideline at 40 CFR 423.12(b) at 200 µg/L daily maximum for chlorine; total residual chlorine is more protective than freely available therefore will be continued from the previous permit; and the technology limitations for daily maximum are more protective than the water quality daily maximum. The monthly average, calculated based on water quality standards is 104 µg/L from the previous permit; the water quality limit for the monthly average is more protective. These limits will be maintained to ensure antibacksliding regulations are followed. The facility has indicated the test method used can detect at 50 µg/L or better for this parameter therefore a minimum analytical detection level (ML) is not being established for this parameter as the facility is capable of meeting the limits with the current analytical technology employed on site. During the standard 2-hour chlorination regime, there were a few detections of this parameter; none exceeded permit limits. Limitations retained from original permit as those remain protective of water quality. Monitoring retained at weekly. Antibacksliding regulations do not support the removal of these limits; therefore they will be maintained because the facility is using chlorine based biocides.

The facility is also subject to free available chlorine limitations but the test for TRC encompasses the FAC test. Additional monitoring not necessary. FAC is required per BPT at 40 CFR 423.12 (b)(7) for recirculating cooling systems. 0.5 mg/L daily maximum and 0.2 mg/L monthly average (expressed as 500 µg/L daily maximum and 200 µg/L monthly average). However, the facility is testing for TRC which encompasses FAC; TRC limitations in this permit are more stringent than FAC therefore are used in place of FAC.

The time limitation for standard chlorination is 2 hours daily. The facility will report 0 for the time component if standard chlorination was not used during the month. The facility will report the total time of standard chlorination for the monthly value.

**Oil & Grease**

15 mg/L daily maximum; 10 mg/L monthly average; continued from previous permit. Oil and grease is considered a conventional pollutant. Oil and grease is a comprehensive test which measures for gasoline, diesel, crude oil, creosote, kerosene, heating oils, heavy fuel oils, lubricating oils, waxes, and some asphalt and pitch. The test can also detect some volatile organics such as benzene, toluene, ethylbenzene, or toluene, but these constituents are often lost during testing due to their boiling points. The facility reported from non-detect to 8.33 mg/L. The permit writer completed an RPD on this parameter and found RP due to analytical data for first quarter 2017. Oils and greases of different densities will possibly form sheen or unsightly bottom deposits at levels which vary from 10 mg/L. To protect the general criteria, it is the responsibility of the permittee to visually observe the discharge and receiving waters for sheen or bottom deposits. Technology limitations are less restrictive therefore will not be used to comply with antibacksliding regulations. 40 CFR 423.13 sets the effluent limit at 20 mg/L maximum daily and 15 mg/L monthly average. The water quality standard is 10 mg/L monthly average. The water quality standard is more protective than the Effluent Limit Guideline.

AQL Chronic: 10 mg/L per 10 CSR 20-7.031 Table A1

Set chronic standard equal to chronic WLA per TSD §5.4.2 (EPA/505/2-90-001); multiply by 1.5 to obtain acute limit.

10 mg/L \* 1.5 = 15 mg/L

**pH**

6.0 to 9.0 SU. Technology based limits per 40 CFR 423.12(b)(1) are applicable to this outfall. The permit writer has determined there is no reasonable potential to affect water quality below 6.5 SU therefore technology limitations for wastewater are applied. pH is a fundamental water quality indicator. Additionally, metals leachability and ammonia availability in wastewater is dependent on pH. The facility reported in the 8 SU range for almost the entirety of the permit term. Callaway Energy Center has continuous pH measurement on Outfall #002. With continuous pH measurement per 40 CFR 401.17, the facility may have excursions of pH. The facility may exceed the numeric effluent limitations for a total of 446 minutes per month but never more than 60 minutes at one time. The permittee shall report the total minutes per month exceeding the pH effluent limits.

### **Total Dissolved Solids (TDS)**

5500 mg/L daily maximum, monitoring for monthly average, new limits. Continued monitoring requirement per 10 CSR 20-7.031(5) to determine total dissolved solids into the Missouri River which is a drinking water source. The facility reported a minimum average of 450 to a daily maximum of 3666 mg/L. TDS is a measurement of inorganic salts, organic matter, and other dissolved materials in water and could contain beneficial minerals or organic molecules, or contaminants such as metals or organic pollutants; measurements of TDS do not differentiate among ions. The Missouri River is a drinking water source; secondary drinking water regulations indicate TDS should not be above 500 mg/L for users (this is not an effluent limit and mixing is afforded for this parameter); the effluent derivation uses the 30Q10 of the river which closely approximates the harmonic mean in accordance with Section 4.6 of the Technical Support Document, EPA/505/2-90-001. This particular outfall does not demonstrate reasonable potential for this parameter therefore this limit will be established as a best professional judgment limitation and in compliance with antidegradation regulations and 40 CFR 122.41(e), proper operation and maintenance of systems; see Part III, ANTIDEGRADATION section.

Secondary Drinking Water Requirement: 500 mg/L

Acute WLA:  $C_e = ((22.28 \text{ cfsDF} + 222.8 \text{ cfsZID}) * 500 - (22.28 \text{ cfsZID} * 0 \text{ background})) / 22.28 \text{ cfsDF} = 5500$

LTAa:  $WLAa * LTAa \text{ multiplier} = 5500 * 0.617 = 3392.719$

[CV: 0.221, 99th %ile]

Daily Maximum:  $MDL = LTA * MDL \text{ multiplier} = 3392.719 * 1.621 = 5500 \text{ mg/L}$

[CV: 0.221, 99th %ile]

### **Total Suspended Solids (TSS)**

Previous permit required weekly monitoring, continued. Daily values range from 19 to 204 mg/L for this parameter; monthly averages were from 8 to 123 mg/L. Cooling tower blowdown is not considered a low-volume waste source hence no technology limits established for TSS for CT blowdown. There are no numeric water quality standards for this parameter. As the Missouri River has a sediment load which typically exceeds the effluent's values, the permit writer has determined there is no water quality concern for this pollutant at this time and site specific technology limits will be covered by TDS instead.

## **NUTRIENTS:**

### **Ammonia, Total as Nitrogen**

Nitrogen is expected to be present in the discharge therefore monthly monitoring is required per 10 CSR-20-7.015(9)(D)8.

### **Kjeldahl Nitrogen, Total (TKN)**

Nitrogen is expected to be present in the discharge therefore monthly monitoring is required per 10 CSR 20-7.015(9)(D)8.

### **Nitrate plus Nitrite**

Nitrogen is expected to be present in the discharge therefore monthly monitoring is required per 10 CSR 20-7.015(9)(D)8.

### **Phosphorus, Total P (TP)**

Phosphorus is expected to be present in the discharge therefore monthly monitoring is required per 10 CSR 20-7.015(9)(D)8.

## **OTHER:**

### **Whole Effluent Toxicity (WET) Test, Acute**

Monitoring is required to determine if reasonable potential exists for the discharge to cause toxicity within the receiving stream. A WET test is a quantifiable method to determine discharges from the facility cause toxicity to aquatic life by itself, in combination with, or through synergistic responses, when mixed with receiving stream water. Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures the provisions in 10 CSR 20-6 and the Water Quality Standards in 10 CSR 20-7 are being met. Under 10 CSR 20-6.010(8)(A)4, the Department may require other terms and conditions it deems necessary to ensure compliance with the CWA and related regulations of the Missouri Clean Water Commission. The following Missouri Clean Water Laws (MCWL) apply: §644.051.3. requires the Department to set permit conditions complying with the MCWL and CWA; §644.051.4 specifically references toxicity as an item we must consider in writing permits (along with water quality-based effluent limits); and §644.051.5. is the basic authority to require testing conditions. WET tests are required by all facilities meeting the following criteria:

- ✓ Facility is a designated a Major
- ✓ Annual testing is the minimum testing frequency; monitoring requirements promulgated in 40 CFR 122.44(i)(2) state "requirements to report monitoring results shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the discharge, but in no case less than once per year."
- ✓ The previous permit required combining outfall #002 and #016 wastewater to complete one test. However, there is no basis for this requirement as #002 and #016 are not a combined discharge. The facility shall take a grab sample from only outfall #002 to complete the WET test.
- ✓ The Allowable Effluent Concentration (AEC) is 9%; the dilution series is: 2.25%, 4.5%, 9%, 18%, and 36%.

## OUTFALL #003 – WATER TREATMENT PLANT

### EFFLUENT LIMITATIONS TABLE:

PARAMETERS	UNIT	DAILY MAX	MONTHLY AVG.	PREVIOUS PERMIT LIMITS	MINIMUM SAMPLING FREQUENCY	REPORTING FREQUENCY	SAMPLE TYPE
PHYSICAL							
FLOW	MGD	*	*	SAME	ONCE/MONTH ‡	MONTHLY ‡	24 Hr. Tot
CONVENTIONAL							
CHLORINE, TOTAL RESIDUAL	µg/L	18 (ML50)	9 (ML50)	SAME	ONCE/MONTH ‡	MONTHLY ‡	GRAB
OIL & GREASE	mg/L	15	10	SAME	ONCE/MONTH ‡	MONTHLY ‡	GRAB
pH †	SU	6.5 to 9.0	6.5 to 9.0	SAME	ONCE/MONTH ‡	MONTHLY ‡	GRAB
TOTAL SUSPENDED SOLIDS (TSS)	mg/L	100	30	SAME	ONCE/MONTH ‡	MONTHLY ‡	GRAB
NUTRIENTS							
AMMONIA AS N	mg/L	*	*	NEW	ONCE/MONTH ‡	MONTHLY ‡	GRAB
KJELDAHL NITROGEN, TKN	mg/L	*	*	NEW	ONCE/MONTH ‡	MONTHLY ‡	GRAB
NITRATE PLUS NITRITE AS N	mg/L	*	*	NEW	ONCE/MONTH ‡	MONTHLY ‡	GRAB
PHOSPHORUS, TOTAL P (TP)	mg/L	*	*	NEW	ONCE/MONTH ‡	MONTHLY ‡	GRAB
OTHER							
WHOLE EFFLUENT TOX, CHRONIC	TUc	1.6	-	NEW	ONCE/YEAR ‡	ANNUALLY ‡	GRAB

\* Monitoring and reporting requirement only

† Report the minimum and maximum pH values; pH is not to be averaged

new Parameter not established in previous state operating permit

### DERIVATION AND DISCUSSION OF LIMITS:

Sampling for permit renewal was completed by sampling at the pump station, but there was no discharge to waters of the state. This sampling regime was deemed appropriate as the wastewater characteristics are the same regardless of the location sampled, as no additional inputs occur prior to discharge..

‡ The facility is only required to sample this outfall once per month if discharging to the surface. Sampling is not required when pumping to the headworks of the WTP. A monitoring report is not required if there is no discharge.

### PHYSICAL:

#### Flow

In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to ensure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification. The facility will report the total flow in millions of gallons per day (MGD), monthly monitoring continued from previous permit.

### CONVENTIONAL:

#### Chlorine, Total Residual (TRC)

18 µg/L daily maximum; 9 µg/L monthly average per 1/29/2019 effluent regulations approved 12/2019 at 10 CSR 20-7.031 Table A. Previous permit limits were 200 µg/L daily maximum; 104 µg/L monthly average based on inaccurate information showing the discharge was routed to the Missouri River; however if this effluent discharges, it will discharge to the surface near the lagoons entering a 0-flow stream according to facility personnel in an email dated 2/4/2020. 40 CFR 423.12(b) require technology limits, however, water quality limits are more stringent for this outfall. Because this outfall is recycled, the facility is currently meeting the new limits by not discharging; therefore, no schedule of compliance is afforded. The facility has indicated the test method used can detect at 50 µg/L or better for this parameter therefore a minimum analytical detection level (ML) is being established at 50 for this parameter.

Acute AQL: 19 µg/L

Chronic AQL: 11 µg/L

LTAa: WLAa \* LTAa multiplier = 19 \* 0.321 = 6.101

LTAc: WLAc \* LTAc multiplier = 11 \* 0.527 = 5.802

use most protective LTA: 5.802

[CV: 0.6, 99th %ile]

[CV: 0.6, 99th %ile]

Daily Maximum: MDL = LTA \* MDL multiplier =  $5.802 * 3.114 = 18.1 \mu\text{g/L}$  [CV: 0.6, 99th %ile]  
Monthly Average: AML = LTA \* AML multiplier =  $5.802 * 1.552 = 9 \mu\text{g/L}$  [CV: 0.6, 95th %ile, n=4]

### **Oil & Grease**

15 mg/L daily maximum; 10 mg/L monthly average; continued from previous permit. Oil and grease is considered a conventional pollutant. Oil and grease is a comprehensive test which measures for gasoline, diesel, crude oil, creosote, kerosene, heating oils, heavy fuel oils, lubricating oils, waxes, and some asphalt and pitch. The test can also detect some volatile organics such as benzene, toluene, ethylbenzene, or toluene, but these constituents are often lost during testing due to their boiling points. The facility reported non-detect in the application. The permit writer completed an RPD on this parameter and found RP. While this outfall is typically maintained as no-discharge, this outfall includes an oil water separator; the limit is being maintained to account for antibacksliding regulations and to ensure antidegradation requirements are being met.

AQL Chronic: 10 mg/L per 10 CSR 20-7.031 Table A1

Set chronic standard equal to chronic WLA per TSD §5.4.2 (EPA/505/2-90-001); multiply by 1.5 to obtain acute limit.

$10 \text{ mg/L} * 1.5 = 15 \text{ mg/L}$

### **pH**

6.5 to 9.0 SU instantaneous grab sample. Water quality limits [10 CSR 20-7.031(5)(E)] are applicable to this outfall. Technology based limits per 40 CFR 423.12(b)(3) for low volume waste sources are also applicable to this outfall but not continued from the previous permit as water quality limitations are more protective. The previous permit erroneously assumed the discharge was going to the Missouri River but if this outfall was to discharge would travel to a 0-base flow classified stream. The permit writer has determined there is reasonable potential to affect water quality therefore water quality limitations for wastewater are applied because the stream does not provide any buffering capacity as a 0-base flow stream. pH is a fundamental water quality indicator. Additionally, metals leachability and ammonia availability in wastewater is dependent on pH. Limitations in this permit will protect against aquatic organism toxicity, downstream water quality issues, human health hazard contact, and negative physical changes in accordance with the general criteria at 10 CSR 20-7.031(4) and the Clean Water Act's (CWA) goal of 100% fishable and swimmable rivers and streams.

### **Total Suspended Solids (TSS)**

100 mg/L daily maximum and 30 mg/L monthly average per 40 CFR 423.12(b)(3) for low volume waste sources. There is no numeric water quality standard for TSS; however, sediment discharges can negatively impact aquatic life habitat. The technology-based effluent limitations imposed in this permit are expected to also protect for water quality's narrative conditions per 10 CSR 20-7.031(4) for visual plumes and are being maintained to prevent backsliding.

## **METALS:**

### **Aluminum, Total Recoverable**

750  $\mu\text{g/L}$  daily maximum, 374  $\mu\text{g/L}$  monthly average. The facility reported 420  $\mu\text{g/L}$  in the application for renewal. Aluminum is a known contaminant from the water treatment process therefore effluent limitations are being established at this time ensure compliance with Missouri's WQS. As this effluent does not receive mixing from the receiving stream, the facility should continue to ensure this outfall is managed in a no-discharge fashion by recycling back to the WTP headworks.

Acute AQL: 750  $\mu\text{g/L}$

LTAa: WLAa \* LTAa multiplier =  $750 * 0.321 = 240.812$

[CV: 0.6, 99th %ile]

Daily Maximum: MDL = LTA \* MDL multiplier =  $240.812 * 3.114 = 750 \mu\text{g/L}$

[CV: 0.6, 99th %ile]

Monthly Average: AML = LTA \* AML multiplier =  $240.812 * 1.552 = 373.8 \mu\text{g/L}$

[CV: 0.6, 95th %ile, n=4]

## **NUTRIENTS:**

### **Ammonia, Total as Nitrogen**

Nitrogen is expected to be present in the discharge therefore monthly monitoring is required per 10 CSR-20-7.015(9)(D)8.

### **Kjeldahl Nitrogen, Total (TKN)**

Nitrogen is expected to be present in the discharge therefore monthly monitoring is required per 10 CSR 20-7.015(9)(D)8.

### **Nitrate plus Nitrite**

Nitrogen is expected to be present in the discharge therefore monthly monitoring is required per 10 CSR 20-7.015(9)(D)8.

### **Phosphorus, Total P (TP)**

Phosphorus is expected to be present in the discharge therefore monthly monitoring is required per 10 CSR 20-7.015(9)(D)8.

**OTHER:**

**Whole Effluent Toxicity (WET) Test, Chronic**

A WET test is a quantifiable method to determine if discharges from the facility cause toxicity to aquatic life by itself, in combination with, or through synergistic responses, when mixed with receiving stream water. The previous permit erroneously identified this outfall as discharging to the Missouri River, however, any discharge (non-recycled wastewater) would discharge to the surface to a newly classified ephemeral stream. Because this outfall typically operates as no-discharge, effluent limits are effective immediately; by maintaining the outfall as no-discharge, the department has determined the limit is already being met. Allowance to discharge is contingent on lack of toxicity.

Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures the provisions in 10 CSR 20-6 and the Water Quality Standards in 10 CSR 20-7 are being met. Under 10 CSR 20-6.010(8)(A)4, the Department may require other terms and conditions it deems necessary to ensure compliance with the CWA and related regulations of the Missouri Clean Water Commission. The following Missouri Clean Water Laws (MCWL) apply: §644.051.3. requires the Department to set permit conditions complying with the MCWL and CWA; §644.051.4 specifically references toxicity as an item we must consider in writing permits (along with water quality-based effluent limits); and §644.051.5. is the basic authority to require testing conditions. WET tests are required by all facilities meeting the following criteria:

- ✓ Facility is a designated a Major
- ✓ Annual testing is the minimum testing frequency; monitoring requirements promulgated in 40 CFR 122.44(i)(2) state “requirements to report monitoring results shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the discharge, but in no case less than once per year.” (unless there was no discharge)
- ✓ The previous permit required combining outfall #002 and #016 wastewater to complete one test. However, there is no basis for this requirement.
- ✓ The standard Allowable Effluent Concentration (AEC) for facilities discharging to unclassified, Class C, Class P (with default mixing considerations), or lakes [10 CSR 20-7.031(4)(A)4.B.(IV)(b)], or to monitor the whole of the effluent, is 100%. The standard dilution series for facilities discharging to waterbodies with no mixing considerations is 100%, 50%, 25%, 12.5%, & 6.25%.

WQS: no toxics in toxic amounts [10 CSR 20-7.031(4)(J)2.B.] = 0.3 TU<sub>a</sub>, 1.0 TU<sub>c</sub>

Acute WLA:  $C_e = 0.3 \text{ TU}_a \times 10 = 3.0 \text{ TU}_{a,c}$

[ACR: acute-to-chronic ratio = 10]

(The acute WLA is converted to a long-term average concentration (LTA<sub>a,c</sub>) using:  $\text{WLA}_{a,c} = \text{WLA}_a \times \text{ACR}$ . A default acute to chronic ratio [ACR] value of 10 is used based on Section 1.3.4 and Appendix A, March 1991 TSD.)

Chronic WLA:  $C_e = 1.0 \text{ TU}_a$

LTA<sub>a,c</sub>:  $3.0 (0.321) = 0.963 \text{ TU}_{a,c}$

[CV = 0.6, 99<sup>th</sup> Percentile]

LTA<sub>c</sub>:  $1.0 (0.527) = 0.527 \text{ TU}_{a,c}$

[CV = 0.6, 99<sup>th</sup> Percentile]

Use most protective number of LTA<sub>a,c</sub> or LTA<sub>c</sub>.

MDL:  $0.527 (3.11) = 1.64 \text{ TU}_c = 1.6 \text{ TU}_c$

[CV = 0.6, 99<sup>th</sup> Percentile]

## **OUTFALL #007 – DOMESTIC AND LABORATORY WASTEWATER**

### **EFFLUENT LIMITATIONS TABLE:**

PARAMETERS	UNIT	DAILY MAX	WEEKLY AVG.	MONTHLY AVG.	PREVIOUS PERMIT LIMITS	MINIMUM SAMPLING FREQUENCY	REPORTING FREQ.	SAMPLE TYPE
PHYSICAL								
FLOW	MGD	*	-	*		WEEKLY ▲	▲	24 Hr. Tot
CONVENTIONAL								
BOD <sub>5</sub>	mg/L	*	65	45	SAME	WEEKLY ▲	▲	GRAB
<i>E. coli</i> †	#/100 mL	1030	-	206	*,*	WEEKLY ▲	▲	GRAB
OIL & GREASE	mg/L	15	-	10	SAME	WEEKLY ▲	▲	GRAB
pH †	SU	6.0 to 9.0	-	6.0 to 9.0	SAME	WEEKLY ▲	▲	GRAB
TOTAL SUSPENDED SOLIDS	mg/L	*	110	70	SAME	WEEKLY ▲	▲	GRAB
METALS								
CHROMIUM (VI), DISSOLVED	µg/L	*	-	*	NEW	WEEKLY ▲	▲	GRAB
NUTRIENTS								
AMMONIA AS N	mg/L	*	-	*	NEW	WEEKLY ▲	▲	GRAB
KJELDAHL NITROGEN, TKN	mg/L	*	-	*	NEW	WEEKLY ▲	▲	GRAB
NITRATE PLUS NITRITE AS N	mg/L	*	-	*	NEW	WEEKLY ▲	▲	GRAB
PHOSPHORUS, TOTAL P (TP)	mg/L	*	-	*	NEW	WEEKLY ▲	▲	GRAB
OTHER								
CHLORIDE	mg/L	378	-	188	NEW	WEEKLY ▲	▲	GRAB
WHOLE TOXICITY, CHRONIC	TUc	1.6	-	-	NEW	ONCE/YEAR	ANNUALLY	GRAB

\* monitoring and reporting requirement only

† *E. coli*: final limitations and monitoring requirements are applicable only during the recreational season from April 1 through October 31. The Monthly Average Limit for *E. coli* is expressed as a geometric mean.

† report the minimum and maximum pH values; pH is not to be averaged

new parameter not established in previous state operating permit

▲ Weekly monitoring required when discharging due to the TSS and BOD<sub>5</sub> limitations. The facility shall submit the monitoring data by the 28<sup>th</sup> day of the month following discharge. A report is not necessary if there was no discharge.

interim parameter requirements prior to end of SOC

final parameter requirements at end of SOC

### **DERIVATION AND DISCUSSION OF LIMITS:**

The previous permit required quarterly sampling when discharging. This outfall has not discharged for at least 20 years but if it does, will flow to a stream with 0-base flow, confirmed via email on 2/4/2020; the previous permit was inaccurate. The monitoring frequency when discharging has been changed to weekly when discharging due to the stream classification. The permit writer believes this increase in sampling frequency will have no negative impacts on the facility as a whole as the facility has committed to maintain this outfall as no-discharge although discharge permissions remain.

### **PHYSICAL:**

#### **Flow**

In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to ensure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification. The facility will report the total flow in millions of gallons per day (MGD), weekly monitoring when discharging.

### **CONVENTIONAL:**

#### **Biochemical Oxygen Demand - 5 Day (BOD<sub>5</sub>)**

65 mg/L weekly average; 45 mg/L monthly average per 10 CSR 20-7.015(8)(A)3.A.; continued from previous permit. While maintaining this outfall as no-discharge is more protective than effluent limits, these established effluent limitations comply with Missouri's effluent regulations.



### **Escherichia coli (E. coli)**

For discharge to a stream with WBC-B: Daily maximum limit of 1030 colony forming units per 100 mL [10 CSR 20-7.015(9)(B)1.E.] and a monthly geometric mean limit of 206 bacteria per 100 mL [10 CSR 20-7.031 Table A1] during the recreational season from April 1 through October 31 only [10 CSR 20-7.031(5)(C)], to protect Whole Body Contact (B) [10 CSR 20-7.031(C)2.A.(II)] designated use of the receiving stream.

An effluent limit for both daily maximum and monthly geometric mean is required by 40 CFR 122.45(d). The geometric mean is calculated by multiplying all of the data points and then taking the  $n^{\text{th}}$  root of this product, where  $n = \#$  of samples collected. For example: Five *E. coli* samples were collected with results of 1, 4, 5, 6, and 10 (#/100 mL). Geometric mean =  $5^{\text{th}}$  root of  $(1)(4)(5)(6)(10) = 5^{\text{th}}$  root of 1,200 = 4.1 #/100 mL.

The previous permit required monitoring only, however, due to new stream designations, the outfall is now located within 2 miles of a classified stream. The facility reported 310 MPN/100 mL in the application; however, no schedule of compliance is afforded as this outfall is currently maintained as no-discharge.

### **Oil and Grease**

15 mg/L daily maximum, 10 mg/L monthly average. Previous permit limits are retained. The application data shows a non-detect. However, the limits are retained to comply with antibacksliding regulations, and because these are open lagoons receiving some Oily Waste Processing System wastewater, and discharge to a stream which does not provide mixing.

### **pH**

6.0 to 9.0 SU. Technology based limits [10 CSR 20-7.015(8)(A)2.] are applicable to this outfall; continued from the previous permit. The permit writer has determined there is no reasonable potential to affect water quality until additional data is collected. Typically, lagoon systems discharge effluents in the higher pH range; the technology upper limit and water quality upper limit are identical, therefore technology limitations for wastewater are applied. pH is a fundamental water quality indicator.

### **Total Suspended Solids (TSS)**

100 mg/L weekly average; 70 mg/L monthly average per 10 CSR 20-7.015(8)(A)2; limitations for lagoons. There is no numeric water quality standard for TSS; however, sediment discharges can negatively impact aquatic life habitat. Increased suspended solids in runoff can lead to decreased available oxygen for aquatic life and an increase of surface water temperatures in a receiving stream. Suspended solids can also be carriers of toxins, which can adsorb to the suspended particles; therefore, total suspended solids are a valuable indicator parameter for other pollution. Discharges in compliance with the technology limitations established in this permit are expected to also convey compliance with the general criteria per 10 CSR 20-7.031(4)(A), (B), (D), (E), and (H).

## **METALS:**

### **Chromium, Hexavalent, Dissolved**

The facility reported 6.6 µg/L in the application for renewal. The water quality standard is 11 µg/L for continuous discharges. The data are greater than one-half the chronic standard so any discharge will be monitored for this parameter.

## **NUTRIENTS:**

### **Ammonia, Total as Nitrogen**

Previous permit limits were monitoring only; nitrogen is expected to be present in the discharge therefore one sample per discharge event monitoring of ammonia is required per 10 CSR-20-7.015(9)(D)8.

### **Nitrogen, Total Kjeldahl (TKN)**

Nitrogen is expected to be present in this outfall's discharge therefore monitoring is required per 10 CSR 20-7.015(9)(D)8. One sample per discharge event monitoring of total Kjeldahl nitrogen is required per 10 CSR 20-7.015(9)(D)8.

### **Nitrate plus Nitrite**

Nitrogen is expected to be present in this outfall's discharge therefore one weekly sample per discharge event monitoring is required per 10 CSR 20-7.015(9)(D)8.

### **Phosphorus, Total P (TP)**

Phosphorus is expected to be present in this outfall's discharge therefore one weekly sample per discharge event monitoring is required per 10 CSR 20-7.015(9)(D)8.

**OTHER:**

**Chloride**

378 mg/L daily maximum; 188 mg/L monthly average. The application reported 200 mg/L for this parameter. Although not likely, the facility has authority to discharge continuously therefore effluent limits are established for this parameter. A schedule of compliance is not afforded because this outfall is maintained as no-discharge.

Acute AQL: 860 mg/L

Chronic AQL: 230 mg/L

LTAa: WLAa \* LTAa multiplier = 860 \* 0.321 = 276.132

[CV: 0.6, 99th %ile]

LTAc: WLAc \* LTAc multiplier = 230 \* 0.527 = 121.31

[CV: 0.6, 99th %ile]

use most protective LTA: 121.31

Daily Maximum: MDL = LTA \* MDL multiplier = 121.31 \* 3.114 = 377.8 mg/L

[CV: 0.6, 99th %ile]

Monthly Average: AML = LTA \* AML multiplier = 121.31 \* 1.552 = 188.3 mg/L

[CV: 0.6, 95th %ile, n=4]

**Whole Effluent Toxicity (WET) Test, Chronic**

A WET test is a quantifiable method to determine if discharges from the facility cause toxicity to aquatic life by itself, in combination with, or through synergistic responses, when mixed with receiving stream water. The previous permit erroneously identified this outfall as discharging to the Missouri River, however, any discharge (non-recycled wastewater) would discharge to the surface to a newly classified ephemeral stream. Because this outfall typically operates as no-discharge, effluent limits are effective immediately; by maintaining the outfall as no-discharge, the department has determined the limit is already being met. Allowance to discharge is contingent on lack of toxicity.

Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures the provisions in 10 CSR 20-6 and the Water Quality Standards in 10 CSR 20-7 are being met. Under 10 CSR 20-6.010(8)(A)4, the Department may require other terms and conditions it deems necessary to ensure compliance with the CWA and related regulations of the Missouri Clean Water Commission. The following Missouri Clean Water Laws (MCWL) apply: §644.051.3. requires the Department to set permit conditions complying with the MCWL and CWA; §644.051.4 specifically references toxicity as an item we must consider in writing permits (along with water quality-based effluent limits); and §644.051.5. is the basic authority to require testing conditions. WET tests are required by all facilities meeting the following criteria:

- ✓ Facility is a designated a Major
- ✓ Annual testing is the minimum testing frequency; monitoring requirements promulgated in 40 CFR 122.44(i)(2) state “requirements to report monitoring results shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the discharge, but in no case less than once per year.”
- ✓ The standard Allowable Effluent Concentration (AEC) for facilities discharging to unclassified, Class C, Class P (with default mixing considerations), or lakes [10 CSR 20-7.031(4)(A)4.B.(IV)(b)], or to monitor the whole of the effluent, is 100%. The standard dilution series for facilities discharging to waterbodies with no mixing considerations is 100%, 50%, 25%, 12.5%, & 6.25%.

WQS: no toxics in toxic amounts [10 CSR 20-7.031(4)(J)2.B.] = 0.3 TUa, 1.0 TUC

Acute WLA:  $C_e = 0.3 \text{ TUa} \times 10 = 3.0 \text{ TUa,c}$

[ACR: acute-to-chronic ratio = 10]

(The acute WLA is converted to a long-term average concentration (LTAa,c) using:  $\text{WLAa,c} = \text{WLAa} \times \text{ACR}$ . A default acute to chronic ratio [ACR] value of 10 is used based on Section 1.3.4 and Appendix A, March 1991 TSD.)

Chronic WLA:  $C_e = 1.0 \text{ TUa,c}$

LTAa,c:  $3.0 (0.321) = 0.963 \text{ TUa,c}$

[CV = 0.6, 99th Percentile]

LTAc:  $1.0 (0.527) = 0.527 \text{ TUa,c}$

[CV = 0.6, 99th Percentile]

Use most protective number of LTAa,c or LTAc.

MDL:  $0.527 (3.11) = 1.64 \text{ TUC} = 1.6 \text{ TUC}$

[CV = 0.6, 99th Percentile]

## **OUTFALL #009 – INTAKE AND INTAKE HEATER BLOWDOWN**

### **EFFLUENT LIMITATIONS TABLE:**

PARAMETERS	UNIT	DAILY MAX	MONTHLY AVG.	PREVIOUS PERMIT LIMITS	MINIMUM SAMPLING FREQUENCY	REPORTING FREQUENCY	SAMPLE TYPE
PHYSICAL							
FLOW (INTAKE)	MGD	*	*	NEW	DAILY	MONTHLY	MEASURED
FLOW (DISCHARGE)	MGD	*	*	SAME	WEEKLY ▲	▲	24 Hr. Tot
TEMPERATURE	°F	*	*	NEW	WEEKLY ▲	▲	MEASURED
CONVENTIONAL							
OIL & GREASE	mg/L	15	10	SAME	WEEKLY ▲	▲	GRAB
pH †	SU	6.0 TO 9.0	6.0 to 9.0	SAME	WEEKLY ▲	▲	GRAB
TOTAL SUSPENDED SOLIDS (TSS)	mg/L	100	30	SAME	WEEKLY ▲	▲	GRAB

\* monitoring and reporting requirement only

† report the minimum and maximum pH values; pH is not to be averaged

▲ Weekly monitoring required when discharging. The facility shall submit the monitoring data by the 28<sup>th</sup> day of the month following discharge. No report is required if no discharge occurred.

new parameter not established in previous state operating permit

### **DERIVATION AND DISCUSSION OF LIMITS:**

See special conditions for sampling requirements during first discharge.

#### **PHYSICAL:**

##### **Flow (Intake)**

Flow monitoring of the intake is required to determine actual intake values at this facility. This is a new requirement. The facility will calculate the total amount of water withdrawn each day and report monthly.

##### **Flow (Discharge)**

In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to ensure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification. The facility will report the total flow in millions of gallons per day (MGD), weekly when discharging, continued from the previous permit.

##### **Temperature**

In accordance with 10 CSR 20-7.031(5)(D), water contaminant sources shall not cause or contribute to stream temperature in excess of ninety degrees Fahrenheit (90 °F) or change the stream temperature by more than 5 degrees Fahrenheit. There is no data for this parameter and temperature is likely a pollutant of concern. Because the design flow is designated as 6,000 gallons per day, there is no expectation of exceedance of water quality standards alone, but could in combination with other heat sources. However, monitoring, should this outfall discharge, is required to assess technology limitations in the future.

#### **CONVENTIONAL:**

##### **Oil & Grease**

15 mg/L daily maximum; 10 mg/L monthly average; continued from previous permit. Oil and grease is considered a conventional pollutant. Oil and grease is a comprehensive test which measures for gasoline, diesel, crude oil, creosote, kerosene, heating oils, heavy fuel oils, lubricating oils, waxes, and some asphalt and pitch. The test can also detect some volatile organics such as benzene, toluene, ethylbenzene, or toluene, but these constituents are often lost during testing due to their boiling points. Oils and greases of different densities will possibly form sheen or unsightly bottom deposits at levels which vary from 10 mg/L. To protect the general criteria, it is the responsibility of the permittee to visually observe the discharge and receiving waters for sheen or bottom deposits. The limit is being retained to comply with antibacksliding regulations and the possibility of greases entering the system causing discharge. Technology limitations of 20 mg/L daily maximum and 15 mg/L monthly average are not applied, as they are less stringent than water quality limitations.

AQL Chronic: 10 mg/L per 10 CSR 20-7.031 Table A1

Set chronic standard equal to chronic WLA per TSD §5.4.2 (EPA/505/2-90-001); multiply by 1.5 to obtain acute limit.

10 mg/L \* 1.5 = 15 mg/L

**pH**

6.0 to 9.0 SU. Technology based limits 40 CFR 423.12(b)(3) for low volume waste sources are applicable to this outfall. The permit writer has determined there is no reasonable potential to affect water quality therefore technology limitations for wastewater are applied. pH is a fundamental water quality indicator. Additionally, metals leachability and ammonia availability in wastewater is dependent on pH.

**Total Suspended Solids (TSS)**

100 mg/L daily maximum and 30 mg/L monthly average per 40 CFR 423.12(b)(3); technology-based limits. The previous permit's limits were continued although the citation appears incorrect in the previous permit. There is no numeric water quality standard for TSS; however, sediment discharges can negatively impact aquatic life habitat. The Missouri River's sediment load is typically above the established limits therefore the technology limits imposed are protective of water quality as well. Suspended solids can be carriers of toxins, which can adsorb to the suspended particles; therefore, total suspended solids are a valuable indicator parameter for other pollution. The value is known to be achievable at this site through proper operational and maintenance.

## **OUTFALL #016 – COOLING TOWER BYPASS**

### **EFFLUENT LIMITATIONS TABLE:**

PARAMETERS	UNIT	DAILY MAX	MONTHLY AVG.	PREVIOUS PERMIT LIMITS	MINIMUM SAMPLING FREQUENCY	REPORTING FREQUENCY	SAMPLE TYPE
PHYSICAL							
FLOW	MGD	*	*	SAME	ONCE/MONTH	MONTHLY	24 Hr. Tot
TEMPERATURE	°F	*	*	SAME	ONCE/QUARTER	QUARTERLY	GRAB
CONVENTIONAL							
CHLORINE, TOTAL RESIDUAL	µg/L	200	104	SAME	ONCE/QUARTER	QUARTERLY	GRAB
OIL & GREASE	mg/L	15	10	SAME	ONCE/QUARTER	QUARTERLY	GRAB
pH †	SU	6.0 to 9.0	6.0 to 9.0	SAME	ONCE/QUARTER	QUARTERLY	GRAB
TOTAL DISSOLVED SOLIDS (TDS)	mg/L	*	*	NEW	ONCE/QUARTER	QUARTERLY	GRAB
TOTAL SUSPENDED SOLIDS (TSS)	mg/L	100	30	SAME	ONCE/QUARTER	QUARTERLY	GRAB
NUTRIENTS							
AMMONIA AS N	mg/L	*	*	NEW	ONCE/MONTH	MONTHLY	GRAB
KJELDAHL NITROGEN, TOTAL	mg/L	*	*	NEW	ONCE/MONTH	MONTHLY	GRAB
NITRATE PLUS NITRITE AS N	mg/L	*	*	NEW	ONCE/MONTH	MONTHLY	GRAB
PHOSPHORUS, TOTAL P (TP)	mg/L	*	*	NEW	ONCE/MONTH	MONTHLY	GRAB
OTHER							
WET TEST - ACUTE	TUc	*	-	SAME	ONCE/YEAR	ANNUALLY	GRAB

\* Monitoring and reporting requirement only

† Report the minimum and maximum pH values; pH is not to be averaged

new Parameter not established in previous state operating permit

### **DERIVATION AND DISCUSSION OF LIMITS:**

Due to the design flow of this outfall, monthly monitoring of nutrients is required. Data show nutrients are present in the discharge therefore monitoring is warranted. Monitoring of flow must be as least as frequent than the most frequently tested parameter, therefore flow must be reported monthly.

### **PHYSICAL:**

#### **Flow**

In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to ensure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification. The facility will report the total flow in millions of gallons per day (MGD), quarterly monitoring increased to monthly due to nutrient monitoring requirements.

#### **Temperature**

In accordance with 10 CSR 20-7.031(5)(D), water contaminant sources shall not cause or contribute to stream temperature in excess of ninety degrees Fahrenheit (90 °F) or change the stream temperature by more than 5 degrees Fahrenheit. Data reported by the facility ranged from 39 to 84.2 degrees Fahrenheit (°F). Given the large mixing zone afforded by the Missouri River, there is no reasonable potential. However, monitoring is continued to provide site-wide temperature loading of the Missouri River.

### **CONVENTIONAL:**

#### **Chlorine, Total Residual (TRC)**

200 µg/L daily maximum; 104 µg/L monthly average. Daily maximum limitations are governed by the effluent limitation guideline at 40 CFR 423.12(b). Limiting for total residual chlorine is more protective than freely available therefore will be continued from the previous permit. The technology limitations for daily maximum are more protective than the water quality daily maximum. The monthly average, calculated based on water quality standards is 104 µg/L from the previous permit; the water quality limit for the monthly average is more protective. Antibacksliding regulations do not support removal of limits for this parameter because chlorine is used in the system. The facility has indicated the test method used can detect at 50 µg/L or better for this parameter therefore a minimum analytical detection level (ML) is not being established for this parameter as the

facility is capable of meeting the limits with the current analytical technology employed on site. There were no detections of this parameter.

#### **Oil & Grease**

15 mg/L daily maximum; 10 mg/L monthly average; continued from previous permit. The facility reported from non-detect to 8.33 mg/L. The permit writer completed an RPD on this parameter and found RP due to analytical data for first quarter 2017. Oil and grease is considered a conventional pollutant. Oil and grease is a comprehensive test which measures for gasoline, diesel, crude oil, creosote, kerosene, heating oils, heavy fuel oils, lubricating oils, waxes, and some asphalt and pitch. The test can also detect some volatile organics such as benzene, toluene, ethylbenzene, or toluene, but these constituents are often lost during testing due to their boiling points. Oils and greases of different densities will possibly form sheen or unsightly bottom deposits at levels which vary from 10 mg/L. To protect the general criteria, it is the responsibility of the permittee to visually observe the discharge and receiving waters for sheen or bottom deposits. Technology limitations are less restrictive therefore will not be applied. 40 CFR 423.13 sets the effluent limit at 20 mg/L maximum daily and 15 mg/L monthly average. The water quality standard is 10 mg/L. The water quality standard is more protective than the Effluent Limit Guideline.

AQL Chronic: 10 mg/L per 10 CSR 20-7.031 Table A1

Set chronic standard equal to chronic WLA per TSD §5.4.2 (EPA/505/2-90-001); multiply by 1.5 to obtain acute limit.

$10 \text{ mg/L} * 1.5 = 15 \text{ mg/L}$

#### **pH**

6.0 to 9.0 SU. Technology based limits per 40 CFR 423.12(b)(1) are applicable to this outfall. The permit writer has determined there is no reasonable potential to affect water quality below 6.5 SU therefore technology limitations for wastewater are applied. pH is a fundamental water quality indicator. Additionally, metals leachability and ammonia availability in wastewater is dependent on pH. The facility reported in the 8 SU range for almost the entirety of the permit term.

#### **Total Dissolved Solids (TDS)**

New monitoring requirement per 10 CSR 20-7.031(5) to determine total dissolved solids into the Missouri River which is a drinking water source. TDS is a measurement of inorganic salts, organic matter, and other dissolved materials in water and could contain beneficial minerals or organic molecules, or contaminants such as metals or organic pollutants; measurements of TDS do not differentiate among ions. The Missouri River is a drinking water source; secondary drinking water regulations, similar to water quality standards, indicate TDS should not be above 500 mg/L for users (this is not an effluent limit and mixing will be afforded for this parameter if necessary in the future). Data collection will determine if TDS from this site is of concern for downstream drinking water intakes. Pending additional sampling, determination of the components of the TDS may be required in the future. The Missouri River is listed as a drinking water source.

#### **Total Suspended Solids (TSS)**

100 mg/L daily maximum and 30 mg/L monthly average per 40 CFR 423.12(b)(3) for low volume waste sources of clarified river water and water treatment plant recycled wastewater (cooling tower bypass); these limitations were reassessed, and continued from previous permit.

### **NUTRIENTS:**

#### **Ammonia, Total as Nitrogen**

Nitrogen is expected to be present in the discharge therefore monthly monitoring is required per 10 CSR-20-7.015(9)(D)8.

#### **Kjeldahl Nitrogen, Total (TKN)**

Nitrogen is expected to be present in the discharge therefore monthly monitoring is required per 10 CSR 20-7.015(9)(D)8.

#### **Nitrate plus Nitrite**

Nitrogen is expected to be present in the discharge therefore monthly monitoring is required per 10 CSR 20-7.015(9)(D)8.

#### **Phosphorus, Total P (TP)**

Phosphorus is expected to be present in the discharge therefore monthly monitoring is required per 10 CSR 20-7.015(9)(D)8.

### **OTHER:**

#### **Whole Effluent Toxicity (WET) Test, Acute**

Monitoring is required to determine if reasonable potential exists for the discharge to cause toxicity within the receiving stream. A WET test is a quantifiable method to determine discharges from the facility cause toxicity to aquatic life by itself, in combination with, or through synergistic responses, when mixed with receiving stream water. Wastewater from outfall #016 is used to dilute and transport wastewater from outfall #001; outfall #001 is never discharged by itself to waters of the state. The facility shall obtain a flow-weighted sample and submit this blended wastewater for WET analysis. See special conditions.



Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures the provisions in 10 CSR 20-6 and the Water Quality Standards in 10 CSR 20-7 are being met. Under 10 CSR 20-6.010(8)(A)4, the Department may require other terms and conditions it deems necessary to ensure compliance with the CWA and related regulations of the Missouri Clean Water Commission. The following Missouri Clean Water Laws (MCWL) apply: §644.051.3. requires the Department to set permit conditions complying with the MCWL and CWA; §644.051.4 specifically references toxicity as an item we must consider in writing permits (along with water quality-based effluent limits); and §644.051.5. is the basic authority to require testing conditions. WET tests are required by all facilities meeting the following criteria:

- ✓ Facility is a designated a Major
- ✓ Annual testing is the minimum testing frequency; monitoring requirements promulgated in 40 CFR 122.44(i)(2) state “requirements to report monitoring results shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the discharge, but in no case less than once per year.”
- ✓ The previous permit required combining outfall #002 and #016 wastewater to complete one test. However, there is no basis for this requirement. The facility shall take a grab sample from only outfall #001 and #016 to complete the WET test. See special conditions.
- ✓ The Allowable Effluent Concentration (AEC) is 9%; the dilution series is: 2.25%, 4.5%, 9%, 18%, and 36%.
- ✓ The previous permit only required a WET test during biocide use. Citing, if no biocide use occurred in a given year, monitoring was not required. However, because this is a new mixture requirement (the previous permit required mixing outfall #002 with #016), the facility must perform a WET test for outfall #016 mixed with outfall #001.
- ✓ A flow-proportional sample is used to determine the actual ratio of outfall #001 to outfall #016 wastewater being discharged. It is expected outfall #016’s flow is typically at least 10 times or greater than outfall #001’s flow which will render the radiological components in the sample undetectable.
- ✓ See special conditions for minimum test acceptability criteria.

**OUTFALL #018 – FIRE WATER FLUSH**

**EFFLUENT LIMITATIONS TABLE:**

PARAMETERS	UNIT	DAILY MAX	MONTHLY AVG.	PREVIOUS PERMIT LIMITS	MINIMUM SAMPLING FREQUENCY	REPORTING FREQUENCY	SAMPLE TYPE
PHYSICAL							
FLOW	MGD	*	*	NEW	ONCE/DAY ♦	♦	24 Hr. TOT
CONVENTIONAL							
pH †	SU	6.5 to 9.0	6.5 to 9.0	NEW	ONCE/DAY ♦	♦	GRAB

\* Monitoring and reporting requirement only

† Report the minimum and maximum pH values; pH is not to be averaged

new Parameter not established in previous state operating permit

♦ Facility shall sample at least once per day when discharging; the report is due on the month following discharge, no report is due if there was no discharge.

**DERIVATION AND DISCUSSION OF LIMITS:**

This is a new outfall.

**PHYSICAL:**

**Flow**

In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to ensure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification. The facility will report the total flow in millions of gallons per day (MGD), monthly monitoring continued from previous permit.

**CONVENTIONAL:**

**Chlorine, Total Residual (TRC)**

During the preview period, the facility indicated the fire protection water comes directly from the ground and is not treated with chlorine. Therefore no TRC limits or monitoring is needed.

**pH**

6.5 to 9.0 SU instantaneous grab sample. Water quality limits [10 CSR 20-7.031(5)(E)] are applicable to this outfall. New requirement. Limitations in this permit will protect against aquatic organism toxicity, downstream water quality issues, human health hazard contact, and negative physical changes in accordance with the general criteria at 10 CSR 20-7.031(4) and the Clean Water Act's (CWA) goal of 100% fishable and swimmable rivers and streams. The facility should monitor the tank's pH prior to discharge and only discharges shall be reported to the Department. A schedule of compliance is not permissible for this parameter as the facility should be monitoring the pH prior to discharge and adjust the pH if necessary to meet water quality limits.

**OUTFALL #100 – MAIN DISCHARGE PIPE**

**EFFLUENT LIMITATIONS TABLE:**

PARAMETERS	UNIT	DAILY MAX	MONTHLY AVG.	PREVIOUS PERMIT LIMITS	MINIMUM SAMPLING FREQUENCY	REPORTING FREQUENCY	SAMPLE TYPE
PHYSICAL							
FLOW	MGD	*	*	NEW	DAILY	MONTHLY	TOTAL FLOW CALCULATION

\* monitoring and reporting requirement only  
 new parameter not established in previous state operating permit

**DERIVATION AND DISCUSSION OF LIMITS:**

**PHYSICAL:**

**Flow**

The total volume of effluent discharged from the facility is needed to ensure compliance with permitted effluent limitations; this will be a sum of the total effluent discharged from all outfalls each day. The facility will report the total flow in millions of gallons per day (MGD), daily monitoring necessary to include all flows. The flows do not have to be metered; the facility will calculate the total flow for each day.

**OUTFALLS #010, #011, #012, #014, #015 – STORMWATER**

**EFFLUENT LIMITATIONS TABLE:**

PARAMETERS	UNIT	DAILY MAX	QUARTERLY AVG.	BENCH- MARK	PREVIOUS PERMIT LIMITS	MINIMUM SAMPLING FREQUENCY	REPORTING FREQUENCY	SAMPLE TYPE
PHYSICAL								
FLOW	MGD	*	*	-	NEW	ONCE/QUARTER	QUARTERLY	ESTIMATE
CONVENTIONAL								
COD	mg/L	**	*	90	SAME	ONCE/QUARTER	QUARTERLY	GRAB
OIL & GREASE	mg/L	**	*	10	SAME	ONCE/QUARTER	QUARTERLY	GRAB
pH <sup>†</sup>	SU	**	**	6.5 to 9.0	SAME	ONCE/QUARTER	QUARTERLY	GRAB
TOTAL SUSPENDED SOLIDS	mg/L	**	*	100	NEW	ONCE/QUARTER	QUARTERLY	GRAB

- \* monitoring and reporting requirement only  
<sup>†</sup> report the minimum and maximum pH values; pH is not to be averaged  
 new parameter not established in previous state operating permit

**DERIVATION AND DISCUSSION OF LIMITS:**

**PHYSICAL:**

**Flow**

In accordance with [40 CFR Part 122.44(i)(1)(ii)] the estimated volume of effluent discharged from each outfall is needed to ensure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification. The facility will report the total flow in millions of gallons per day (MGD), quarterly monitoring required. New reporting requirement this permit.

**CONVENTIONAL:**

**Chemical Oxygen Demand (COD)**

Quarterly monitoring with a benchmark of 90 mg/L is included using the permit writer's best professional judgment. There is no numeric water quality standard for COD; however, increased oxygen demand may impact instream water quality. COD is also a valuable indicator parameter in stormwater. COD monitoring allows the permittee to identify increases in COD which may indicate materials/chemicals coming into contact with stormwater and causing an increase in oxygen demand. Increases in COD may indicate a need for maintenance or improvement of BMPs. A benchmark of 90 mg/L is attainable using typical BMPs, and the benchmark is continued from the previous permit. The facility should strive to continue to meet this target. Values above 90 mg/L should be evaluated to determine causes and effective solutions for the discharge.

**Oil & Grease**

Monitoring with a daily maximum benchmark of 10 mg/L, continued from previous permit. Data suggest there is no RP for oil and grease. Oil and grease is considered a conventional pollutant. Oil and grease is a comprehensive test which measures for gasoline, diesel, crude oil, creosote, kerosene, heating oils, heavy fuel oils, lubricating oils, waxes, and some asphalt and pitch. The test can also detect some volatile organics such as benzene, toluene, ethylbenzene, or toluene, but these constituents are often lost during testing due to their boiling points. It is recommended to perform separate testing for these constituents if they are a known pollutant of concern at the site, i.e. aquatic life toxicity or human health is a concern. Results do not allow for separation of specific pollutants within the test, they are reported, totaled, as "oil and grease". Per 10 CSR 20-7.031 Table A1: *Criteria for Designated Uses*; 10 mg/L is the standard for protection of aquatic life. This standard will also be used to protect the general criteria found at 10 CSR 20-7.031(4). Ten mg/L is the level at which sheen is expected to form on receiving waters. Oils and greases of different densities will possibly form sheen or unsightly bottom deposits at levels which vary from 10 mg/L. To protect the general criteria, it is the responsibility of the permittee to visually observe the discharge and receiving waters for sheen or bottom deposits. The benchmark is achievable through proper operational and maintenance of BMPs and falls within the range of values implemented in other permits having similar industrial activities.

**pH**

6.5 to 9.0 SU benchmark– instantaneous grab sample; continued from the previous permit. pH is a fundamental water quality indicator.

### **Total Suspended Solids (TSS)**

Monitoring with a daily maximum benchmark of 100 mg/L. There is no numeric water quality standard for TSS; however, sediment discharges can negatively impact aquatic life habitat. TSS is also a valuable indicator parameter. TSS monitoring allows the permittee to identify increases in TSS indicating uncontrolled materials leaving the site. Increased suspended solids in runoff can lead to decreased available oxygen for aquatic life and an increase of surface water temperatures in a receiving stream. Suspended solids can also be carriers of toxins, which can adsorb to the suspended particles; therefore, total suspended solids are a valuable indicator parameter for other pollution. The benchmark is achievable through proper operational and maintenance of BMPs and falls within the range of values implemented in other permits having similar industrial activities. Application data submitted by the permittee indicate TSS at the five outfalls covered under this section range from 6 mg/L at outfall #015 to 48 mg/L at outfall #012. 100 mg/L is achievable through proper operational and maintenance of BMPs and falls within the range of values implemented in other permits having similar industrial activities.

### **Settleable Solids**

Monitoring removed from permit. The previous permit required sampling of settleable solids, however, this facility uses settling basins therefore TSS is a more applicable parameter to determine solids discharges and the effectiveness of the basins.

## **PART V. ADMINISTRATIVE REQUIREMENTS**

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

### **PERMIT SYNCHRONIZATION:**

The Department of Natural Resources is currently undergoing a synchronization process for operating permits. Permits are normally issued on a five-year term, but to achieve synchronization many permits will need to be issued for less than the full five years allowed by regulation. The intent is all permits within a watershed will move through the Watershed Based Management (WBM) cycle together will all expire in the same fiscal year. <http://dnr.mo.gov/env/wpp/cpp/docs/watershed-based-management.pdf>. This will allow further streamlining by placing multiple permits within a smaller geographic area on public notice simultaneously, thereby reducing repeated administrative efforts. This will also allow the Department to explore a watershed based permitting effort at some point in the future. Renewal applications must continue to be submitted within 180 days of expiration, however, in instances where effluent data from the previous renewal is less than two years old, such data may be re-submitted to meet the requirements of the renewal application. If the permit provides a schedule of compliance for meeting new water quality based effluent limits beyond the expiration date of the permit, the time remaining in the schedule of compliance will be allotted in the renewed permit.

✓ This permit will maintain synchronization by expiring in five years from date of issuance.

### **PUBLIC NOTICE:**

The Department shall give public notice a draft permit has been prepared and its issuance is pending.

<http://dnr.mo.gov/env/wpp/permits/pn/index.html> Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in or with water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing.

The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit.

For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

✓ The Public Notice period for this operating permit was from 4/24/2020 to 5/25/2020; no comments were received. During data entry, the permit writer noted “time of application” for chlorine at outfall #002 could not be input into the system for hours; the compliance was changed to minutes; 2 hours was changed to 120 minutes. The “Ammonia as N (April 1 – Sept 30)” parameter monitoring at outfall #003 was changed to remove the dates. Dates of compliance are only implemented in permits with seasonal limits; monitoring of this effluent is required all year. The fact sheet did not contain this error and made it clear the monitoring requirement was for each month in the year; this typographical error change does not require an additional public notice.

**DATE OF FACT SHEET:** MAY 29, 2020

### **COMPLETED BY:**

PAM HACKLER, ENVIRONMENTAL SCIENTIST  
MISSOURI DEPARTMENT OF NATURAL RESOURCES  
WATER PROTECTION PROGRAM  
OPERATING PERMITS SECTION - INDUSTRIAL UNIT  
(573) 526-3386  
[pam.hackler@dnr.mo.gov](mailto:pam.hackler@dnr.mo.gov)