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, 92nd Congress) as amended,

Permit No.	MO-0101117
Owner:	Kansas City Power & Light Company
Address:	Attention: Manager of Environmental Services, P.O. Box 418679, Kansas City, MO 64141
Continuing Authority:	Kansas City Power & Light Company Montrose Station
Address:	400 Southwest Highway P, Clinton, MO 64735
Facility Name:	Kansas City Power & Light Company Montrose Station
Address:	400 Southwest Highway P, Clinton, MO 64735
Legal Description:	Sec. 31 and Sec. 32, T41N, R27W, Henry County
Latitude/Longitude	See Page 2 through 3
Receiving Stream:	Unnamed Tributary to Montrose Lake (U)
First Classified Stream and ID:	Montrose Lake (L3) (07208)
USGS Basin & Sub-watershed No.:	(10290108-0603)

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

FACILITY DESCRIPTION

See pages 2 through 5

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

March 27, 2009
Effective Date

January 4, 2013
Revised Date

Sara Parker Pauley, Director, Department of Natural Resources

March 26, 2014
Expiration Date

John Madras, Director, Water Protection Program

FACILITY DESCRIPTION (continued)

Outfall #001 – Generating Station - SIC #4911 UTM 417952/4240972
No-discharge System
Three cell storage lagoon/Wastewater is irrigated/Sludge is retained in lagoons.
Design population equivalent is 163.
Design flow is 7,206 gallons per day (1-in-10 year design including net rainfall minus evaporation).
Average design flow is 4,180 gallons per day (dry weather flows).
Design sludge production is 2.45 dry tons per year.

Outfall #002 - Generating Station - SIC #4911 UTM 417268/4240517
Maximum flow (all flow rates in gallons per day)

Once through cooling water	502,301,324
South ash pond (003)	122,371
North ash pond (004)	122,114
Unit 3 blowdown & washdown (006)	47,535
Stormwater	38,080

Outfall #003 - Generating Station - SIC #4911 UTM 417910/4240652

South ash pond	122,371
Units 1 & 2 hydroveyer nozzles	9,090
Units 1 & 2 dewatering bin	29,926
Unit 3 hydroveyer nozzles	18,810
Pyrite pit	9,503
Neutralization pond	60,000
Stormwater	15,092

Outfall #004 - Generating Station - SIC #4911 UTM 417841/4240795

North ash pond	122,114
Units 1 & 2 hydroveyer nozzles	9,090
Units 1 & 2 dewatering bin	29,926
Unit 3 hydroveyer nozzles	18,810
Pyrite pit	9,503
Neutralization pond	60,000
Stormwater	12,605

Outfall #005 - Generating Station - SIC #4911 UTM 417913/4240649
Metal cleaning waste nominal if any

Outfall #006 - Generating Station - SIC #4911 - Oil/Water Separator Unit 3 Washdown and Boiler Blowdown UTM 418131/4240638

Unit 3 washdown & boiler blowdown	47,535
Unit 3 washdown	9,720

Outfall #007 - Generating Station - SIC #4911 UTM 418785/4240933

Coal pile runoff	632,202
Coal yard washdown	576,000
Stormwater	58,936

Outfall #008 - Generating Station - SIC #4911 UTM 417244/4240591
Utility Waste Landfill Contact Water Settling Pond 33,333 (avg)
1,645,000 (max)

FACILITY DESCRIPTION (continued)

Outfall #009 - Generating Station - SIC #4911 - Oil/Water Separator Units 1 & 2 Washdown and Boiler Blowdown
UTM 418349/4240534

Units 1 & 2 washdown & boiler blowdown	49,061
Units 1 & 2 blowdown	46,000
Units 1 & 2 washdown	9,720
Stormwater	5,341

Outfall #010 - Generating Station - SIC #4911
UTM 416812/4240173
Stormwater from plant area (2.8" rainfall) 425,000

Outfall #001 –
Receiving Stream Watershed: The Unnamed tributary to Montrose Lake is a gaining stream setting.
Facility Type: No-discharge Storage and Irrigation System for year seasonal flows.

Design Basis:	**Avg Annual**
Design dry weather flows	4,180 gallons/day
Design with 1-in-10 year flows	7,206 gallons/day

Design PE 163

Storage Basin/Tank:
Freeboard for basin: 1 foot
Maximum volume (min. to max. water levels): 525,970 gallons Cell #1; 159,410 gallons Cell #2; 179,340 gallons Cell #3

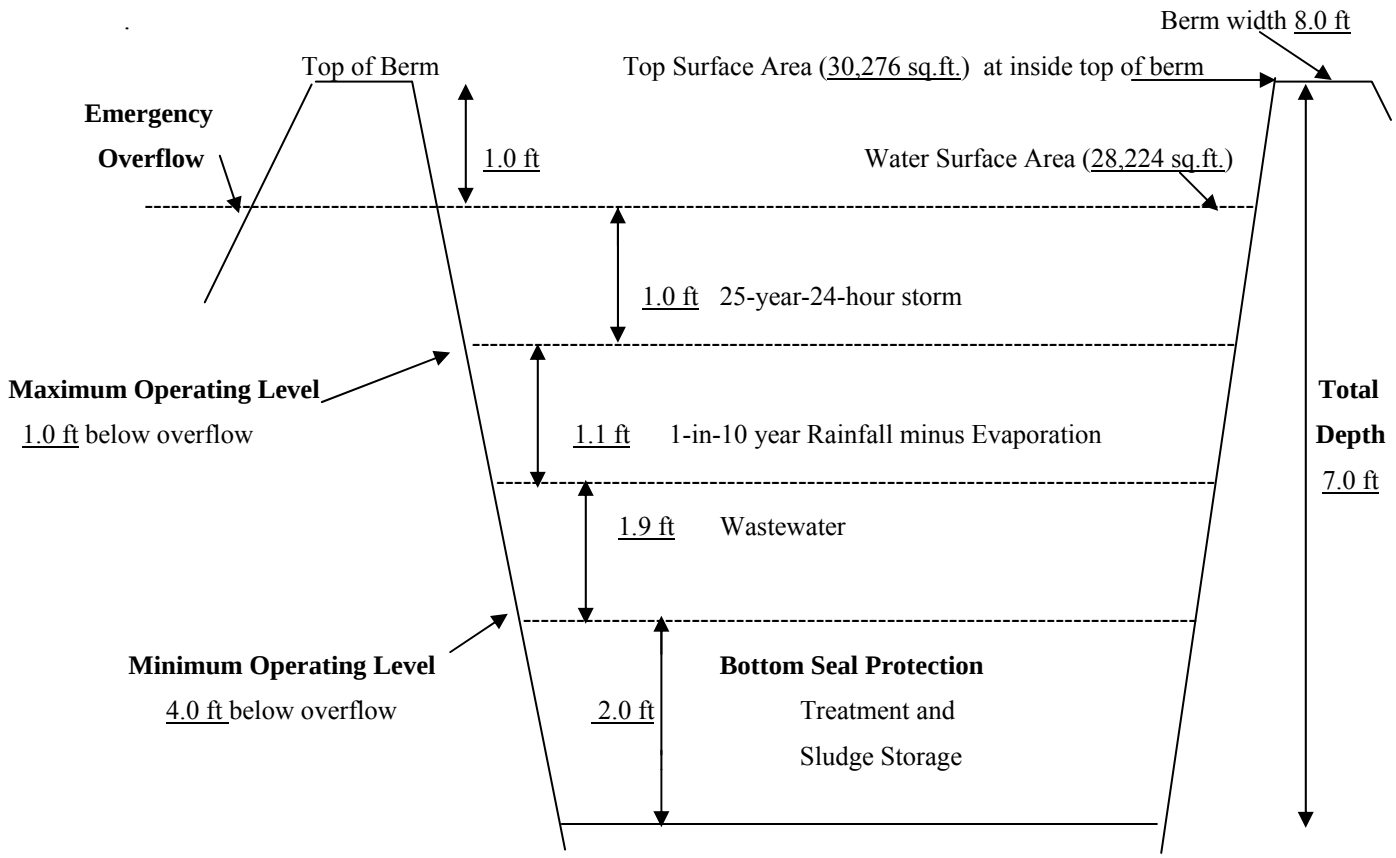
Days of Storage

Storage Capacity:	**Avg Annual**
Design for Dry weather Flows:	207 days
Design with 1-in 10 year flows:	120 days

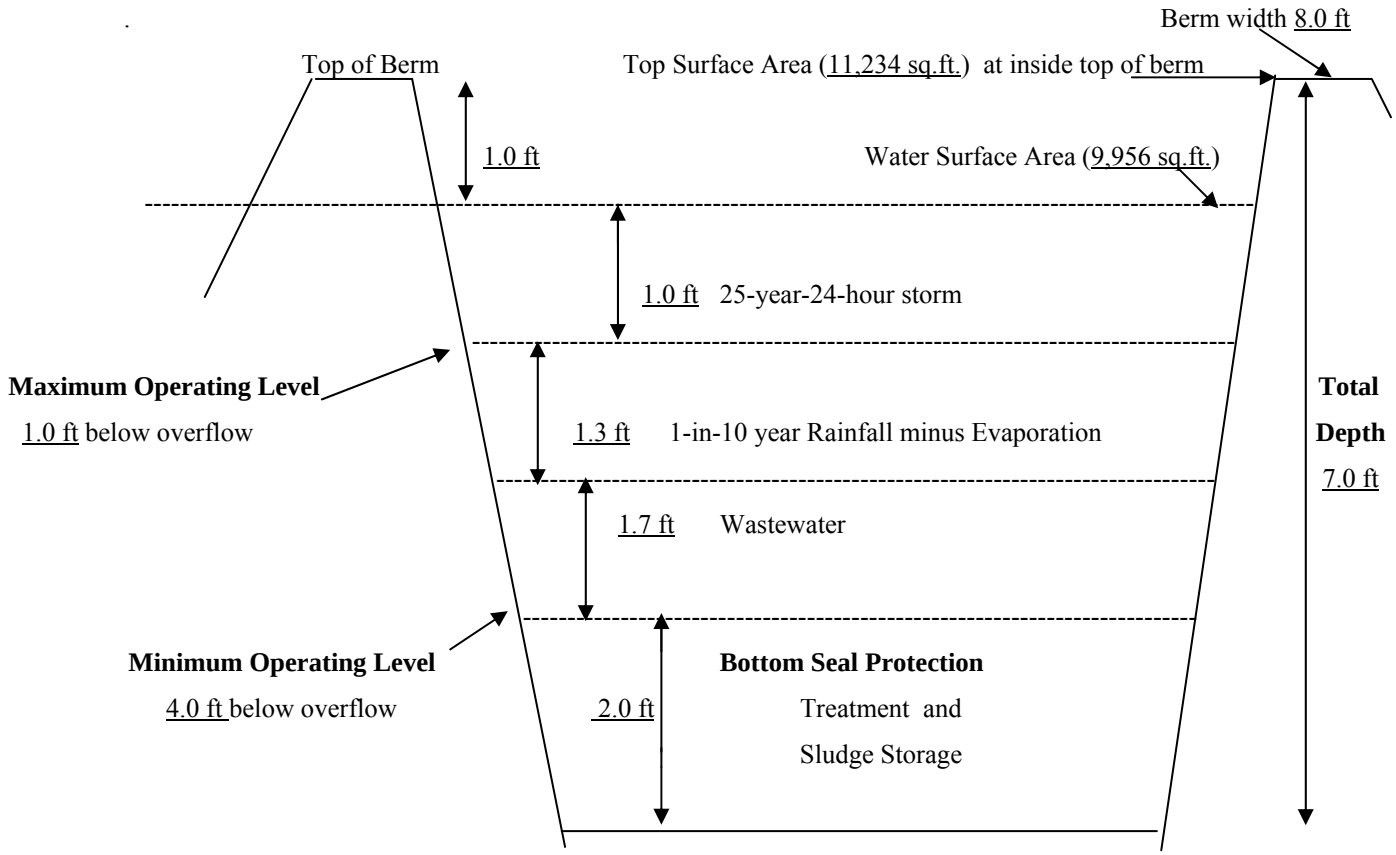
Land Application:
Design Irrigation Volume/year: 2,630,000 gallons (including 1-in-10 year flows)
Irrigation areas: 2.8 acres at design loading (2.8 acres total available)
Application rates/acre: 0.04 inch/hour; 0.3 inch/day; 2.1 inches/week; 34.6 inches/year
Field slopes: less than 4 percent
Equipment type: Sprinkler
Vegetation: Pasture
Application rate is based on: Hydraulic Loading

FACILITY DESCRIPTION (continued)

EXISTING LAGOON PROFILE CELL #1 (approximate dimensions)

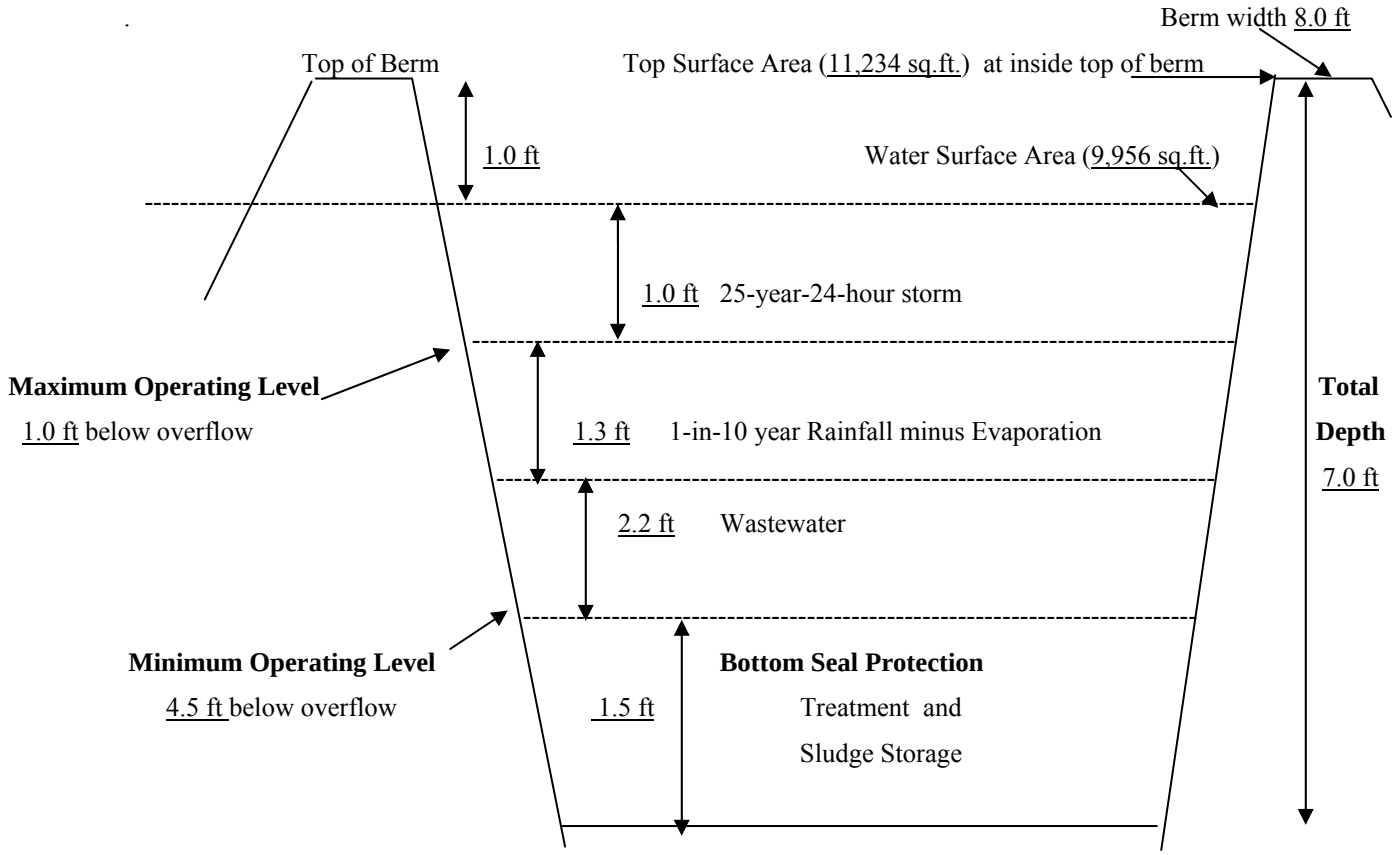


LAGOON PROFILE CELL #2



FACILITY DESCRIPTION (continued)

LAGOON PROFILE CELL #3



A. 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 upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #001 - Land Application Operational Monitoring (Notes 1, 2, 3, & 4)						
Lagoon Freeboard	feet	*			once/month	measured
Irrigation Period	hours	*			daily	total
Volume Irrigated	gallons	*			daily	total
Application Area	acres	*			daily	total
Application Rate	in/acre	*			daily	total
Rainfall	inches	*			daily	total
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE January 28, 2010.						
Outfall #001 - Irrigated Wastewater (Note 4)						
Total Kjeldahl Nitrogen as N	mg/L	*			once/year	grab
Total Phosphorus as P	mg/L	*			once/year	grab
Total Iron	mg/L	*			once/year	grab
Total Magnesium	mg/L	*			once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE January 28, 2010. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

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 upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #002 – Generating Station Cooling Water						
Flow	MGD	*		*	once/week	24 hr. estimate
Total Suspended Solids	mg/L	*		*	once/month	grab
Temperature, Intake	°F	*		*	once/daily	grab
Temperature, Outfall	°F	*		*	once/daily	grab
pH – Units	SU	***		***	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
Total Residual Chlorine (Note 5 & Note 6)	mg/L	0.019 (0.13 ML)		0.010 (0.13 ML)	once/month	grab
Outfalls #003 & #004 – South Ash Pond Overflow						
Flow	MGD	*		*	once/month	24 hr. estimate
Net Total Suspended Solids (Note 7)	mg/L	100		30	once/month	grab
pH – Units	SU	***		***	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
Sulfates	mg/L	*		*	once/month	grab
Outfall #005 – Metal Cleaning Waste						
Flow	MGD	*		*	daily during cleaning event	24 hr. estimate
Total Suspended Solids	mg/L	100		30	daily during cleaning event	grab
Oil & Grease	mg/L	15		10	daily during cleaning event	grab
Copper, Total Recoverable	mg/L	1.0		1.0	daily during cleaning event	grab
Iron, Total Recoverable	mg/L	1.0		1.0	daily during cleaning event	grab
pH - Units	SU	***		***	daily during cleaning event	grab
Outfall #006 – Oil/Water Separator Unit 3 Washdown and Boiler Blowdown						
Flow	MGD	*		*	once/month	24 hr. estimate
Total Suspended Solids	mg/L	100		30	once/month	grab
pH – Units	SU	***		***	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE May 28, 2009. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

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 upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #007 – Coal Pile Runoff						
Flow	MGD	*		*	once/month	24 hr. estimate
Total Suspended Solids	mg/L	50		50	once/month	grab
pH – Units	SU	***		***	once/month	grab
Precipitation	inches	*		*	once/month	30 day total
Oil & Grease	mg/L	15		10	once/month	grab
Outfall #008 – Utility Waste Landfill Settling Pond						
Flow	MGD	*		*	once/month	24 hr. estimate
Total Suspended Solids	mg/L	50		30	once/month	grab
pH – Units	SU	***		***	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
Boron	mg/L	*		*	once/month	grab
Molydenum	mg/L	*		*	once/month	grab
Sulfate	mg/L	*		*	once/month	grab
Outfall #009 – Oil/Water Separator Units 1 & 2 Washdown and Boiler Blowdown						
Flow	MGD	*		*	once/month	24 hr. estimate
Oil & Grease	mg/L	15		10	once/month	grab
Total Suspended Solids	mg/L	100		30	once/month	grab
pH - Units	SU	***		***	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE May 28, 2009.						
Outfall #010 – Stormwater from Plant Area						
Flow	MGD	*		*	once/quarter****	24 hr. estimate
Settleable Solids	ml/L/hr	2.0		1.0	once/quarter****	grab
Oil & Grease	mg/L	15		10	once/quarter****	grab
pH – Units	SU	***		***	once/quarter****	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE July 28, 2009. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Outfalls #002, #003, #004, #006 #008 & #009						
Whole Effluent Toxicity (WET) Test	% Survival	See Special Conditions			See Special Conditions	
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE January 28, 2010. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

* Monitoring requirement only.
** Monitor only when discharge occurs. Report as no-discharge when a discharge does not occur during the report period.
*** pH is measured in pH units and is not to be averaged. The pH is limited to the range of 6.5 - 9.0.
**** Sample once per quarter in the months of March, June, September, and November.

Note 1 - No-discharge facility requirements. Wastewater shall be stored and land applied during suitable conditions so that there is no-discharge from the lagoon or irrigation site. An emergency discharge may occur when excess wastewater has accumulated above feasible irrigation rates due to precipitation exceeding the 1-in-10-year 365 day rainfall or the 25-year 24-hour storm event.

Note 2 - Records shall be maintained and summarized into an annual operating report, which shall be submitted by January 28th of each year for the previous calendar year period using report forms approved by the Department. The report shall include the following:

(a) Record of maintenance and repairs performed during the year, average number of times per month the facility is checked to see if it is operating properly, and description of any unusual operating conditions encountered during the year;
(b) The number of days the lagoon has discharged during the year, the discharge flow, the reasons discharge occurred and effluent analysis performed; and
(c) A summary of the irrigation operations including freeboard at the start and end of the irrigation season, the number of days of irrigation for each month, the total gallons irrigated, the total acres used, crops grown, crop yields per acre, the application rate in inches/acre per day and for the year, the monthly and annual precipitation received at the facility and summary of testing results.

Note 3 - Lagoon freeboard shall be reported as lagoon water level in feet below the overflow level. See Special Conditions for Wastewater Irrigation System requirements.

Note 4 - Wastewater that is irrigated shall be sampled at the irrigation pump, wet well, or at a special sampling port attached to one or more of the irrigation heads. Report no-irrigation when irrigation does not occur during the report period.

Note 5 – This permit contains a Total Residual Chlorine (TRC) limit.

(a) Total Residual Chlorine may not be discharged from any single generating unit for more than two hours per day unless the discharger demonstrates to Missouri Department of Natural Resources that discharges for more than two hours is required for macroinvertebrate control. Please see Appendix B – Zebra Mussel Corrective Action Plan, for more information.
(b) This effluent limit is below the minimum quantification level (ML) of the most common and practical EPA approved CLTRC methods. The department has determined the current acceptable ML for total residual chlorine to be 0.13 mg/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 0.13 mg/L will be considered violations of the permit and values less than the minimum quantification level of 0.13 mg/L will be considered to be in compliance with the permit limitation. Report non-detect when the measured value is less than 0.13 mg/L. The minimum quantification level does not authorize the discharge of chlorine in excess of the effluent limits stated in the permit.
(c) Do not chemically dechlorinate **if it is not needed to meet the limits in your permit.**
(d) If no chlorine was used in a given sampling period, an actual analysis is not necessary. Simply report as “0 mg/L” TRC.
(e) Samples for TRC shall be collected inside the mixing zone. For purposes of TRC monitoring this zone is an arc 10 feet in radius from the tip of the south or north bank of the west end of the discharge channel.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Note 6 – In-waterbody sampling.
(a) Samples should be taken at least four feet from the bank and 6-inches below the surface.
(b) Samples shall not be collected from areas with especially turbulent flow, still water or from the bank, unless these conditions are representative of the waterbody or no other areas are available for sample collection.

Note 7 – Intake Total Suspended Solids values may be used to calculate "net" limitations, however, permittee shall continue to maintain the ash pond system for adequate retention time for settling. If "net" limitations are used, influent sample results shall be submitted with the Discharge Monitoring Reports (DMR's). Permittee is responsible for reporting all values necessary to calculate the "net" limitations and shall perform such calculations and submit with the Discharge Monitoring Reports.

B. STANDARD CONDITIONS

In addition to specified conditions stated herein, this permit is subject to the attached Parts I and III Standard Conditions dated October 1, 1980 and August 15, 1994, and hereby incorporated as though fully set forth herein.

C. SPECIAL CONDITIONS

1. Emergency Discharge. Outfall 001 may only discharge if rainfall exceeds the 1 in 10 year (Data taken from the Missouri Climate Atlas) or the 24 hour, 25 year (Data taken from NRCS Urban Hydrology for Small Watersheds) rainfall events. Discharge for any other reason shall constitute a permit violation and shall be recorded in accordance with Standard Conditions, Part 1, Section B.2.b. Monitoring shall take place once per day while discharging. Test results are due on the 28th day of the month after the cessation of the discharge. Permittee shall monitor for the following constituents:

Constituent	**Units**
Flow	MGD
Biochemical Oxygen Demand$_5$	mg/L
Total Suspended Solids	mg/L
Total Ammonia Nitrogen	mg/L
Temperature	^oC
pH	Standard Units
Fecal Coliform	#/100mL

2. This permit may be reopened and modified, or alternatively revoked and reissued, to:
   (a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
      (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
      (2) controls any pollutant not limited in the permit.
   (b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.
   (c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.

   The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

3. All outfalls must be clearly marked in the field.

4. Report as no-discharge when a discharge does not occur during the report period.

5. There shall be no discharge of toxic pollutants at levels which would cause an exceedance of Water Quality Standards.

C. SPECIAL CONDITIONS (continued)

6. Changes in Discharges of Toxic Substances

The permittee shall notify the Director as soon as it knows or has reason to believe:

(a) That any activity has occurred or will occur which would result in the discharge 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; five hundred micrograms per liter (500 µg/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
   (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;
   (4) The level established in Part A of the permit by the Director.

(b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant, which was not reported in the permit application.

(c) That the effluent limit established in part A of the permit will be exceeded.

7. Water Quality Standards

(a) Discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.

(b) General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. NO water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
   (1) Waters shall be free form substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
   (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
   (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
   (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
   (5) There shall be no significant human health hazard from incidental contact with the water;
   (6) There shall be no acute toxicity to livestock or wildlife watering;
   (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
   (8) 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.

8. Sludge and Biosolids Use For Domestic Wastewater Treatment Facilities

(a) Permittee shall comply with the pollutant limitations, monitoring, reporting, and other requirements in accordance with the attached permit Standard Conditions.

(b) If sludge is not removed by a contract hauler, permittee is authorized to land apply biosolids. Permit Standard Conditions, Part III shall apply to the land application of biosolids. Permittee shall notify the department at least 180 days prior to the planned removal of biosolids. The department may require submittal of a biosolids management plan for department review and approval as determined appropriate on a case-by-case basis.

9. Lagoons and earthen basins shall have a liner that is designed, constructed and maintained. If operating records indicate excessive percolation, the department may require corrective action as necessary to eliminate excess leakage.

10. At least one gate, constructed of materials comparable to the fence, must be provided to access the lagoon and provide for maintenance and mowing. The gate shall remain locked except when opened by the permittee to perform maintenance or mowing.

11. At least one sign shall appear on the fence on each side of each facility. Minimum wording shall be "Sewage Treatment Facility – Keep Out", in letters at least 2 inches high.

C. SPECIAL CONDITIONS (continued)

12. The inner and outer berm slopes shall not be steeper than three to one (3:1). Inner berm slopes shall not be flatter than four to one (4:1). Consideration may be given to steeper inner slopes provided special attention is given to stabilizing the slope with rip-rap, concrete, or other rigid materials.

13. The berms of storage basins shall be mowed and kept free of any trees, muskrat dens, or other potential sources of damage to the berms.

14. Wastewater Irrigation System.
    (a) Discharge Reporting. Any unauthorized discharge from the lagoon or irrigation system shall be reported to the department as soon as possible but always within 24 hours. Discharge is allowed only as described in the Facility Description and Effluent Limitations sections of this permit.
    (b) Lagoon Operating Levels - No-discharge Systems. The minimum and maximum operating water levels for the storage lagoon shall be clearly marked. Each lagoon shall be operated so that the maximum water elevation does not exceed one foot below the overflow point except due to excedances of the 1-in-10 year or 25-year-24 hour storm events. Wastewater shall be land applied whenever feasible based on soil and weather conditions and permit requirements. Storage lagoon(s) shall be lowered to the minimum operating level prior to each winter by November 30.
    (c) Emergency Spillway. Lagoons and earthen storage basins should have an emergency spillway to protect the structural integrity of earthen structures during operation at near full water levels and in the event of overflow conditions. The spillway shall be at least one foot below top of berm. The department may waive the requirement for overflow structures on small existing basins.
    (d) General Irrigation Requirements. The wastewater irrigation system shall be operated so as to provide uniform distribution of irrigated wastewater over the entire irrigation site. A complete ground cover of vegetation shall be maintained on the irrigation site unless the system is approved for row crop irrigation. Wastewater shall be land applied only during daylight hours. The wastewater irrigation system shall be capable of irrigating the annual design flow during an application period of less than 100 days or 800 hours per year.
    (e) Saturated/Frozen Conditions. There shall be no irrigation during frozen, snow covered, or saturated soil conditions.
    (f) Buffer Zones. There shall be no irrigation within 300 feet of any down gradient pond, lake, sinkhole, losing stream or water supply withdrawal; 100 feet of gaining streams or tributaries; 150 feet of dwelling or public use areas; or 50 feet of the property line.
    (g) Public Access Restrictions. Public access shall not be allowed to the irrigation site(s).
    (h) Operation and Maintenance Manual.
    The permittee shall develop, maintain and implement an Operation and Maintenance (O&M) Manual that includes all necessary items to ensure the operation and integrity of the waste handling and land application systems. Copies of the O&M Manual and subsequent revisions shall be submitted to Regional Office for review and approval. The O&M Manual shall be reviewed and updated at least every five years.
    (i) Nitrogen Loading Rates. Wastewater irrigation rates shall not exceed a nitrogen application rate of 150 pounds total nitrogen per acre per year. Hydraulic application rates exceeding 60 inches per acre per year shall calculate nitrogen loading rates and include results in the annual report. The calculation procedures are as follows: (Total N) x (0.226) x (inches per acre irrigated) = pounds total N per acre. Where Total N = [Total Kjeldahl Nitrogen (TKN) as N] + [Nitrate Nitrogen as N]. If the applied wastewater exceeds, 150 pounds total nitrogen per acre/year, the permittee must reduce the application rates or submit a revised permit application to request use of the Plant Available Nitrogen (PAN) method based on crop nitrogen requirements for harvested crops. PAN availability factors for surface application are: [Ammonia N x 0.6] + [Nitrate N x 0.9] + [Organic N x 0.6] = PAN. The annual report shall include testing results for wastewater, soils and crop yields and calculations for nitrogen applied and crop removal of nitrogen.
    (j) Equipment Checks during Irrigation. The irrigation system and application site shall be visually inspected at least once/day during wastewater irrigation to check for equipment malfunctions and runoff from the irrigation site.

15. There shall be no release of polychlorinated biphenyl compounds (PCBs) to waters of the state at or above the level of quantification currently defined as 1 ug/L or 1 ppb.

16. Any pesticide discharge from any point source shall comply with the requirements of the Federal Insecticide, Fungicide and Rodenticide Act, amended (7 U.S.C. 136 et. seq.) and the use of such pesticides shall be in a manner consistent with its label.

17. Discharge of wastewater from this facility must not alone or in combination with other sources causes the receiving stream to violate the following:
    (a) Water temperatures and temperature differentials specified in Missouri Water Quality Standards shall be met.

C. SPECIAL CONDITIONS (continued)

18. Use or Disposal of Ash from Power Plants
    (a) Disposal of ash is not authorized by this permit.
    (b) This permit does not pertain to permits for disposal of ash or exemptions for beneficial uses of ash under the Missouri Solid Waste Management Law and regulations.
    (c) This permit does not authorize off-site storage, use or disposal of ash in regard to water pollution control permits required under 10 CSR 20-6.015 and 10 CSR 20-6.200.
    (d) Ash stored in on-site treatment ponds (ash ponds) shall not cause a discharge to subsurface waters of the state. Ash ponds which have a leakage rate exceeding the limitations under 10 CSR 20-8.020 and 10 CSR 20-8.200 are discharges to waters of the state and must by authorized by permit.

19. The permittee shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must be prepared within 60 days and implemented within 120 days of permit issuance. The SWPPP must be kept on-site and should not be sent to DNR unless specifically requested. The SWPPP must be reviewed and updated, if needed, every five (5) years or as site conditions 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 the following document:

    Developing Your Stormwater Pollution Prevention Plan, A Guide for Industrial Operators, (Document number EPA 833-B-09-002) published by the United States Environmental Protection Agency (USEPA) in February 2009.

    The SWPPP must include the following:

    An assessment of all storm water discharge associated with this facility. This must include a list of potential contaminants and an annual estimate of amounts that will be used in the described activities.

    (a) A listing of specific Best Management Practices (BMPs) and a narrative explaining how BMPs will be implemented to control and minimize the amount of potential contaminants that may enter storm water. Minimum BMPs are listed in SPECIAL CONDITIONS #8 below.
    (b) The SWPPP must include a schedule for a quarterly site inspection and a brief written report. The inspections must include observation and evaluation of BMP effectiveness. Deficiencies must be corrected within seven (7) days and the actions taken to correct the deficiencies shall be included with the written report, including photographs. Any corrective measure that necessitates major construction may also need a construction permit. 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 DNR personnel upon request.
    (c) A provision for designating an individual to be responsible for environmental matters.
    (d) A provision for providing training to all personnel involved in material handling and storage, and housekeeping of maintenance and cleaning areas. Proof of training shall be submitted on request of DNR.

20. Permittee shall adhere to the following minimum Best Management Practices:

    (a) Prevent the spillage or loss of fluids, oil, grease, fuel, etc. from vehicle maintenance, equipment cleaning, or warehouse activities and thereby prevent the contamination of storm water from these substances.
    (b) Provide collection facilities and arrange for proper disposal of waste products including but not limited to petroleum waste products, and solvents.
    (c) Store all paint, solvents, petroleum products and petroleum waste products (except fuels), and storage containers (such as drums, cans, or cartons) so that these materials are not exposed to storm water or provide other prescribed BMP's such as plastic lids and/or portable spill pans to prevent the commingling of storm water 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.
    (d) Provide good housekeeping practices on the site to keep trash from entry into waters of the state.
    (e) Provide sediment and erosion control sufficient to prevent or control sediment loss off of the property. This could include the use of straw bales, silt fences, or sediment basins, if needed, to comply with effluent limits.

21. All fueling facilities present on the site shall adhere to applicable federal and state regulations concerning underground storage, above ground storage, and dispensers, including spill prevention, control and counter measure.

C. SPECIAL CONDITIONS (continued)

22. Before releasing water that has accumulated in secondary containment areas it must be examined for hydrocarbon odor and presence of a sheen. When the presence of hydrocarbons is indicated then the water must be handled in accordance with the Facility's Spill Prevention Control and Countermeasure (SPCC) Plan.

23. Whole Effluent Toxicity (WET) tests shall be conducted as follows:

SUMMARY OF WET TESTING FOR THIS PERMIT				
OUTFALL	**A.E.C. %**	**FREQUENCY**	**SAMPLE TYPE**	**MONTH**
#002, #003, #004, #006, #009	**100%**	once/year	3 grabs 1 hour apart	Any Month, Report by January 28 for the previous year.
#008	**100%**	once/permit cycle		

Whole effluent Toxicity (WET) tests shall be conducted as follows:
Outfall #002, WET test samples shall be collected during a period of time when biocide residuals will be present in the effluent.

(a) Test Schedule and Follow-Up Requirements
- (1) Perform a SINGLE-dilution test in the months and at the frequency specified above. For tests which are successfully passed, submit test results USING THE DEPARTMENT'S WET TEST REPORT FORM #MO-780-1899 along with complete copies of the test reports as received from the laboratory, including copies of chain-of-custody forms within 30 calendar days of availability to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102. If the effluent passes the test, do not repeat the test until the next test period.
  - (a) Samples shall be collected only when precipitation has not occurred for a period of forty-eight hours prior to sample collection. In no event shall sample collection occur simultaneously with the occurrence of precipitation excepting for stormwater samples.
  - (b) A twenty-four hour composite sample shall be submitted for analysis of non-stormwater discharges.
  - (c) Upstream receiving water samples, where required, shall be collected upstream from any influence of the effluent where downstream flow is clearly evident.
  - (d) Samples submitted for analysis of upstream receiving water may be collected as either a grab or twenty-four-hour composite as appropriate to the nature of the discharge.
  - (e) Chemical and physical analysis of the upstream control 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 that are required to stabilize the sample during shipping.
  - (f) Any and all chemical or physical analysis of the effluent sample performed in conjunction with the WET test shall be performed at the 100% Effluent concentration in addition to analyses performed upon any other effluent concentration.
  - (g) All chemical analyses included in the Missouri Department of Natural Resources WET test report form #MO-780-1899 shall be performed and results shall be recorded in the appropriate field of the report form.
  - (h) Where flow-weighted composite sample is required for analysis, the samples shall be composited at the laboratory where the test is to be performed.
  - (i) Where in stream testing is required downstream from the discharge, sample collection shall occur immediately below the established Zone of Initial Dilution in conjunction with or immediately following a release or discharge.
  - (j) Samples submitted for analysis of downstream receiving water may be collected as either a grab or twenty-four-hour composite as appropriate to the nature of the discharge.
  - (k) All instream samples, including downstream samples, shall be tested for toxicity at the 100% concentration in addition to any other assigned AEC for in-stream samples.
- (2) All failing test results along with complete copies of the test reports as received from the laboratory, INCLUDING THOSE TESTS CONDUCTED UNDER CONDITION (3) BELOW, shall be reported to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the availability of the results.
- (3) If the effluent fails the test, a multiple dilution test shall be performed within 30 calendar days and biweekly thereafter, until one of the following conditions are met:
  - (a) THREE CONSECUTIVE MULTIPLE-DILUTION TESTS PASS. No further tests need to be performed until next regularly scheduled test period.
  - (b) A TOTAL OF THREE MULTIPLE-DILUTION TESTS FAIL.

C. SPECIAL CONDITIONS (continued)

23. Whole Effluent Toxicity (WET) tests shall be conducted as follows: (continued)

(4) Failure of at least two multiple-dilution tests during any period of accelerated monitoring violates the permit narrative requirement for aquatic life protection.
(5) The permittee shall submit a concise summary of all test results for the test series to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the third failed test.
(6) Additionally, the following shall apply upon failure of the third MULTIPLE DILUTION test: A toxicity identification evaluation (TIE) or toxicity reduction evaluation (TRE) is automatically triggered. The permittee shall contact THE WATER PROTECTION PROGRAM within 14 calendar days from availability of the test results to ascertain as to whether a TIE or TRE is appropriate. The permittee shall submit a plan for conducting a TIE or TRE to the WATER PROTECTION PROGRAM within 60 calendar days of the date of DNR's direction to perform either a TIE or TRE. This plan must be approved by DNR before the TIE or TRE is begun. A schedule for completing the TIE or TRE shall be established in the plan approval.
(7) Upon DNR's approval, the TIE/TRE schedule may be modified if toxicity is intermittent during the TIE/TRE investigations. A revised WET test schedule may be established by DNR for this period.
(8) If a previously completed TIE has clearly identified the cause of toxicity, additional TIEs will not be required as long as effluent characteristics remain essentially unchanged and the permittee is proceeding according to a DNR approved schedule to complete a TRE and reduce toxicity. Regularly scheduled WET testing as required in the permit, without the follow-up requirements, will be required during this period.
(9) When WET test sampling is required to run over one DMR period, each DMR report shall contain a copy of the Department's WET test report form that was generated during the reporting period.
(10) Submit a concise summary in tabular format of all test results with the annual report.

(b) PASS/FAIL procedure and effluent limitations:
(1) To pass a single-dilution test, mortality observed in the AEC test concentration shall not be significantly different (at the 95% confidence level; $p = 0.05$) than that observed in the upstream receiving-water control sample. Where upstream receiving water is not available mortality observed in the AEC test concentration shall not be significantly different (at the 95% confidence level; $p = 0.05$) than that observed in the laboratory control. The appropriate statistical tests of significance shall be consistent with the most current edition of METHODS FOR MEASURING THE ACUTE TOXICITY OF EFFLUENTS AND RECEIVING WATERS TO FRESHWATER AND MARINE ORGANISMS or other Federal guidelines as appropriate or required.
(2) To pass a multiple-dilution test:
(a) For facilities with a computed percent effluent at the edge of the zone of initial dilution, Allowable Effluent Concentration (AEC), OF 30% OR LESS THE AEC must be less than three-tenths (0.3) of the LC_{50} concentration for the most sensitive of the test organisms; **OR**,
(b) For facilities with an AEC greater than 30% the LC50 concentration must be greater than 100%; **AND**,
(c) all effluent concentrations equal to or less than the AEC must be nontoxic. Mortality observed in all effluent concentrations equal to or less than the AEC shall not be significantly different (at the 95% confidence level; $p = 0.05$) than that observed in the upstream receiving-water control sample. Where upstream receiving water is not available mortality observed in the AEC test concentration shall not be significantly different (at the 95% confidence level; $p = 0.05$) than that observed in the laboratory control. The appropriate statistical tests of significance shall be consistent with the most current edition of METHODS FOR MEASURING THE ACUTE TOXICITY OF EFFLUENTS AND RECEIVING WATERS TO FRESHWATER AND MARINE ORGANISMS or other federal guidelines as appropriate or required. Failure of one multiple-dilution test may be considered an effluent limit violation.

(c) Test Conditions
(1) Test Type: Acute Static non-renewal.
(2) All tests, including repeat tests for previous failures, shall include both test species listed below.
(3) Test species: Ceriodaphnia dubia and Pimephales promelas (fathead minnow). Organisms used in WET testing shall come from cultures reared for the purpose of conducting toxicity tests and cultured in a manner consistent with the most current USEPA guidelines. All test animals shall be cultured as described in the most current edition of METHODS FOR MEASURING THE ACUTE TOXICITY OF EFFLUENTS AND RECEIVING WATERS TO FRESHWATER AND MARINE ORGANISMS.
(4) Test period: 48 hours at the "Acceptable Effluent Concentration" (AEC) specified above.

C. SPECIAL CONDITIONS (continued)

23. Whole Effluent Toxicity (WET) tests shall be conducted as follows: (continued)

(5) When dilutions are required, upstream receiving stream water shall be used as dilution water. If upstream water is unavailable or if mortality in the upstream water exceeds 10%, "reconstituted" water will be used as dilution water. Procedures for generating reconstituted water will be supplied by the MDNR upon request.

(6) Single-dilution tests will be run with:
- (a) Effluent at the AEC concentration;
- (b) 100% receiving-stream water (if available), collected upstream of the outfall at a point beyond any influence of the effluent; and
- (c) reconstituted water.

(7) Multiple-dilution tests will be run with:
- (a) 100%, 50%, 25%, 12.5%, and 6.25% effluent, unless the AEC is less than 25% effluent, in which case dilutions will be 4 times the AEC, two times the AEC, AEC, 1/2 AEC and 1/4 AEC;
- (b) 100% receiving-stream water (if available), collected upstream of the outfall at a point beyond any influence of the effluent; and
- (c) reconstituted water.

(8) If reconstituted-water control mortality for a test species exceeds 10%, the entire test will be rerun.

(9) If upstream control mortality exceeds 10%, the entire test will be rerun using reconstituted water as the dilutant.

D. OTHER REQUIREMENTS

1. Manage the Utility Waste Landfill Settling Pond associated with Outfall #008 to ensure that there is enough capacity to capture run-off from a 25-year/24-hour storm event.

2. Water from the Utility Waste Landfill Settling Pond should be utilized for dust suppression on the landfill, if possible.

SUMMARY OF TEST METHODOLOGY FOR WHOLE-EFFLUENT TOXICITY TESTS

Whole-effluent-toxicity test required in NPDES permits shall use the following test conditions when performing single or multiple dilution methods. Any future changes in methodology will be supplied to the permittee by the Missouri Department of Natural Resources (MDNR). Unless more stringent methods are specified by the DNR, the procedures shall be consistent with the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms,

Test conditions for Ceriodaphnia dubia:

Test duration:	48 h
Temperature:	25 ± 1°C Temperatures shall not deviate by more than 3°C during the test.
Light Quality:	Ambient laboratory illumination
Photoperiod:	16 h light, 8 h dark
Size of test vessel:	30 mL (minimum)
Volume of test solution:	15 mL (minimum)
Age of test organisms:	<24 h old
No. of animals/test vessel:	5
No. of replicates/concentration:	4
No. of organisms/concentration:	20 (minimum)
Feeding regime:	None (feed prior to test)
Aeration:	None
Dilution water:	Upstream receiving water; if no upstream flow, synthetic water modified to reflect effluent hardness.
Endpoint:	Pass/Fail (Statistically significant Mortality when compared to upstream receiving water control or synthetic control if upstream water was not available at $p \leq 0.05$)
Test acceptability criterion:	90% or greater survival in controls

Test conditions for (Pimephales promelas):

Test duration:	48 h
Temperature:	25 ± 1°C Temperatures shall not deviate by more than 3°C during the test.
Light Quality:	Ambient laboratory illumination
Photoperiod:	16 h light/ 8 h dark
Size of test vessel: 250 mL (minimum)	
Volume of test solution:	200 mL (minimum)
Age of test organisms:	1-14 days (all same age)
No. of animals/test vessel:	10
No. of replicates/concentration:	4 (minimum) single dilution method 2 (minimum) multiple dilution method
No. of organisms/concentration:	40 (minimum) single dilution method 20 (minimum) multiple dilution method
Feeding regime:	None (feed prior to test)
Aeration:	None, unless DO concentration falls below 4.0 mg/L; rate should not exceed 100 bubbles/min.
Dilution water:	Upstream receiving water; if no upstream flow, synthetic water modified to reflect effluent hardness.
Endpoint:	Pass/Fail (Statistically significant Mortality when compared to upstream receiving water control or synthetic control if upstream water was not available at $p \leq 0.05$)
Test Acceptability criterion:	90% or greater survival in controls

Missouri Department of Natural Resources
Fact Sheet
For the Purpose of Modification
Of
MO-0101117
Kansas City Power &Light Company Montrose Station

The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollution 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 storm water 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. Permits in Missouri 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). NPDES operating permits are issued for a period of five (5) years unless otherwise specified.

A Fact Sheet gives pertinent information regarding the applicable regulations, rational for the development of the NPDES Missouri State Operating Permit (operating permit), and the public participation process for operating permit listed below.

A Fact Sheet is not an enforceable part of an operating permit.

This Fact Sheet is for a Major ☐, Minor ☐, Industrial Facility ☒; Variance ☐;
Master General Permit ☐; General Permit Covered Facility ☐; and/or permit with widespread public interest ☐.

Facility Information

NPDES #:	MO-0101117
Facility Name:	Kansas City Power & Light Company Montrose Station
Facility Address:	400 Southwest Highway P, Clinton, MO 64735
Owner's Name:	Kansas City Power & Light Company
Owner's Address:	Attention: Manager of Environmental Services, P.O. Box 418679, Kansas City, MO 64141
Facility Region:	KCRO
Facility County:	Henry
Facility Type:	510 Megawatt Electrical Generating Station
Facility SIC Code(s):	4911
Facility Description:	The Montrose Generating Station consists of three coal-fired steam units used to generate electric power. By-products from the coal combustion process are disposed of in the on-site utility waste landfill. Landfill contact water is collected and ultimately discharged to Montrose Lake.

Last Inspection: 01/26/2011 In Compliance ☒; Non-Compliance ☐

COMMENT: Contact storm water from the existing landfill is routed to either Outfall #008 Utility Waste Landfill Settling Pond or the Outfalls #003/#004 South/North Ash Ponds. KCPL is expanding the utility waste landfill at the Montrose Station, the increased storm water run-off and leachate from the expanded landfill area will be routed through Outfall 008. The discharge will expand from 0.0191 MGD to 0.0333 MGD. The types of waste to be accepted shall consist of non-hazardous coal combustion by-products including but not limited to: fly ash, scrubber sludge, bottom ash and boiler slag. The majority of the waste disposed in the existing landfill is fly ash. The Montrose Station uses a dry fly ash transport system. The expansion disposal area contains approximately 16 acres bringing the total to 47.8 acres to be used for waste disposal. The remaining approximately 80.2 acres are to be utilized for utility waste landfill related design features such as borrow area, all-weather access roads, buffer zone, leachate collection and removal system, and storm water diversion structures. The existing collection pond will continued to be used to collect contact storm water and now leachate from the expanded landfill leachate collection system.

Groundwater monitoring of the utility waste landfill is being completed under the solid waste management program (SWMP) approved groundwater monitoring program (June 21, 2010) as attached to SWMP Construction Permit Number 0908301. There are three (3) background and six (6) compliance monitoring wells to be used in the groundwater monitoring program for the existing and expanded utility waste landfill area. The groundwater samples are required to be analyzed for the following constituents; Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chemical Oxygen Demand, Chloride, Chromium, Cobalt,

Copper, Fluoride, Hardness, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, pH, Selenium, Silver, Sodium, Specific Conductance, Sulfate, Thallium, Total Dissolved Solids, Total Organic Carbon, Total Organic Halogens, and Zinc. The groundwater data should be reviewed as part of the operating permit renewal process.

Factsheet Revision/Permit Modification: On September 21, 2012 the factsheet for permit number MO0101117 was revised to include a TBEL determination appendix E for outfall 008. The Department of Natural Resources' Water Protection Program has determined that the analysis contained in this Appendix E, regarding pollutants of concern is immediately necessary to protect human health, public welfare, or the environment as per 640.016.4 RSMo. As a result, a monitoring requirement for outfall 008 for Boron has been added to the permit.

OUTFALL(S) TABLE:

OUTFALL	DESIGN FLOW (GPD)	TREATMENT LEVEL	EFFLUENT TYPE	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	7,206	Secondary	Domestic	Less than 1 mile
002	502,301,324	Industrial	Generating Station Cooling Water	Less than 1 mile
003	122,371	Industrial	South Ash Pond	Less than 1 mile
004	122,114	Industrial	North Ash Pond	Less than 1 mile
005	No discharge recorded in the last 10 years	Industrial	Metal Cleaning Waste	Less than 1 mile
006	47,535	Industrial	Washdown and Boiler Blowdown	Less than 1 mile
007	632,202	Stormwater/BMP	Coal Pile Runoff	Less than 1 mile
008	33,333	Stormwater/BMP	Utility Landfill Contact Water	Less than 1 mile
009	49,061	Industrial	Washdown and Boiler Blowdown	Less than 1 mile
010	425,000	Stormwater/BMP	Stormwater from Plant Area	Less than 1 mile

Outfall #001
Legal Description: NW ¼, NW ¼, Sec. 32, T41N, R27W
UTM(X/Y): 417952/4240972
Receiving Stream: Montrose Lake (L3)
First Classified Stream and ID: Montrose Lake (L3) (07208)
USGS Basin & Sub-watershed No.: (10290108-0603)

Outfall #002
Legal Description: NE ¼, Sec. 31, T41N, R27W
UTM(X/Y): 417268/4240517
Receiving Stream: Montrose Lake (L3)
First Classified Stream and ID: Montrose Lake (L3) (07208)
USGS Basin & Sub-watershed No.: (10290108-0603)

Please See APPENDIX A – OUTFALL LOCATION/DESCRIPTION for Outfalls #003 through #010

Water Quality History:	This review is comprised of DMR records from the first quarter of 1996 to the first quarter of 2007
Outfall 001:	Effluent exceedance for BOD, TSS, and pH.
Outfall 002:	No reported effluent exceedance.
Outfall 003:	Effluent exceedance for Net TSS and pH.
Outfall 004:	Effluent exceedance for Net TSS and pH.
Outfall 005:	Effluent exceedance for Copper and Iron.
Outfall 006:	Effluent exceedance for pH, TSS and Oil & Grease.
Outfall 007:	Effluent exceedance for TSS.
Outfall 008:	No reported effluent exceedance.
Outfall 009:	Effluent exceedance for pH, TSS and Oil & Grease.
Outfall 010:	Effluent exceedance for Settleable Solids.

A review of the facility's previous five years of discharge monitoring results for Outfall 008, there has been no exceedances of effluent limits. Since 1996 there has been no documented exceedance of an effluent limit at Outfall 008.

Receiving Stream Information

APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:
As per Missouri's Effluent Regulations [10 CSR 20-7.015], the waters of the state are divided into the below listed seven (7) categories. Each category list effluent limitations for specific parameters, which are presented in each outfall's Effluent Limitation Table and further discussed in the Derivation & Discussion of Limits section.
Please mark the correct designated waters of the state categories of the receiving stream.

Missouri or Mississippi River [10 CSR 20-7.015(2)]: Yes ☐; No ☒
Lake or Reservoir [10 CSR 20-7.015(3)]: Yes ☒; No ☐
Losing [10 CSR 20-7.015(4)]: Yes ☐; No ☒
Metropolitan No-Discharge [10 CSR 20-7.015(5)]: Yes ☐; No ☒
Special Stream [10 CSR 20-7.015(6)]: Yes ☐; No ☒
Subsurface Water [10 CSR 20-7.015(7)]: Yes ☐; No ☒
All Other Waters [10 CSR 20-7.015(8)]: Yes ☐; No ☒

10 CSR 20-7.031 Missouri Water Quality Standards, the department defines the Clean Water Commission water quality objectives in terms of "water uses to be maintained and the criteria to protect those uses." The receiving stream and/or 1st classified receiving stream's beneficial water uses to be maintained are located in the Receiving Stream Table located below in accordance with [10 CSR 20-7.031(3)].

RECEIVING STREAM(S) TABLE:

WATERBODY NAME	CLASS	WBID	DESIGNATED USES*	8-DIGIT HUC	EDU**
Montrose Lake	L3	07208	LWW, AQL, WBC(B)***, IND	10290108	Plains/Osage Drainage

* - Irrigation (IRR), Livestock & Wildlife Watering (LWW), Protection of Warm Water Aquatic Life and Human Health-Fish Consumption (AQL), Cool Water Fishery(CLF), Cold Water Fishery (CDF), Whole Body Contact Recreation (WBC), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Industrial (IND).
** - Ecological Drainage Unit
*** - UAA has not been conducted.

Montrose Lake is a cooling water lake basically a lake established for cooling water purposes. Montrose Lake is exempt from the requirements for a cool-water fishery per regulation 10 CSR 20-7.031(4)(D)(4). In accordance with 10 CSR 20-7.031(4)(D)(4) water contaminant sources shall not cause any measurable rise in the temperature of lakes. An increase is allowable for Lake Springfield, Thomas Hill Reservior, and Montrose Lake; however, discharges from these lakes must comply with temperature limits for streams.

MIXING CONSIDERATIONS:
The mixing zone is not to exceed one-quarter (1/4) of the lake width at the discharge point or one hundred feet (100') from the discharge point, whichever is less [10 CSR 20-7.031(4)(A)4.B.(IV)a].

Triangular Prism Method (ref Appendix C: Water Quality and Antidegradation Review)
Mixing Zone (MZ) Parameters: According to the USGS 1:24,000K Quadrangle, the lake width near the facility outfall location is approximately 225 feet (ft). One quarter fo this width equals 56.25 ft. Therefore, MZ Width = 56.25 feet.

Mixing Zone (MZ): The flow volume approximates a triangular prism because of the slope of the lake bottom, where the formula is Volume = L*W*(D*0.5). Assuming that the width will be either side of the discharge (MZ) length (100 feet) to form the plume effect, the box dimensions are length (L) = 100 ft, width (W) = 56.25 ft, and depth (D) = 10 ft. Depth was obtained using mixing zone length projected 100 ft from shoreline to the intersecting contour on 7.5' USGS topographic map. Volume = L*W*(D*0.5) = 100*56.25*(10*0.5) = 28,125 ft^3. The flow volume of 112,500 ft^3 is assumed as the daily mixing zone. Therefore (28,125 ft^3/day)*(1 day/86,400 sec) = 0.33 ft^3/sec.

The Zone of Initial Dilution is not allowed [10 CSR 20-7.031(4)(A)4.B.(IV)b].

The CMC (criteria maximum concentration also known as maximum daily limit) should be met within 10 percent of the distance from the edge of the outfall structure to the edge of the regulatory mixing zone in any spatial direction.[1]

RECEIVING STREAM MONITORING REQUIREMENTS:
No receiving water monitoring requirements recommended at this time.

[1] United States. Environmental Protection Agency. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001, PB91-127415. Washington, DC: EPA, March 1991.

Rationale and Derivation of Effluent Limitations & 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 does not discharge to a Losing Stream as defined by [10 CSR 20-2.010(36)] & [10 CSR 20-7.031(1)(N)], or is an existing facility.

ANTI-BACKSLIDING:
A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(c); CFR §122.44(I)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

☒ - All limits in this Fact Sheet are at least as protective as those previously established; therefore, backsliding does not apply.

ANTIDEGRADATION:
In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(2)], the department is to document by means of Antidegradation Review that the use of a water body's available assimilative capacity is justified. Degradation is justified by documenting the socio-economic importance of a discharging activity after determining the necessity of the discharge.

☒ - Modification to utility waste landfill; increase in storm water flow through Outfall 008. Antidegradation Analysis included in Appendix C; Water Quality and Antidegradation Review KCP&L Montrose Generating Station.

APPLICABLE PERMIT PARAMETERS:
Effluent parameters for conventional, non-conventional, and toxic pollutants have been obtained from the previous NPDES operating permit for this facility, technology based effluent limits (TBEL), and from appropriate sections of the renewal application.

COMPLIANCE AND ENFORCEMENT:
Action taken by the department to resolve violations of the Missouri Clean Water Law, its implementing regulations, and/or any terms and condition of an operating permit.

Not Applicable ☒;
The permittee/facility is not under enforcement action and is considered to be in compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and condition of an operating permit.

STORM WATER POLLUTION PREVENTION PLAN (SWPPP):
In accordance with 40 CFR 122.44(k) *Best Management Practices (BMPs)* 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 storm water 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*, (Document number EPA 833-B-09-002) [published by the United States Environmental Protection Agency (USEPA) in February 2009], BMPs are measures or practices used to reduce the amount of pollution entering (regarding this operating permit) waters of the state. BMPs may take the form of a process, activity, or physical structure.

Additionally in accordance with the Storm Water 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.

Applicable ☒;
A SWPPP shall be developed and implemented for each site and shall incorporate required practices identified by the department with jurisdiction, incorporate erosion control practices specific to site conditions, and provide for maintenance and adherence to the plan.

VARIANCE:
As 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 shall be 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.

Applicable ☒;
Kansas City Power & Light Company Montrose Station was granted a variance on August 4, 2004. The variance stated, "the lagoon will be replaced with an acceptable secondary treatment facility capable of meeting "lake effluent limitations" within two years. The discharge from the new facility will be routed directly to the lake, or the discharge channel, not the intake channel. The variance is granted to Kansas City Power & Light Company, Montrose Generating Station for a period of two years from issuance of the construction permit."

WHOLE EFFLUENT TOXICITY (WET) TEST:
As per [10 CSR 20-7.031(1)(CC)], a toxicity test conducted under specified laboratory conditions on specific indicator organism; and as per [40 CFR §122.2], the aggregate toxic effect of an effluent measured directly by a toxicity test.

Applicable ☒;
Effective July 15, 2005, upon revision, renewal, modification, or issuance, all Missouri State Operating Permits under the NPDES will incorporate use of the following guidelines for determining the applicability and requirements for WET testing. WET testing requirements are established by the WET Test Policy, 120 § 308 of the Federal Water Pollution Control Act, and 40 CFR § 136.
Please check WET tests applicability for this facility:

- All major discharge facilities ☒;
- Facilities that are exceeding or routinely exceed their design flow ☐;
- Most municipals, domestic sewage dischargers ☐;
- Industrial dischargers or other dischargers that may alter their production processes throughout the year ☐;
- Facilities that may handle large quantities of toxic substances, or substances that are toxic in large amounts ☐; and
- Facilities that have been granted seasonal relief of numeric limitations ☐.

303(d) LIST & TOTAL MAXIMUM DAILY LOAD (TMDL):
Section 303(d) of the federal Clean Water Act requires that each state identify waters that are 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 waters that are impaired but not addressed by normal water pollution control programs.

A TMDL is a calculation of the maximum amount of a given pollutant that a body of water can absorb before its water quality is affected. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan will be developed that shall include the TMDL calculation

Not Applicable ☒;
This facility does not discharge to a 303(d) listed stream.

OUTFALL #001 - DOMESTIC EFFLUENT; NO-DISCHARGE SYSTEM

ALL THE EFFLUENT LIMITS REMAIN THE SAME FOR OUTFALL #001.

- **<u>Minimum Sampling and Reporting Frequency Requirements</u>**.

  Sampling and reporting frequency requirements have been retained from previous state operating permit for Outfall #001.

Outfall #002 – Generating Station Cooling Water

ALL THE EFFLUENT LIMITS REMAIN THE SAME FOR OUTFALL #002 EXCEPT FOR THE POLLUTANT HIGHLIGHTED IN THE TABLE.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
pH	SU	2	6.5 – 9			YES	6.0-9.0
OIL & GREASE	MG/L	1	15		10	YES	20/15

Basis for Limitations Codes:

1. State or Federal Regulation/Law
2. Water Quality Standard[2]
3. Water Quality Based Effluent Limits
4. Lagoon Policy
5. Ammonia Policy
6. Antidegradation Policy
7. Water Quality Model
8. Best Professional Judgment
9. TMDL or Permit in lieu of TMDL
10. WET test Policy

[2] – Water Quality Standards also includes Reasonable Potential Analysis.

OUTFALL #002 – DERIVATION AND DISCUSSION OF LIMITS:

- **pH.** 40 CFR 423 requires the pH to be maintained between six to nine (6.0-9.0) standard units (40 CFR 423). 10 CSR 20-7.031(4)(E) requires the pH to be maintained in the range from six and a half to nine (6.5-9.0) standard units [10 CSR 20-7.031(4)(E)]. The state water quality standards are more stringent than the effluent limit guidelines, thus pH shall be maintained between six and a half to nine (6.5-9.0) standard units.

- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum. 20 mg/L daily maximum and 15 mg/L monthly average as TBEL found in the federal effluent guidelines for fly ash and bottom ash transport water, in accordance with 40 CFR Part 423, Steam Electric Power Generating Point Source Category. 10 CSR 20-7 Table A sets more stringent limits for the protection of aquatic life, thus the AML=10 mg/L and the MDL=15 mg/L.

- **Minimum Sampling and Reporting Frequency Requirements**.

  Sampling and reporting frequency requirements have been retained from previous state operating permit for Outfall #002.

Outfall #003 & #004 – South and North Ash Pond Overflow

ALL THE EFFLUENT LIMITS REMAIN THE SAME FOR OUTFALL #003 & #004 EXCEPT FOR THE POLLUTANT HIGHLIGHTED IN THE TABLE.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
pH	SU	2	6.5 – 9			YES	6.0-9.0
OIL & GREASE	MG/L	1	15		10	YES	20/15

* - Monitoring requirement only
N/A – Not applicable

Basis for Limitations Codes:

1. State or Federal Regulation/Law
2. Water Quality Standard[2]
3. Water Quality Based Effluent Limits
4. Lagoon Policy
5. Ammonia Policy
6. Antidegradation Policy
7. Water Quality Model
8. Best Professional Judgment
9. TMDL or Permit in lieu of TMDL
10. WET test Policy

[2] – Water Quality Standards also includes Reasonable Potential Analysis.

OUTFALL #003 & #004 – DERIVATION AND DISCUSSION OF LIMITS:

- **pH.** 40 CFR 423 requires the pH to be maintained between six to nine (6.0-9.0) standard units (40 CFR 423). 10 CSR 20-7.031(4)(E) requires the pH to be maintained in the range from six and a half to nine (6.5-9.0) standard units [10 CSR 20-7.031(4)(E)]. The state water quality standards are more stringent than the effluent limit guidelines, thus pH shall be maintained between six and a half to nine (6.5-9.0) standard units.

- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum. 20 mg/L daily maximum and 15 mg/L monthly average as TBEL found in the federal effluent guidelines for fly ash and bottom ash transport water, in accordance with 40 CFR Part 423, Steam Electric Power Generating Point Source Category. 10 CSR 20-7 Table A sets more stringent limits for the protection of aquatic life, thus the AML=10 mg/L and the MDL=15 mg/L.

- **Minimum Sampling and Reporting Frequency Requirements**.
  Sampling and reporting frequency requirements have been retained from previous state operating permit for Outfall #003 & #004.

Outfall #005 – Metal Cleaning Waste

ALL THE EFFLUENT LIMITS REMAIN THE SAME FOR OUTFALL #005 EXCEPT FOR THE POLLUTANT HIGHLIGHTED IN THE TABLE.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
pH	SU	1	6.5 – 9			YES	6.0-9.0
OIL & GREASE	MG/L	1	15		10	YES	20/15

Basis for Limitations Codes:

1. State or Federal Regulation/Law
2. Water Quality Standard[2]
3. Water Quality Based Effluent Limits
4. Lagoon Policy
5. Ammonia Policy
6. Antidegradation Policy
7. Water Quality Model
8. Best Professional Judgment
9. TMDL or Permit in lieu of TMDL
10. WET test Policy

[2] – Water Quality Standards also includes Reasonable Potential Analysis.

OUTFALL #005 – DERIVATION AND DISCUSSION OF LIMITS:

- **pH.** 40 CFR 423 requires the pH to be maintained between six to nine (6.0-9.0) standard units (40 CFR 423). 10 CSR 20-7.031(4)(E) requires the pH to be maintained in the range from six and a half to nine (6.5-9.0) standard units [10 CSR 20-7.031(4)(E)]. The state water quality standards are more stringent than the effluent limit guidelines, thus pH shall be maintained between six and a half to nine (6.5-9.0) standard units.

- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum. 20 mg/L daily maximum and 15 mg/L monthly average as TBEL found in the federal effluent guidelines for fly ash and bottom ash transport water, in accordance with 40 CFR Part 423, Steam Electric Power Generating Point Source Category. 10 CSR 20-7 Table A sets more stringent limits for the protection of aquatic life, thus the AML=10 mg/L and the MDL=15 mg/L.

- **Minimum Sampling and Reporting Frequency Requirements**.
  Sampling and reporting frequency requirements have been retained from previous state operating permit for Outfall #005.

Outfall #006 – Oil/Water Separator Unit 3 Washdown and Boiler Blowdown

ALL THE EFFLUENT LIMITS REMAIN THE SAME FOR OUTFALL #006 EXCEPT FOR THE POLLUTANT HIGHLIGHTED IN THE TABLE.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
pH	SU	1	6.5 - 9			YES	6.0-9.0
OIL & GREASE	MG/L	1	15		10	YES	20/15

Basis for Limitations Codes:

1. State or Federal Regulation/Law
2. Water Quality Standard[2]
3. Water Quality Based Effluent Limits
4. Lagoon Policy
5. Ammonia Policy
6. Antidegradation Policy
7. Water Quality Model
8. Best Professional Judgment
9. TMDL or Permit in lieu of TMDL
10. WET test Policy

[2] – Water Quality Standards also includes Reasonable Potential Analysis.

OUTFALL #006 – DERIVATION AND DISCUSSION OF LIMITS:

- **pH.** 40 CFR 423 requires the pH to be maintained between six to nine (6.0-9.0) standard units (40 CFR 423). 10 CSR 20-7.031(4)(E) requires the pH to be maintained in the range from six and a half to nine (6.5-9.0) standard units [10 CSR 20-7.031(4)(E)]. The state water quality standards are more stringent than the effluent limit guidelines, thus pH shall be maintained between six and a half to nine (6.5-9.0) standard units.

- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum. 20 mg/L daily maximum and 15 mg/L monthly average as TBEL found in the federal effluent guidelines for fly ash and bottom ash transport water, in accordance with 40 CFR Part 423, Steam Electric Power Generating Point Source Category. 10 CSR 20-7 Table A sets more stringent limits for the protection of aquatic life, thus the AML=10 mg/L and the MDL=15 mg/L.

- **Minimum Sampling and Reporting Frequency Requirements**.
  Sampling and reporting frequency requirements have been retained from previous state operating permit for Outfall #006.

Outfall #007 – Coal Pile Runoff

ALL THE EFFLUENT LIMITS REMAIN THE SAME FOR OUTFALL #007 EXCEPT FOR THE POLLUTANT HIGHLIGHTED IN THE TABLE.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
pH	SU	1	6.5 - 9			YES	6.0-9.0
OIL & GREASE	MG/L	1	15		10	YES	20/15

Basis for Limitations Codes:

1. State or Federal Regulation/Law
2. Water Quality Standard[2]
3. Water Quality Based Effluent Limits
4. Lagoon Policy
5. Ammonia Policy
6. Antidegradation Policy
7. Water Quality Model
8. Best Professional Judgment
9. TMDL or Permit in lieu of TMDL
10. WET test Policy

[2] – Water Quality Standards also includes Reasonable Potential Analysis.

OUTFALL #007 – DERIVATION AND DISCUSSION OF LIMITS:

- **pH.** 40 CFR 423 requires the pH to be maintained between six to nine (6.0-9.0) standard units (40 CFR 423). 10 CSR 20-7.031(4)(E) requires the pH to be maintained in the range from six and a half to nine (6.5-9.0) standard units [10 CSR 20-7.031(4)(E)]. The state water quality standards are more stringent than the effluent limit guidelines, thus pH shall be maintained between six and a half to nine (6.5-9.0) standard units.

- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum. 20 mg/L daily maximum and 15 mg/L monthly average as TBEL found in the federal effluent guidelines for fly ash and bottom ash transport water, in accordance with 40 CFR Part 423, Steam Electric Power Generating Point Source Category. 10 CSR 20-7 Table A sets more stringent limits for the protection of aquatic life, thus the AML=10 mg/L and the MDL=15 mg/L.

- **Minimum Sampling and Reporting Frequency Requirements**.
  Sampling and reporting frequency requirements have been retained from previous state operating permit for Outfall #007.

Outfall #008 – Utility Waste Landfill Settling Pond

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
FLOW	MGD	1	*		*	NO	
TOTAL SUSPENDED SOLIDS	MG/L	1	50		30	YES	50/50
OIL & GREASE	MG/L	1/8	15		10	YES	20/15
pH	SU	1	6.5 – 9			YES	6.0-9.0
SULFATE	MG/L	1	*		*	YES	**
BORON	MG/L	8	*		*	YES	**

* - Monitoring requirement only
** - Parameter not previously established in previous state operating permit.

Basis for Limitations Codes:

1. State or Federal Regulation/Law
2. Water Quality Standard[2]
3. Water Quality Based Effluent Limits
4. Lagoon Policy
5. Ammonia Policy
6. Antidegradation Policy
7. Water Quality Model
8. Best Professional Judgment
9. TMDL or Permit in lieu of TMDL
10. WET test Policy

[2] – Water Quality Standards also includes Reasonable Potential Analysis.

OUTFALL #008 – DERIVATION AND DISCUSSION OF LIMITS:

- **Total Suspended Solids (TSS).** Current permit has a monthly average and a daily maximum of 50 mg/L. These effluent limits do not match the effluent limits found in other power plant permits for landfills or fly ash. Effluent limitations have been derived from the TBELs found in the federal effluent guidelines for fly ash and bottom ash transport water, in accordance with 40 CFR Part 423, Steam Electric Power Generating Point Source Category (daily maximum 100 mg/L; monthly average 30 mg/L). Although this process and associated TBELs are not exactly the same as the affected facility, the monthly average has been reduced to the 30 mg/L. [10 CSR 20-7.015(2)(B)1]. Daily maximum remains at 50 mg/L; monthly average is 30 mg/L.

- **Flow.** In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from the outfall is needed to assure 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.

- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum. 20 mg/L daily maximum and 15 mg/L monthly average as TBEL found in the federal effluent guidelines for fly ash and bottom ash transport water, in accordance with 40 CFR Part 423, Steam Electric Power Generating Point Source Category. 10 CSR 20-7 Table A sets more stringent limits for the protection of aquatic life, thus the AML=10 mg/L and the MDL=15 mg/L.

- **pH.** 40 CFR 423 requires the pH to be maintained between six to nine (6.0-9.0) standard units (40 CFR 423). 10 CSR 20-7.031(4)(E) requires the pH to be maintained in the range from six and a half to nine (6.5-9.0) standard units [10 CSR 20-7.031(4)(E)]. The state water quality standards are more stringent than the effluent limit guidelines, thus pH shall be maintained between six and a half to nine (6.5-9.0) standard units.

- **SULFATE.** Monitoring only to determine "reasonable potential" to violate Water Quality Standards.

- **BORON.** Monitoring only to determine pollutant of concern applicability, based on the best professional judgment of the permit writer, at the time of the 2014 renewal.

- **TBEL DETERMINATION (SEE APPENDIX E)**

- **Minimum Sampling and Reporting Frequency Requirements**.

PARAMETER	SAMPLING FREQUENCY	REPORTING FREQUENCY
FLOW	ONCE/MONTH	ONCE/MONTH
TOTAL SUSPENDED SOLIDS		
pH		
SULFATE		
OIL & GREASE		
BORON		

Outfall #009 – Oil/Water Separator Units 1 and 2 Washdown and Boiler Blowdown

ALL THE EFFLUENT LIMITS REMAIN THE SAME FOR OUTFALL #009 EXCEPT FOR THE POLLUTANT HIGHLIGHTED IN THE TABLE.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
pH	SU	2	6.5 - 9			YES	6.0-9.0
OIL & GREASE	MG/L	1	15		10	YES	20/15

Basis for Limitations Codes:

1. State or Federal Regulation/Law
2. Water Quality Standard[2]
3. Water Quality Based Effluent Limits
4. Lagoon Policy
5. Ammonia Policy
6. Antidegradation Policy
7. Water Quality Model
8. Best Professional Judgment
9. TMDL or Permit in lieu of TMDL
10. WET test Policy

[2] – Water Quality Standards also includes Reasonable Potential Analysis.

OUTFALL #009 – DERIVATION AND DISCUSSION OF LIMITS:

- **pH.** 40 CFR 423 requires the pH to be maintained between six to nine (6.0-9.0) standard units (40 CFR 423). 10 CSR 20-7.031(4)(E) requires the pH to be maintained in the range from six and a half to nine (6.5-9.0) standard units [10 CSR 20-7.031(4)(E)]. The state water quality standards are more stringent than the effluent limit guidelines, thus pH shall be maintained between six and a half to nine (6.5-9.0) standard units.

- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum. 20 mg/L daily maximum and 15 mg/L monthly average as TBEL found in the federal effluent guidelines for fly ash and bottom ash transport water, in accordance with 40 CFR Part 423, Steam Electric Power Generating Point Source Category. 10 CSR 20-7 Table A sets more stringent limits for the protection of aquatic life, thus the AML=10 mg/L and the MDL=15 mg/L.

- **Minimum Sampling and Reporting Frequency Requirements**.
  Sampling and reporting frequency requirements have been retained from previous state operating permit for Outfall #009.

Outfall #010 – Stormwater from Plant Area

ALL THE EFFLUENT LIMITS REMAIN THE SAME FOR OUTFALL #010 EXCEPT FOR THE POLLUTANT HIGHLIGHTED IN THE TABLE.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
pH	SU	2	6.5 - 9			YES	6.0-9.0
OIL & GREASE	MG/L	1	15		10	YES	20/15

* - Monitoring requirement only

Basis for Limitations Codes:

1. State or Federal Regulation/Law
2. Water Quality Standard[2]
3. Water Quality Based Effluent Limits
4. Lagoon Policy
5. Ammonia Policy
6. Antidegradation Policy
7. Water Quality Model
8. Best Professional Judgment
9. TMDL or Permit in lieu of TMDL
10. WET test Policy

[2] – Water Quality Standards also includes Reasonable Potential Analysis.

OUTFALL #010 – DERIVATION AND DISCUSSION OF LIMITS:

- **pH.** 40 CFR 423 requires the pH to be maintained between six to nine (6.0-9.0) standard units (40 CFR 423). 10 CSR 20-7.031(4)(E) requires the pH to be maintained in the range from six and a half to nine (6.5-9.0) standard units [10 CSR 20-7.031(4)(E)]. The state water quality standards are more stringent than the effluent limit guidelines, thus pH shall be maintained between six and a half to nine (6.5-9.0) standard units.

- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum. 20 mg/L daily maximum and 15 mg/L monthly average as TBEL found in the federal effluent guidelines for fly ash and bottom ash transport water, in accordance with 40 CFR Part 423, Steam Electric Power Generating Point Source Category. 10 CSR 20-7 Table A sets more stringent limits for the protection of aquatic life, thus the AML=10 mg/L and the MDL=15 mg/L.

- **Minimum Sampling and Reporting Frequency Requirements**.
  Sampling and reporting frequency requirements have been retained from previous state operating permit for Outfall #009.

Finding of Affordability

Pursuant to Section 644.145, RSMo., the Department is required to determine whether a permit or decision is affordable and makes a finding of affordability for certain permitting and enforcement decisions. This requirement applies to discharges from combined or separate sewer systems or publically-owned treatment works.

Not Applicable ☒; The Department is not required to determine findings of affordability because the facility is not a combined or separate sanitary sewer system for a publically-owned treatment works.

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.

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 was from January 13, 2012 to March 5, 2012. Responses to the Public Notice of this operating permit warrant the modification of effluent limits and/or the terms and conditions of this permit. The following changes to the operating permit and fact sheet were completed in response to comments received during the public notice period.

1. Whole Effluent Toxicity (WET) testing was added to the operating permit due to the potential toxic nature of the coal combustion residue being disposed of into the utility waste landfill.
2. The comment section of the fact sheet was expanded to discuss the groundwater monitoring required for the Utility Waste Landfill by the Missouri Department of Natural Resources Solid Waste Management Program.
3. The comment section of the fact sheet was also expanded to discuss the routing of contact storm water flow to Outfall #003, #004, and #008.
4. The Receiving Stream section was expanded to discuss that Montrose Lake is exempt from the designated use of cool water fishery per regulation 10 CSR 20-7.031(4)(D)(4).

A modification was conducted on September 21, 2012.

Date of Fact Sheet: November 18, 2011
Date of Fact Sheet: Revised June 13, 2012

Scott F. Honig, P.E.
Kansas City Regional Office
(816)622-7011
Scott.Honig@dnr.mo.gov

Date of Fact Sheet Modification: September 21, 2012
Chris Wieberg
Water Protection Program
chris.wieberg@dnr.mo.gov
(573) 526-5781

APPENDIX A – OUTFALL LOCATION/DESCRIPTION:

Outfall #003
Legal Description: NW ¼, Sec. 32, T41N, R27W
UTM(X/Y): 417910/4240652
Receiving Stream: Montrose Lake (L3)
First Classified Stream and ID: Montrose Lake (L3) (07208)
USGS Basin & Sub-watershed No.: (10290108-0603)

Outfall #004
Legal Description: NW ¼, Sec. 32, T41N, R27W
UTM(X/Y):: 417841/4240795
Receiving Stream: Montrose Lake (L3)
First Classified Stream and ID: Montrose Lake (L3) (07208)
USGS Basin & Sub-watershed No.: (10290108-0603)

Outfall #005
Legal Description: Sec. 32, T41N, R27W
UTM(X/Y): 417913/4240649
Receiving Stream: Montrose Lake (L3)
First Classified Stream and ID: Montrose Lake (L3) (07208)
USGS Basin & Sub-watershed No.: (10290108-0603)

Outfall #006
Legal Description: NW ¼, Sec. 32, T41N, R27W
UTM(X/Y): 418131/4240638
Receiving Stream: Montrose Lake (L3)
First Classified Stream and ID: Montrose Lake (L3) (07208)
USGS Basin & Sub-watershed No.: (10290108-0603)

Outfall #007
Legal Description: NW ¼, NE ¼, Sec. 32, T41N, R27W
UTM(X/Y): 418785/4240933
Receiving Stream: Montrose Lake (L3)
First Classified Stream and ID: Montrose Lake (L3) (07208)
USGS Basin & Sub-watershed No.: (10290108-0603)

Outfall #008
Legal Description: SW ¼, NE ¼, Sec. 32, T41N, R27W
UTM(X/Y): 417244/4240591
Receiving Stream: Montrose Lake (L3)
First Classified Stream and ID: Montrose Lake (L3) (07208)
USGS Basin & Sub-watershed No.: (10290108-0603)

Outfall #009
Legal Description: SE ¼, NW ¼, Sec. 32, T41N, R27W
UTM(X/Y): 418349/4240534
Receiving Stream: Montrose Lake (L3)
First Classified Stream and ID: Montrose Lake (L3) (07208)
USGS Basin & Sub-watershed No.: (10290108-0603)

Outfall #010
Legal Description: SW ¼, NE ¼, Sec. 31, T41N, R27W
UTM(X/Y): 416812/4240173
Receiving Stream: Montrose Lake (L3)
First Classified Stream and ID: Montrose Lake (L3) (07208)
USGS Basin & Sub-watershed No.: (10290108-0603)

APPENDIX B – ZEBRA MUSSEL CORRECTIVE ACTION PLAN:

Kansas City Power & Light Company proposes that the following be added as a supplemental condition to the NPDES permit.

Under normal conditions, i.e., no detection of zebra mussels, the Montrose Station will treat each cooling water system with a maximum residual oxidant concentration at the discharge of 0.019 mg/L per day and a monthly average of 0.010 mg/L (see Effluent Limitations and Monitoring Requirements, Note 5, Page 9 of 16). Kansas City Power & Light will notify the Missouri Department of Natural Resources, Water Pollution Control Program of this treatment through Discharge Monitoring Reports (DMRs).

Should infant zebra mussels, known as veligers, or adult zebra mussels be encountered, the Montrose Station shall automatically be allowed to treat for the infestation using continuous bromine feed in each cooling water system. Nalco H-130M and EVAC would serve as backup treatments if necessary. The Water Pollution Control Program will be informed when Montrose Station has commenced these treatments upon discovery of zebra mussels.

APPENDIX C –WATER QUALITY AND ANTIDEGRADATION REVIEW:

STATE OF MISSOURI

Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

SEP - 6 2011

Mr. Greg Lee
Plant Manager
KCP&L - Montrose Generating Station
400 SW Highway P
Clinton, Missouri 641735

RE: Water Quality Review / Antidegradation Review Preliminary Determination on *Antidegradation Report Proposed Expansion of KCP&L Montrose Station Utility Waste Landfill*

Dear Mr. Lee:

Enclosed please find the finalized Water Quality and Antidegradation Review (WQAR) for the proposed expansion of *KCP&L - Montrose Station Utility Waste Landfill* in Henry County. The WQAR contains pertinent antidegradation review information based on the use of existing water quality, effluent limitations and monitoring requirements for the facility discharge. It was developed in accordance with 10 CSR 20-7.031, the Clean Water Commission approved *Missouri Antidegradation Rule and Implementation Procedure* (AIP) dated May 7, 2008, U.S. Environmental Protection Agency (US EPA) guidance, the applicant-supplied antidegradation review documentation, and the State of Missouri's effluent regulations (10 CSR 20-7.015). Please refer to the *General Assumptions of the Water Quality and Antidegradation Review* section of the enclosed WQAR. The WQAR is preliminary and subject to change as new information becomes available during future permit application processing.

Based on the Missouri Department of Natural Resources' (Department's) initial review, preliminary determination is that the applicant-supplied antidegradation review documentation satisfies the requirements of the AIP. This WQAR/preliminary determination may be appealed within 30 days of this letter in accordance with the AIP Section II.F.4.

You may proceed with submittal of an application for an operating permit and antidegradation review public notice, an engineering report, or a complete application for a construction permit. These submittals must reflect the design flow, facility description, and general treatment components of this WQAR or this preliminary determination may have to be revisited.

Recycled Paper

Following the Department's public notice of draft Missouri State Operating Permit including the antidegradation review findings and preliminary determination, the Department will review any public notice comments received. If significant comments are made, the project may require another public notice and potentially another antidegradation review. If no comments are received or comments are resolved without another public notice, these findings and determinations will be considered final.

Following issuance of the construction permit and completion of the actual facility construction, the Department will proceed with the issuance of the operating permit.

If you should have questions regarding the enclosed WQAR, please contact Leasue Meyers by telephone at (573) 751-1300, by e-mail at leasue.meyers@dnr.mo.gov, or by mail at the Missouri Department of Natural Resources, Water Protection Program, PO Box 176, Jefferson City, Missouri 65102-0176.

Sincerely,

WATER PROTECTION PROGRAM

Refaat Mefrakis, P.E., Chief
NPDES Permits & Engineering Section

RM/lmn

Enclosure

c: Mr. Bob Beck, KC P&L, P.O. Box 418679, Kansas City, MO 64141
Mr. Scott Honig, KCRO

Water Quality and Antidegradation Review

For the Protection of Water Quality and Determination of Effluent Limits for Discharge to Montrose Lake by

KCP&L Montrose Generating Station

August 2011

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1. FACILITY INFORMATION

FACILITY NAME: KCP&L, Montrose Generating Station Outfall 008 NPDES #: MO-0101117

FACILITY TYPE/DESCRIPTION: Kansas City Power and Light operates the 564 MW Montrose Generating Station in Henry County. The facility is proposing to expand the utility waste landfill, which would increase stormwater run-off from the landfill through Outfall 008. The discharge will expand from 0.0191 MGD to 0.0333 MGD.

COUNTY:	Henry	UTM COORDINATES:	x= 417239; y= 4240581
12- DIGIT HUC:	10290108-0603	LEGAL DESCRIPTION:	NE ¼, NE ¼, Sec. 31, T41N,R27W
EDU*:	Central Plains/Osage /South Grand	ECOREGION:	Osage Plains/Cherokee Plains

* - Ecological Drainage Unit

2. WATER QUALITY INFORMATION

In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(2)] and federal antidegradation policy at Title 40 Code of Federal Regulation (CFR) Section 131.12 (a), the Missouri Department of Natural Resources (MDNR) developed a statewide antidegradation policy and corresponding procedures to implement the policy. A proposed discharge to a water body will be required to undergo a level of Antidegradation Review which documents that the use of a water body's available assimilative capacity is justified. Effective August 30, 2008, a facility is required to use *Missouri's Antidegradation Rule and Implementation Procedure (AIP)* for new and expanded wastewater discharges.

2.1. WATER QUALITY HISTORY:

In review of the facility's previous five years of discharge monitoring results for Outfall 008, there have been no exceedances of effluent limits. In the 2009 permit renewal of discharge monitoring reports from 1996-2007, there were no reported exceedances either.

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	RECEIVING WATERBODY	DISTANCE TO CLASSIFIED SEGMENT (MI)
008	0.0516	Secondary	Montrose Lake	0.0

3. RECEIVING WATERBODY INFORMATION

WATERBODY NAME	CLASS	WBID	LOW-FLOW VALUES (CFS)			DESIGNATED USES**
			1Q10	7Q10	30Q10	
Montrose Lake	L3	7208	--	--	--	AQL, IND, LWW, WBC(B)

** Protection of Warm Water Aquatic Life and Human Health-Fish Consumption (AQL). Cold Water Fishery (CDF). Cool Water Fishery (CLF). Drinking Water Supply (DWS). Industrial (IND). Irrigation (IRR). Livestock & Wildlife Watering (LWW). Secondary Contact Recreation (SCR). Whole Body Contact Recreation (WBC).

RECEIVING WATER BODY SEGMENT #1: Outfall 008
Upper end segment* UTM coordinates: x= 417239; y= 4240581 (Outfall)
Lower end segment* UTM coordinates: x= 417211; y= 4240520 (confluence with additional outfalls)

RECEIVING WATER BODY SEGMENT #2: Confluence with main stem of Montrose Lake
Upper end segment* UTM coordinates: x= 417211; y= 4240520
Lower end segment* UTM coordinates: x= 417179; y= 4240448 (confluence with main stem of the lake)

*Segment is the portion of the stream where discharge occurs. Segment is used to track changes in assimilative capacity and is bound at a minimum by existing sources and confluences with other significant water bodies.

4. GENERAL COMMENTS

- KCPL submitted the *Antidegradation Report Proposed Expansion of Utility Waste Landfill at KCP&L Montrose* dated July 2011. The applicant submitted a copy of the geohydrological evaluation submitted previously to the department's solid waste program (Appendix B). The Solid Waste Program public noticed the draft expansion through June 2010. A Level 1 Missouri Department of Conservation Natural Heritage Review was obtained by the applicant (Appendix C). Applicant elected to determine that all pollutants of concern (POC) were minimally degrading, when using the receiving stream and existing water quality (Appendix D). This analysis was conducted to fulfill the requirements of the AIP. Information that was provided by the applicant in the submitted report and summary forms in Appendix E was used to develop this review document.
- The Missouri Department of Conservation leases and manages the Montrose Wildlife Area - 3,600 acres including the reservoir. Largemouth bass, crappie, channel cat, white pelicans, bald eagles, double-crested cormorants and indigenous Missouri birds and wildlife can be seen at various seasons throughout the year. As a result of a restoration project, osprey are making a comeback in Missouri. At a remote area of the *Montrose Generating Station* lake, young osprey were released from 1998 to 2001. The effort was deemed a success in 2002 when osprey nested and raised three young in the same protected area of the lake.

5. ANTIDEGRADATION REVIEW INFORMATION

The following is a review of the *Antidegradation Report* dated July 13, 2011.

5.1. TIER DETERMINATION

Below is a list of pollutants of concern reasonably expected to be in the discharge (see Appendix D: Tier Determination and Effluent Limit Summary). Pollutants of concern are defined as those pollutants "proposed for discharge that affects beneficial use(s) in waters of the state. POCs include pollutants that create conditions unfavorable to beneficial uses in the water body receiving the discharge or proposed to receive the discharge." (AIP, Page 7). Tier 2 was assumed for all POCs (see Appendix D).

TABLE 1: POLLUTANTS OF CONCERN AND TIER DETERMINATION

POLLUTANTS OF CONCERN	TIER	DEGRADATION	COMMENT
Total Suspended Solids (TSS)	*	Not determined	Permit limits apply only
pH	**	Not determined	Permit limits apply only
Oil and Grease		Not determined	Permit limits apply only
Arsenic	2	Minimal	
Cadmium	2	Minimal	
Sulfate and Chloride	2	Minimal	

Tier determination not possible: * No in-stream standards for these parameters. ** Standards for these parameters are ranges

The following Antidegradation Review Summary attachments in Appendix D were used by the applicant:

☒ Tier Determination and Effluent Summary
☒ Attachment B, Tier 2 with minimal degradation.

5.2. EXISTING WATER QUALITY

Existing water quality for Montrose Lake was determined using analytical results obtained prior to submittal of the Antidegradation Request. The facility sampled for the pollutants found on the NPDES permit renewal forms.

5.3. ASSIMILATIVE CAPACITY CALCULATIONS

Depending on the POC, calculated assimilative capacities were in a range from 0.64% increase to a 4.56% increase in loading (Appendix D). *Missouri's Antidegradation Rule and Implementation Procedure* considers the use of less than 10% of the facility's available assimilative capacity as insignificant.

For potential pollutants, KCP&L used sampling results from the existing Montrose landfill, prior to discharge. To get existing water quality (EWQ), the facility sampled the lake. The potential pollutant results were not subject to the mixing of the Montrose Lake that this landfill will have. The expected effluent concentrations in the table below are at end of pipe prior to discharge. The sampling demonstrated a number of potential pollutants were not detected. Pollutants detected that were near the water quality standards were included in the Antidegradation Report as the list of potential pollutants of concern (POCs). Those POCs included Arsenic, Cadmium, Fluoride, and Sulfate and Chloride. A reasonable potential analysis was completed based on the sample and there was not potential to violate the water quality standards for metals. 40 CFR Part 423 establishes effluent limits for pH, Oil and Grease, and Total Suspended Solids for discharges involving coal combustion wastes. As Arsenic, Cadmium, Fluoride, and Sulfate and Chloride demonstrate extremely minimal impact to the receiving stream, KCP&L GMO proposed monitoring only for the pollutants listed in 40 CFR 423: pH, Oil and Grease, and Total Suspended Solids. MDNR is proposing monitoring only for Sulfate and Flow. MDNR is proposing effluent limits for pH, Total Suspended Solids and Oil and Grease.

TABLE 2: ASSIMILATIVE CAPACITY CALCULATIONS FOR MONTROSE LAKE

Pollutant of Concern	Water Quality Standard AQL (mg/l)	Existing Water Quality (mg/l)	Expected Effluent Concentration (mg/l)	Facility Assimilative Capacity (lbs/day)	New Discharge Load (lbs/day)	Percent of FAC used
Arsenic	0.02	0.0025	0.0036	0.036	0.001	1.19%
Cadmium	0.0003**	0.00004	0.00020	0.00052	0.000024	4.56%
Fluoride	4.0	0.23	0.42	7.77	0.05	0.64%
Sulfate and Chloride	1,000	47.3	537.7	1843	64	3.5%

Water Quality Standards from 10 CSR 20-7 Table A;. ** AQL is hardness dependant; *** WQS for Sulfate and Chloride is in 10 CSR 20-7.031(4)(L).

TABLE 3: LOADING OF EXISTING POLLUTANTS

Pollutant of Concern	Existing Effluent Limit (mg/L)	Existing Load (lbs/day)	Proposed Effluent Limit (mg/L)	New Discharge Load (lbs/day)	Percent Change
Total Suspended Solids	50	7.96	30	8.3	+4.27%

5.4. DEMONSTRATION OF NECESSITY AND SOCIAL AND ECONOMIC IMPORTANCE

Missouri's antidegradation implementation procedures specify that if the proposed activity does not result in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are not required.

6. General Assumptions of the Water Quality and Antidegradation Review

1. A Water Quality and Antidegradation Review (WQAR) assumes that [10 CSR 20-6.010(3) Continuing Authorities and 10 CSR 20-6.010(4) (D), consideration for no discharge] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
2. A WQAR does not indicate approval or disapproval of alternative analysis as per [10 CSR 20-7.015(4) Losing Streams], and/or any section of the effluent regulations.
3. Changes to Federal and State Regulations made after the drafting of this WQAR may alter Water Quality Based Effluent Limits (WQBEL).
4. Effluent limitations derived from Federal or Missouri State Regulations (FSR) may be WQBEL or Effluent Limit Guidelines (ELG).
5. WQBEL supersede ELG only when they are more stringent. Mass limits derived from technology based limits are still appropriate.
6. A WQAR does not allow discharges to waters of the state, and shall not be construed as a National Pollution Discharge Elimination System or Missouri State Operating Permit to discharge or a permit to construct, modify, or upgrade.
7. Limitations and other requirements in a WQAR may change as Water Quality Standards, Methodology, and Implementation procedures change.
8. Nothing in this WQAR removes any obligations to comply with county or other local ordinances or restrictions.
9. If the proposed treatment technology is not covered in 10 CSR 20-8 Design Guides, the treatment process may be considered a new technology. As a new technology, the permittee will need to work with the review engineer to ensure equipment is sized properly. The operating permit may contain additional requirements to evaluate the effectiveness of the technology once the facility is in operation. This Antidegradation Review is based on the information provided by the facility and is not a comprehensive review of the proposed treatment technology. If the review engineer determines the proposed technology will not consistently meet proposed effluent limits, the permittee will be required to revise their Antidegradation Report.

7. Mixing Considerations

Triangular Prism Method

Mixing Zone (MZ) Parameters: According to the USGS 1:24,00OK Quadrangle, the lake width near the facility outfall location is approximately 225 feet (ft). One quarter of this width equals 56.25 ft. Therefore, MZ Width =225 feet [10 CSR 20-7.031 (4)(A) 4.B.(IV)(a)].

Mixing Zone (MZ): The flow volume approximates a triangular prism because of the slope of the lake bottom, where the formula is Volume = L*W*(D*0.5). Assuming that the width will be either side of the discharge (MZ) length (100 feet) to form the plume effect, the box dimensions are length (L) = 100 ft, width (W) = 56.25 ft, and depth (D) = 10 ft. Depth was obtained using mixing zone length projected 100 ft from shoreline to the intersecting contour on 7.5' USGS topographic map. Volume = L*W*(D*(0.5)) = **(100)*(56.25)*(10*0.5)**= 28,125 ft^3. The flow volume of 112,500ft^3 is assumed as the daily mixing zone. Therefore (28,125 ft^3/day)*(1 day/86,400 sec) = 0.33 ft^3/sec.

Zone of Initial Dilution (ZID): Not Allowed [10 CSR 20-7.031(4)(A)5.B.(IV)(b).

8. Permit Limits and Monitoring Information

OUTFALL #008

Wasteload Allocation Study Conducted (Y or N):	N	Use Attainability Analysis Conducted (Y or N):	N	Whole Body Contact Use Retained (Y or N):	Y

Wet Test (Y or N): Y Frequency: Once/Permit Cycle AEC: 100% Method: Multiple

Table 4: Effluent Limits

Parameter	Units	Daily Maximum	Weekly Average	Monthly Average	Basis for Limit (Note 1)	Monitoring Frequency
Flow	MGD	*		*	N/A	once/month
Total Suspended Solids	mg/L	50		30	MDEL	once/month
pH	SU	6.5– 9.0		6.5 – 9.0	FSR	once/month
Oil and Grease	mg/L	15		10	FSR	once/month
Sulfate	mg/L	*		*	N/A	once/month

* - Monitoring requirements only.

Note 1– Water Quality-based Effluent Limitation --WQBEL; or Minimally Degrading Effluent Limit--MDEL; or Preferred Alternative Effluent Limit-PEL; Technology-based Effluent Limit-TBEL; or No Degradation effluent Limit--NDEL; or FSR --Federal/State Regulation; or N/A--Not Applicable. Also, please see the **General Assumptions of the WQAR #4 & #5.**

9. Receiving Water Monitoring Requirements

No receiving water monitoring requirements recommended at this time.

10. Derivation and Discussion of Limits

Wasteload allocations and limits were calculated using two methods:

1) Water quality-based – Using water quality criteria or water quality model results and the dilution equation below:

$$C = \frac{(C_s \times Q_s) + (C_e \times Q_e)}{(Q_e + Q_s)} \qquad \text{(EPA/505/2-90-001, Section 4.5.5)}$$

Where C = downstream concentration
C_s = upstream concentration
Q_s = upstream flow
C_e = effluent concentration
Q_e = effluent flow

Chronic wasteload allocations 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). Acute wasteload allocations 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). Water quality-based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

2) Assimilative capacity based – Using existing water quality (EWQ), water quality criteria, and the facility assimilative capacity ratio within the following equation:

Expanding Facility:

$$C_{d2} = ([C_c*(Q_s+Q_{d2})-C_s*(Q_s+Q_{d1})*CF]FAC_{ratio}+Q_{d1}*C_{d1})/Q_{d2}$$

Where: C_c = downstream concentration, the Water Quality Standard (WQS)
Q_s = Stream 7Q10 flow (ft^3/s)
Q_{d1} = Current effluent **design** flow (ft^3/s)
Q_{d2} = Proposed effluent design flow (ft^3/s))
C_s = combined stream concentrations (calculated using EWQ, permitted discharges)
C_{d1}= effluent concentration of the current facility
C_{d2} = effluent concentration of the proposed facility
FAC_{ratio} = facility assimilative capacity ratio (calculated or assumed)
CF= Conversion factors for assimilative capacity calculations are: 0.0054 for ug/L, 5.4 for mg/L.

Chronic wasteload allocations (WLA_c) were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and upstream stream flow without mixing considerations. Acute wasteload allocations are only determined in the absence of applicable chronic criteria. For most toxic and conventional POCs, the minimally-degrading effluent average monthly and daily maximum limits are determined by applying the WLAc as the daily maximum (MDL) and dividing the MDL by 1.5 to derive the average monthly limit. This is an accepted procedure that is defined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

Note: Minimally-degrading effluent limits have been based on the authority included in Section III. Permit Consideration of the AIP.

10.1. Limit Derivation

The process for limit derivation for POCs that are minimally degrading is as follows:

1) Determine using method #2 outlined above for all applicable POCs the minimally degrading wasteload allocation and effluent limits (MDEL) that retains the remaining assimilative capacity and does not exceed 10% of the FAC.

2) Determine the need for permit limits of various POCs using reasonable potential analysis. While this process is applied to all applicable POCs, this process is particularly important for POCs having monitoring only requirements for an existing discharge. No POC will exceed the maximum daily limit (MDL). Limits that exceed the MDL of the MDEL may have MDEL applied. Some POCs may have the limit applied under certain circumstances.

3) To determine if any of the above proposed limits are protective of water quality standards, the final step is to develop water quality-based effluent limits. The more stringent of the MDEL and WQBEL will be applied.

10.2. Outfall #008- Landfill Outfall

- **Flow**. In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from the outfall is needed to assure 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.

- **Total Suspended Solids (TSS).** Current permit has a monthly average and a daily maximum of 50 mg/L. These effluent limits do not match the effluent limits found in other power plant permits for landfills or fly ash. Effluent limitations have been derived from the TBELs found in the federal effluent guidelines for fly ash and bottom ash transport water, in accordance with 40 CFR Part 423, *Steam Electric Power Generating Point Source Category* (daily maximum 100 mg/L; monthly average 30 mg/L). Although this process and associated TBELs are not exactly the same as the affected facility, the monthly average has been reduced to the 30 mg/L. [10 CSR 20-7.015(2)(B)1]. Daily maximum remains at 50 mg/L; monthly average is 30 mg/L.

- **pH.** 40 CFR 423 requires the pH to be maintained between six to nine (6.0 -9.0) standard units (40 CFR 423). 10 CSR 20-7.015(3)(A) 1B requires the pH to be maintained in the range from six and a half to nine (6.5– 9.0) standard units [10 CSR 20-7.015 (3)(A)1B and (8)(B)2]. The state water quality standards are more stringent than the effluent limit guidelines, thus pH shall be maintained between six and a half to nine (6.5-9.0) standard units.

- **Oil & Grease**. Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum. 20 mg/l daily maximum and 15 mg/l monthly average as TBEL found in the federal effluent guidelines for fly ash and bottom ash transport water, in accordance with 40 CFR Part 423, *Steam Electric Power Generating Point Source Category*. 10 CSR 20-7 Table A sets more stringent limits for the protection of aquatic life, thus the AML= 10 mg/l and the MDL= 15 mg/l.

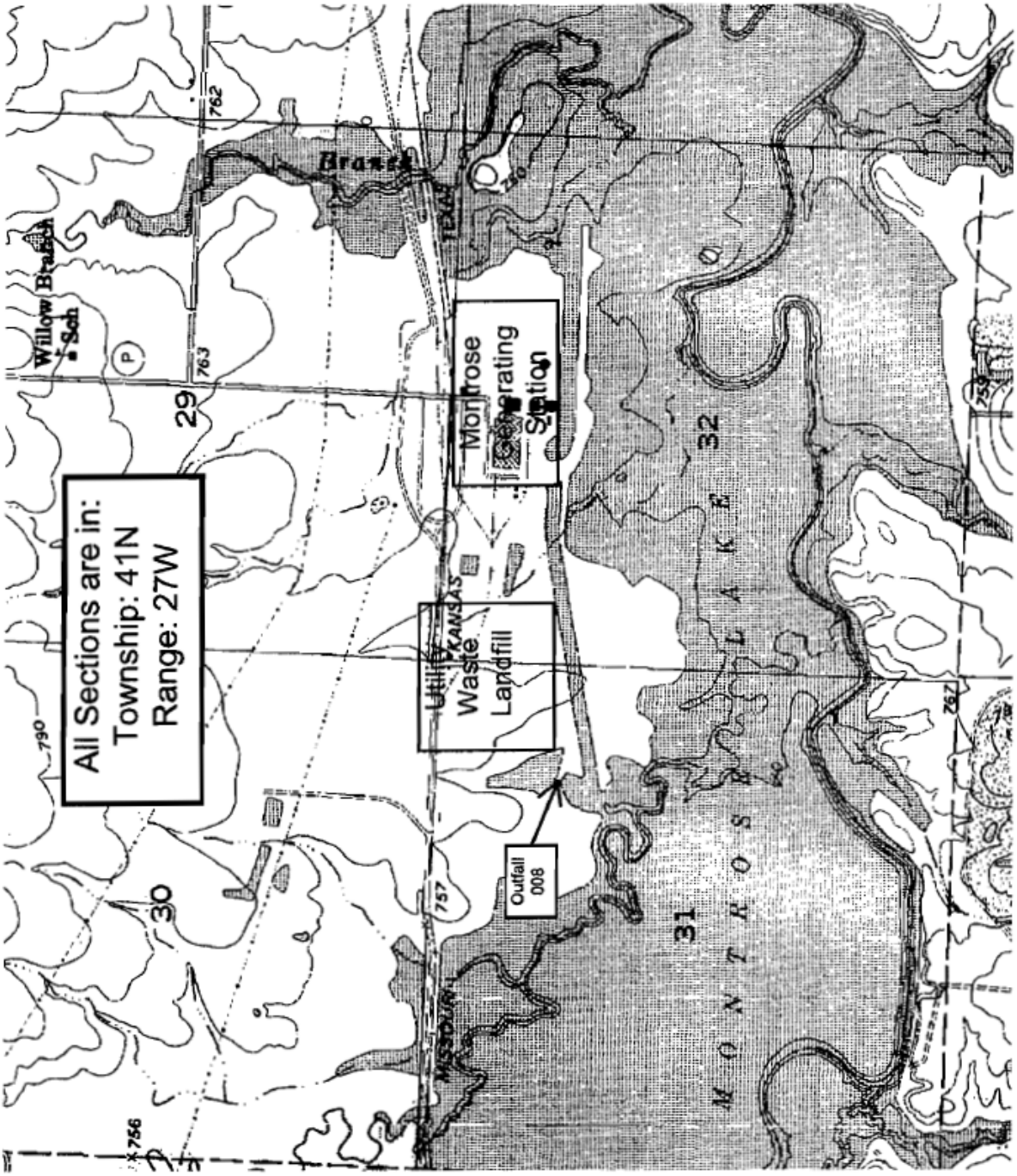
- **Sulfate.** Monitoring only to determine "reasonable potential" to violate Water Quality Standards.

11. ANTIDEGRADATION REVIEW PRELIMINARY DETERMINATION

The proposed expansion from KCP&L Montrose Generating Station Landfill, 0.0333 MGD will result in minimal degradation of the segment identified in Montrose Lake. Per the requirements of the AIP, the effluent limits in this review were developed to be protective of beneficial uses and to retain the remaining assimilative capacity. MDNR has determined that the submitted review is sufficient and meets the requirements of the AIP. No further analysis is needed for this discharge.

Reviewer: Leasue J. Meyers LJM
Date: 07/25/2011
Unit Chief: John Rustige, P.E. JR

Appendix A: Map of Discharge Location



STATE OF MISSOURI
Bob Holden, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.state.mo.us

April 16, 2004

CERTIFIED MAIL # 7002 2030 006 7279 4391
RETURN RECEIPT REQUESTED

Jamie Martens
URS Corporation
10975 El Monte, Suite 100
Overland Park, KS 66211

RE: Detailed Site Investigation for the Proposed Expansion of the KCP&L Montrose Powerstation Utility Waste Landfill
NE ¼, Section 31 and NW ¼, Section 32, Township 41 North, Range 27 West
Montrose 7.5-Minute Quadrangle, Henry County

Dear Ms. Martens,

The "Detailed Site Investigation – Geologic and Hydrologic Evaluation Report" for the proposed utility waste landfill expansion at the KCP&L Montrose Powerstation dated February 13, 2004 has been reviewed by the Geological Survey Program (GSP), Geological Survey and Resource Assessment Division, Missouri Department of Natural Resources.

The GSP concludes that the report adequately characterizes the geology and hydrology at the proposed site. The GSP has provided some comments about the Detailed Site Investigation report that should be addressed. The hydrological and geological data presented in the report indicates the groundwater is monitorable at this site. The GSP approves the Detailed Site Investigation Report and the tract it describes as geologically suitable for development of an environmentally sound solid-waste disposal facility. This site may now advance to the permitting stage. Please contact the Solid Waste Management Program of the Missouri Department of Natural Resources (573-751-5401) for assistance with the permit application process.

GEOLOGICAL SURVEY & Resource Assessment Division

Integrity and excellence in everything we do

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Jamie Martens
April 16, 2004
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Sincerely,

GEOLOGICAL SURVEY AND RESOURCE ASSESSMENT DIVISION

Steven W. Sturgess, R.G., Director
Geological Survey Program
573-368-2149
steve.sturgess@dnr.mo.gov

STATE OF MISSOURI
STEVEN W. STURGESS
RG0574
REGISTERED GEOLOGIST
4-16-04

SWS/skl

Enclosure

c: Solid Waste Management Program
KCP&L
KCRO
SWMD, Region F

Appendix D: Minimal Degradation Calculations

Q_s: 7Q10 of the Montrose Lake, 0.33 cfs
Q_{d1}: Current discharge flow, 0.0295 cfs
Q_{d2}: New discharge flow, 0.0516 cfs
C_{d1}: Current discharge effluent concentration
C_{d2}: New discharge effluent concentration
C_c: Chronic Criterion
FAC: Facility Assimilative Capacity
EWQ: Existing water quality of Montrose Lake
CF: Conversion factor, 5.4
C_s: Pollutant concentration in stream immediately below the point where the facility's effluent enters the segment

Arsenic Minimally Degrading Calculations

Q_s: 0.33 cfs
Q_{d1}: 0.0295 cfs
Q_{d2}: 0.0516 cfs
C_{d1}: 0.0036 mg/L
C_{d2}: 0.0036 mg/L
C_c: 0.020 mg/L
EWQ: 0.0025 mg/L
CF: 5.4

C_s: Stream Load $= EWQ*Q_s*CF$
$= 0.00250*0.33*5.4$
$= 0.00446$ lbs/day

Current discharge Load $= C_{d1}*Q_{d1}*CF$
$= 0.0036*0.0295*5.4$
$= 0.000573$ lbs/day

Total Load = Stream Load + Current discharge load
$= 0.00446+0.00057$
$= 0.0052$ lbs/day

Solve for Cs: $0.0052 \text{ lbs/day} = [(C_s*(Q_s+Q_{d1})]*CF$
$0.0052 \text{ lbs/day} = [(C_s*(0.33+0.0295))]*5.4$
$0.0052 \text{ lbs/day} = [C_s* 0.3595]*5.4$
$0.00096 = 0.3595* C_s$
$C_s = 0.0027$ mg/L

$FAC = [(C_c*(Q_s+Q_{d2}))-(C_s*(Q_s+Q_{d1}))\}*CF$
$=(0.020*(0.33+0.0516)-(0.0027*(0.33+0.0295))*5.4$
$= (0.00763-0.00097)* 5.4$
$= 0.036$ lbs/day

New discharge load $= Q_{d2}*C_{d2}*CF$
$= 0.0516*0.0036*5.4$
$= 0.00103$ lbs /day

Net increase = (New discharge load- Current discharge load)
$= 0.00103- 0.000573$
$= 0.00043$ lbs/day

Percent of FAC= (Net increase/FAC)*100
$= (0.00043/0.036)*100\%$
$= 1.19\%$

Cadmium Minimally Degrading Calculations

Q_s: 0.33 cfs
Q_{d1}: 0.0295 cfs
Q_{d2}: 0.0516 cfs
C_{d1}: 0.00020 mg/L
C_{d2}: 0.00020 mg/L
C_c: 0.0003 mg/L
EWQ: 0.00004 mg/L
CF: 5.4

C_s: Stream Load = EWQ*Q_s*CF
= 0.00004*0.33*5.4
= 0.000071 lbs/day

Current discharge Load = C_{d1}*Q_{d1}*CF
= 0.0002*0.0295*5.4
= 0.000032 lbs/day

Total Load = Stream Load + Current discharge load
= 0.000071+0.000032
= 0.000103 lbs/day

Solve for Cs: 0.000103 lbs/day = [(C_s*(Q_s+Q_{d1})]*CF
0.000103 lbs/day = [(C_s*(0.33+0.0295))]*5.4
0.000103 lbs/day = [C_s* 0.3595]*5.4
0.0000191 = 0.3595* C_s
C_s = 0.000053 mg/L

FAC = [(C_c*(Q_s+Q_{d2}))-(C_s*(Q_s+Q_{d1}))}*CF
=(0.0003*(0.33+0.0516)-(0.000053*(0.33+0.0295))*5.4
= (0.001145-0.0000191)* 5.4
= 0.00052 lbs/day

New discharge load = Q_{d2}*C_{d2}*CF
= 0.0516*0.0036*5.4
= 0.000056 lbs /day

Net increase = (New discharge load- Current discharge load)
= 0.000056- 0.000032
= 0.000024 lbs/day

Percent of FAC= (Net increase/FAC)*100%
= (0.000024/0.00052)*100%
= 4.56%

Fluoride Minimally Degrading Calculations

Q_s: 0.33 cfs
Q_{d1}: 0.0295 cfs
Q_{d2}: 0.0516 cfs
C_{d1}: 0.42 mg/L
C_{d2}: 0.42 mg/L
C_c: 4.0 mg/L
EWQ: 0.23 mg/L
CF: 5.4

C_s: Stream Load $= EWQ*Q_s*CF$
$= 0.23*0.33*5.4$
$= 0.410$ lbs/day

Current discharge Load $= C_{d1}*Q_{d1}*CF$
$= 0.42*0.0295*5.4$
$= 0.067$ lbs/day

Total Load = Stream Load + Current discharge load
$= 0.410+0.067$
$= 0.477$ lbs/day

Solve for Cs: $0.477 \text{ lbs/day} = [(C_s*(Q_s+Q_{d1})]*CF$
$0.477 \text{ lbs/day} = [(C_s*(0.33+0.0295))]*5.4$
$0.477 \text{ lbs/day} = [C_s* 0.3595]*5.4$
$0.088 = 0.3595* C_s$
$C_s = 0.246$ mg/L

$FAC = [(C_c*(Q_s+Q_{d2}))-(C_s*(Q_s+Q_{d1}))\}*CF$
$=(4.0*(0.33+0.0516)-(0.246*(0.33+0.0295))*5.4$
$= (1.526-0.088)* 5.4$
$= 7.77$ lbs/day

New discharge load $= Q_{d2}*C_{d2}*CF$
$= 0.0516*0.42*5.4$
$= 0.117$ lbs /day

Net increase = (New discharge load- Current discharge load)
$= 0.117- 0.067$
$= 0.050$ lbs/day

Percent of FAC= (Net increase/FAC)*100
$= (0.05/7.77)*100\%$
$= 0.64\%$

Sulfate Minimally Degrading Calculations

Q_s: 0.33 cfs
Q_{d1}: 0.0295 cfs
Q_{d2}: 0.0516 cfs
C_{d1}: 537.7 mg/L
C_{d2}: 537.7 mg/L
C_c: 1000 mg/L
EWQ: 74.3 mg/L
CF: 5.4

C_s: Stream Load $= EWQ*Q_s*CF$
$= 74.3*0.33*5.4$
$= 132.4$ lbs/day

Current discharge Load $= C_{d1}*Q_{d1}*CF$
$= 537.7*0.0295*5.4$
$= 85.66$ lbs/day

Total Load = Stream Load + Current discharge load
$= 132.4+85.66$
$= 218.06$ lbs/day

Solve for Cs: 218.06 lbs/day $= [(C_s*(Q_s+Q_{d1})]*CF$
218.06 lbs/day $= [(C_s*(0.33+0.0295))]*5.4$
218.06 lbs/day $= [C_s*\ 0.3595]*5.4$
$40.38 = 0.3595*\ C_s$
$C_s = 112.33$ mg/L

FAC $= [(C_c*(Q_s+Q_{d2}))-(C_s*(Q_s+Q_{d1}))\}*CF$
$=(1000*(0.33+0.0516)-(112.33*(0.33+0.0295))*5.4$
$= (381.6-40.38)*\ 5.4$
$= 1842.6$ lbs/day

New discharge load $= Q_{d2}*C_{d2}*CF$
$= 0.0516*537.7*5.4$
$= 149.82$ lbs /day

Net increase = (New discharge load- Current discharge load)
$= 149.82- 85.66$
$= 64.1$ lbs/day

Percent of FAC= (Net increase/FAC)*100
$= (64.1/1842.6)*100\%$
$= 3.48\%$

Appendix E: Antidegradation Review Summary Attachments

The attachments that follow contain summary information provided by the applicant, MDNR staff determined that changes must be made to the information contained within these attachments. The following were modified and can be found within the MDNR WQAR:

1) Tier Determination and Effluent Limit Summary Sheet: No changes
2) Attachment B: Change in Minimal Degradation Calculations

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH

JUL 13 2011
WATER PROTECTION PROGRAM

WATER QUALITY REVIEW ASSISTANCE/ANTIDEGRADATION REVIEW REQUEST
PRE-CONSTRUCTION REVIEW FOR PROTECTION OF BENEFICIAL USES AND DEVELOPING EFFLUENT LIMITS

TYPE OF PROJECT
☐ Grant ☐ SRF Loan ☑ All Other Projects

REQUESTER	TELEPHONE NUMBER WITH AREA CODE
KCPL Robert Beck SR Environmental Consultant	(816) 654-1767
PERMITTEE	**TELEPHONE NUMBER WITH AREA CODE**
Kansas City Power & Light Company	(816) 654-1767

REASON FOR REQUEST

☐ New Discharge (See Instruction #9) ☐ Upgrade (No expansion) (See AIP) ☑ Expansion

DESCRIPTION OF PROPOSED ACTIVITY:

Expanding discharge of utility waste contact water from 0.0191 MGD to 0.0333 MGD.

FACILITY INFORMATION

FACILITY NAME	MSOP NUMBER (IF APPLICABLE)
Montrose Generating Station	MO-0101117
COUNTY	**SIC / NAICS CODE**
Henry	4911

METHOD OF BACTERIA COMPLIANCE
☐ Chlorine Disinfection ☐ Ultraviolet Disinfection ☐ Ozone ☑ Not Applicable

WATER QUALITY ISSUES

None

Water quality issues include: effluent limit compliance issues, notice (s) of violation, water body beneficial uses not attained or supported, etc.

OUTFALL	LOCATION (LAT/LONG OR LEGAL DESCRIPTION)	MAPPED[1] (CHECK)	RECEIVING WATER BODY[2]
008	Latitude:+3818346/Longitude:-09356476	☑	Montrose Lake
		☐	
		☐	

[1] Attach topographic map (See www.dnr.mo.gov/internetmapviewer/) with outfall location(s) clearly marked. For additional outfalls, attach a separate form.
[2] See general instructions for discharges to streams.

OUTFALL	NEW DESIGN FLOW ** (MGD)	TREATMENT TYPE	EFFLUENT TYPES*
008	0.0333	Settling Pond	Utility landfill waste contact water

* Describe predominating character of effluent. Example: domestic wastewater, municipal wastewater, industrial wastewater, storm water, mining leachate, etc.
** If expansion, indicate new design flow.

☑ Checked for rare or endangered species and provided determination with this request. See Instruction #8.

ANTIDEGRADATION REVIEW SUBMISSION:

See attached Antidegradation instructions. Applicant supplied a summary within:
☑ Tier Determination and Effluent Limit Summary
☐ Attachment A – Significant Degradation
☑ Attachment B – Minimal Degradation
☐ Attachment C – Temporary degradation
☐ Attachment D – Tier 1 Review
☐ No Degradation Evaluation – Conclusion of Antidegradation Review

See general instructions. Additional information may be needed to complete your request. Your request may be returned if items are missing. Revised submittal will be considered a new submittal.

SIGNATURE	DATE
Robert O Beck	7-7-11

PRINT NAME
Robert Beck

E-MAIL ADDRESS
bob.beck@kcpl.com

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

ANTIDEGRADATION REVIEW SUMMARY
TIER DETERMINATION AND EFFLUENT LIMIT SUMMARY

1. FACILITY

NAME		TELEPHONE NUMBER WITH AREA CODE
Montrose Generating Station		660-885-2284

ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE
400 SW Highway P	Clinton	MO	64735

2. RECEIVING WATER BODY SEGMENT #1

NAME
Montrose Lake

2.1 UPPER END OF SEGMENT (Location of discharge)
UTM _____ OR Lat +3818346 Long -09356476
2.2 LOWER END OF SEGMENT
UTM _____ OR Lat _____, Long _____

Per the Missouri Antidegradation Rule and Implementation Procedure, or AIP, the definition of a segment, "a segment is a section of water that is bound, at a minimum, by significant existing sources and confluences with other significant water bodies."

3. WATER BODY SEGMENT #2 (IF APPLICABLE)

NAME
NA

3.1 UPPER END OF SEGMENT
UTM _____ OR Lat _____, Long _____
3.2 LOWER END OF SEGMENT
UTM _____ OR Lat _____, Long _____

4. WATER BODY SEGMENT #3 (IF APPLICABLE)

NAME
NA

4.1 UPPER END OF SEGMENT
UTM _____ OR Lat _____, Long _____
4.2 LOWER END OF SEGMENT
UTM _____ OR Lat _____, Long _____

5. PROJECT INFORMATION

Is the receiving water body an Outstanding National Resource Water, an Outstanding State Resource Water, or drainage thereto?

☐ Yes ☑ No

In Tables D and E of 10 CSR 20-7.031, Outstanding National Resource Waters and Outstanding State Resource Water are listed. Per the Antidegradation Implementation Procedure Section 1.B.3., "any degradation of water quality is prohibited in these waters unless the discharge only results in temporary degradation." Therefore, if degradation is significant or minimal, the Antidegradation Review will be denied.

Will the proposed discharge of all pollutants of concern, or POCs, result in no net increase in the ambient water quality concentration of the receiving water after mixing?

☑ Yes ☐ No

If yes, submit a summary table showing the levels of each pollutant of concern before and after the proposed discharge in the receiving water and then complete Attachment B for the first downstream classified water body segment.

Will the discharge result in temporary degradation?

☐ Yes ☑ No

If yes, complete Attachment C.

Has the project been determined as non-degrading?

☐ Yes ☑ No

If yes, complete No Degradation Evaluation – Conclusion of Antidegradation Review form.
Submit with the appropriate Construction Permit Application as no antidegradation review is required.

If yes to one of the above questions, skip to Section 8 - Wet Weather.

6. EXISTING WATER QUALITY DATA OR MODEL SUMMARY

Obtaining Existing Water Quality is possible by three methods according to the Antidegradation Implementation Procedure Section II.A.1.: (1) using previously collected data with an appropriate Quality Assurance Project Plan, or QAPP (2) collecting water quality data by approved the Missouri Department of Natural Resources methodology or (3) using an appropriate water quality model. QAPPs must be submitted to the department for approval well in advance (six months) of the proposed activity. Provide all the appropriate corresponding data and reports which were approved by the department Water Quality Monitoring and Assessment Section.

Date existing water quality data was provided by the Water Quality Monitoring and Assessment Section:

Approval date of the QAPP by the Water Quality Monitoring and Assessment Section:

Approval date of the project sampling plan by the Water Quality Monitoring and Assessment Section:

Approval date of the data collected for all appropriate pollutants of concern by the Water Quality Monitoring and Assessment Section:

Comments/Discussion:

7. POLLUTANTS OF CONCERN AND TIER DETERMINATION(S)

Pollutants of Concern to be considered include those pollutants reasonably expected to be present in the discharge per the Antidegradation Implementation Procedure Section II.S. The tier protection levels are specified and defined in rule at 10 CSR 20-7.031 (2).

Water Body Segment One
Pollutants of Concern and Tier Determination(s)

Tier 1	Tier 2 with Minimal Degradation	Tier 2 with Significant Degradation
	Arsenic	
	Cadmium	
	Fluoride	
	Sulfate and Chloride	

Note: Add an asterisk to items that you only assume are Tier 2 with significant degradation.

Water Body Segment Two
Pollutants of Concern and Tier Determination(s)

Tier 1	Tier 2 with Minimal Degradation	Tier 2 with Significant Degradation

- For pollutants of concern that are Tier 2 with significant degradation, complete Attachment A.
- For pollutants of concern that are Tier 2 with minimal degradation, complete Attachment B.
- For pollutants of concern that are Tier 1, complete Attachment D. Additionally, a Tier 2 review must be conducted for each pollutant of concern on the appropriate water body segment.

8. WET WEATHER ANTICIPATIONS

If an applicant anticipates excessive inflow or infiltration and pursues approval from the department to bypass secondary treatment, a feasibility analysis is required. The feasibility analysis must comply with the criteria of all applicable state and federal regulations including 40 CFR 122.41(m)(4). Attach the feasibility analysis to this report.

What is the Wet Weather Flow Peaking Factor in relation to design flow?

Wet Weather Design Summary:

9. SUMMARY OF THE PROPOSED ANTIDEGRADATION REVIEW EFFLUENT LIMITS

What are the proposed pollutants of concern and their respective effluent limits that the selected treatment option will comply with:

Pollutant of Concern	Units	Wasteload Allocation	Average Monthly Limit	Daily Maximum Limit
BOD5				
TSS				
Dissolved Oxygen				
Ammonia				
Bacteria (E. Coli)				

These proposed limits must not violate water quality standards, be protective of beneficial uses and achieve the highest statutory and regulatory requirements.

Attach the Antidegradation Review report and all supporting documentation.

CONSULTANT: I have prepared or reviewed this form and all attached reports and documentation. The conclusion proposed is consistent with the Antidegradation Implementation Procedure and current state and federal regulation.

SIGNATURE: Robert C Beck — DATE: 7-7-11

NAME AND OFFICIAL TITLES: Robert Beck — Sr. Environmental Consultant

COMPANY NAME: Kansas City Power and Light Company

ADDRESS	CITY	STATE	ZIP CODE
P.O. Box 418679	Kansas City	MO	64141-9679

TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
816-654-1767	bob.beck@kcpl.com

OWNER: I have read and reviewed the prepared documents and agree with this submittal.

SIGNATURE: Greg Lee — DATE: 7/7/11

NAME AND OFFICIAL TITLES: Greg Lee — Plant Manager

ADDRESS	CITY	STATE	ZIP CODE
400 SW Highway P	Clinton	MO	64735

TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
660-885-2284	greg.lee@kcpl.com

CONTINUING AUTHORITY: Continuing Authority is the permanent organization that will be responsible for the operation, maintenance and modernization of the facility. The regulatory requirement regarding continuing authority is found in 10 CSR 20-6.010(3) available at www.sos.mo.gov/adrules/csr/current/10csr/10c20-6a.pdf.

I have read and reviewed the prepared documents and agree with this submittal.

SIGNATURE: Greg Lee — DATE: 7/7/11

NAME AND OFFICIAL TITLES: Greg Lee — Plant Manager

ADDRESS	CITY	STATE	ZIP CODE
400 SW Highway P	Clinton	MO	64735

TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
660-885-2284	greg.lee@kcpl.com

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH

ANTIDEGRADATION REVIEW SUMMARY
ATTACHMENT B: TIER 2 – MINIMAL DEGRADATION

1. FACILITY

NAME		TELEPHONE WITH AREA CODE	
Montrose Generating Station		660-885-2284	
ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE
400 SW Highway P	Clinton	MO	64735

2. RECEIVING WATER BODY SEGMENT #1

NAME
Montrose Lake

3. WATER BODY SEGMENT #2 (IF APPLICABLE)

NAME

4. ASSIMILATIVE CAPACITY TABLE

Determining the facility assimilative capacity, or FAC, and the segment assimilative capacity, or SAC for each pollutant of concern is explained in detail in the Antidegradation Implementation Procedure Section II.A.3. and Appendix 3. POCs to be considered include those pollutants reasonably expected to be present in the discharge per the Antidegradation Implementation Procedure Section II.A. Provide all calculations in the Antidegradation Review report.

Pollutant of Concern	Facility Assimilative Capacity (lbs/day)	New Load (lbs/day)	Percent of Facility Assimilative Capacity (%)
Arsenic	0.128	.00043	0.33
Cadmium	0.0019	0.00002	1.27
Fluoride	27.55	0.05	0.18
Sulfate and Chloride	6,702	64	0.96

Pollutant of Concern	Water Body Segment #1 SAC	Cumulative Net Increase in Load	Cumulative % of Water Body Segment #1 SAC	Water Body Segment #2 SAC	Cumulative Net Increase in Load	Cumulative % of Water Body Segment #2 SAC

Assimilative Capacity Summary

Is degradation considered minimal for all Pollutants of Concern? ☑ Yes ☐ No

Degradation is considered minimal if the new or proposed loading is less than 10 percent of the FAC and the cumulative degradation is less than 20 percent of the SAC according to the Antidegradation Implementation Procedure Section II.A.3. If yes, an alternatives analysis and a social and economic importance analysis are not required.

Comments/Discussion

MINIMAL DEGRADATION CALCULATIONS

Calculations are included in the attachment to the Antidegredation Review report.

5. OIL AND GREASE

Is this a publicly owned treatment works, or POTW, restaurant, school or other domestic wastewater treatment facility with oil and grease as a Pollutant of Concern? ☐ Yes ■ No

In accordance with 10 CSR 20-7.031(3)(B), waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses. In accordance with 10 CSR 20-7.031 Table A, oil and grease has a chronic toxicity of 10 mg/L for protection of aquatic life. This facility will meet the effluent limits (MDL and AML of 15 mg/L and 10 mg/L, respectively).

6. DECHLORINATION

If Chlorination and Dechlorination is the existing or proposed method of disinfection treatment, will the effluent discharged be equal to or less than the Water Quality Standards for Total Residual Chlorine stated in Table A of 10 CSR 20-7.031?

☐ Yes ☐ No

Based on the disinfection treatment system being designed for total removal of Total Residual Chlorine, minimal degradation for Total Residual Chlorine is assumed and the facility will be required to meet the water quality based effluent limits. These compliance limits for Total Residual Chlorine are much less than the method detection limit of 0.13 mg/L.

7. PROPOSED PROJECT SUMMARY

Attach the Antidegradation Review report and all supporting documentation.

CONSULTANT: I have prepared or reviewed this from and all attached reports and documentation. The conclusion proposed in consistent with the AIP and current state and federal regulations.

SIGNATURE	DATE
Robert C Beck	7-7-11

PRINT NAME
Robert Beck

TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
816-654-1767	bob.beck@kcpl.com

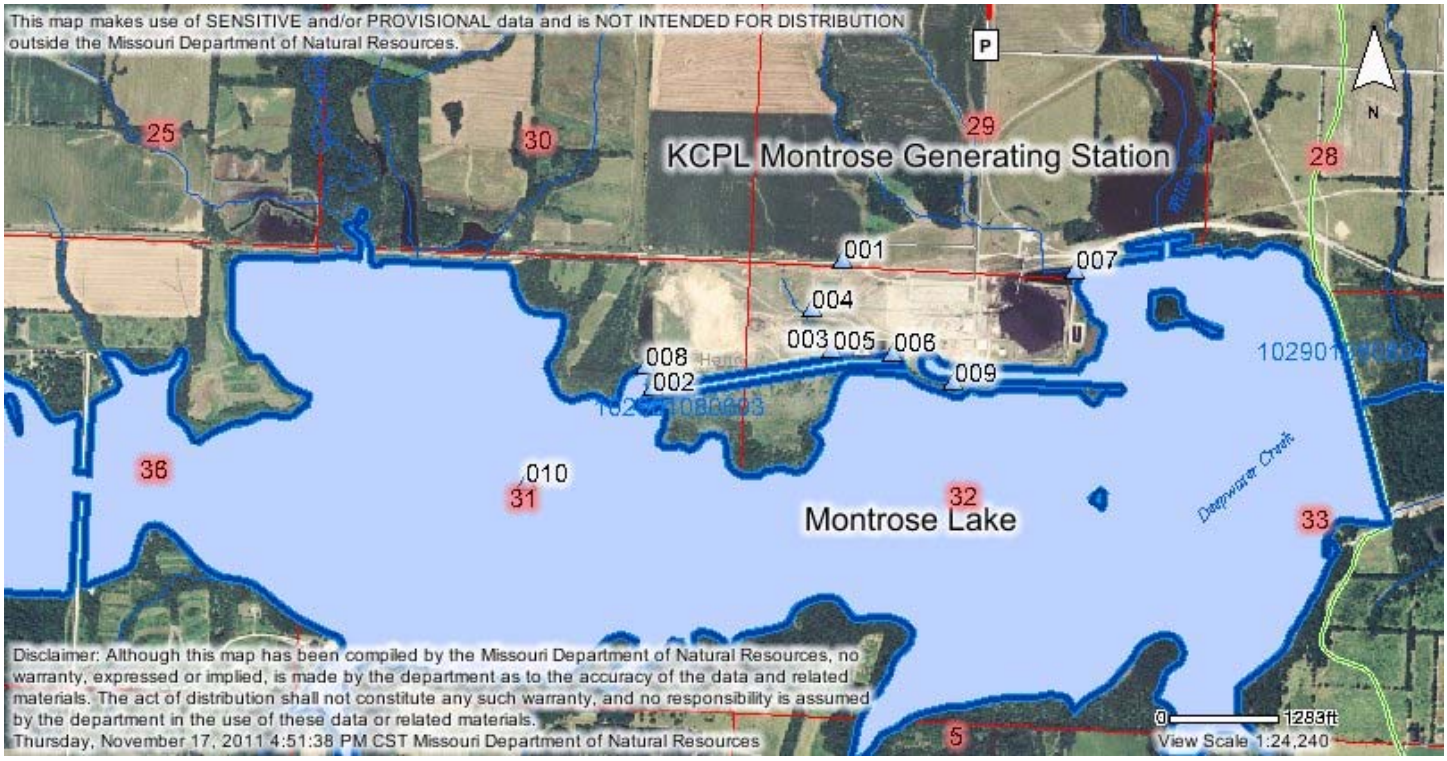
OWNER: I have read and reviewed the prepared documents and agree with this submittal.

SIGNATURE	DATE
Greg Lee	7/7/11

CONTINUING AUTHORITY: I have read and reviewed the prepared documents and agree with this submittal.

SIGNATURE	DATE
Greg Lee	7/7/11

APPENDIX D –OUTFALL MAP



APPENDIX E –TBEL DETERMINATION
TBEL DETERMINATION

The EPA in 2009 published the "Steam Electrical Power Generating Point Source Category: Final Detailed Study Report (2009 Final Report). The 2009 Final Report summarizes data collected and analyzed from the EPA to review discharges from steam electrical power generating industry and to determine whether the current effluent guidelines for this industry and to determine whether current Effluent Limit Guidelines (ELGs) for this industry should be revised. From the 2009 Final Report, it determined a need existed to update the current effluent regulations specific to Steam Electrical Power Generating Point Sources [40 CFR Part 423]. The 2009 Final Report also concluded that the last updated version of this 1982 regulation does not adequately address the pollutants being discharged and have not kept pace with changes that have occurred in the power industry.

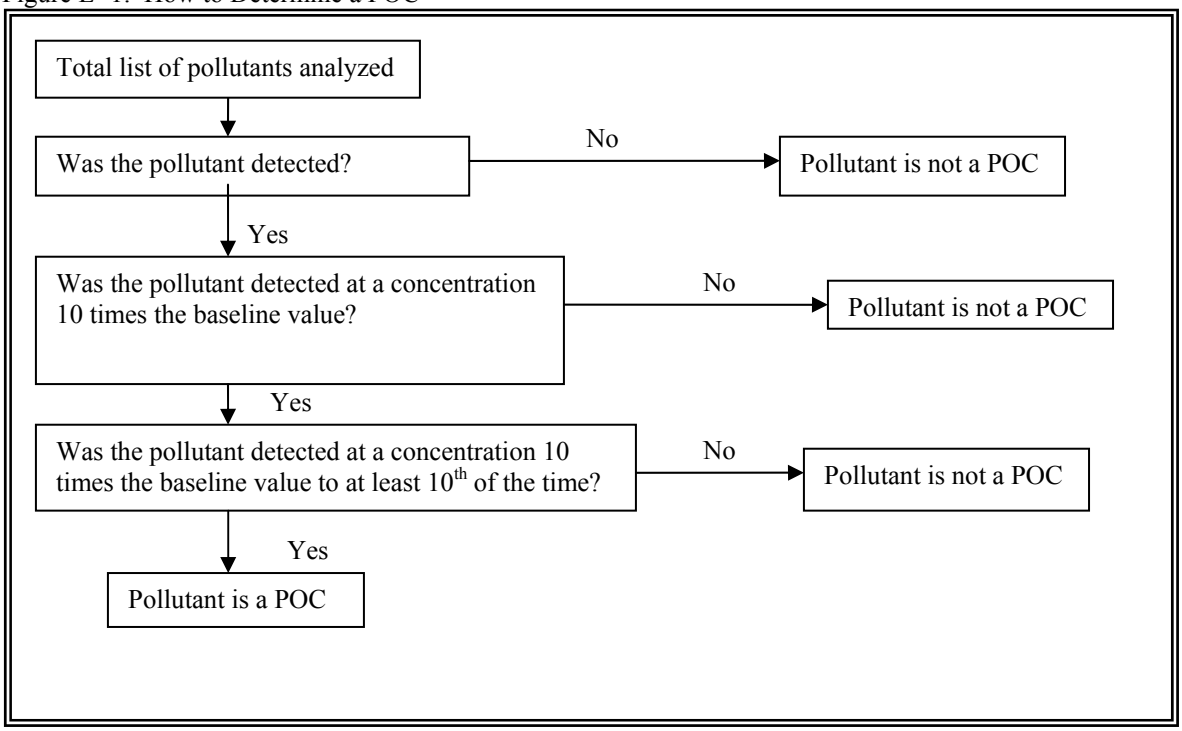
The 2009 Final Report identified pollutants that are commonly associated with the power industry (i.e., Flue Gas Desulfurization [FGD] & Coal Combustion Residuals [CCR]). The 2009 Final Report does not address how to determine a Pollutant of Concern (POC), but (as stated above) determined a need for the EPA to revise the current ELG 40 CFR 423. The EPA expects to complete this rulemaking and promulgate revised effluent guidelines in late 2013.

On June 7, 2010, the EPA's Office of Wastewater Management sent a memorandum with the purpose to provide interim guidance to assist permitting authorities to appropriately establish permit requirements for wastewater discharges from FGD systems and CCR impoundments at steam power plants. The 2010 EPA memo contained two (2) attachments: Appendix A – provided permitting authorities with information on how to establish TBELs for FGD; and Appendix B – was intended to assist permitting authorities to better address water quality impacts associated with discharges from coal ash impoundments. The 2010 EPA memo does not demonstrate how to determine if a pollutant needs to have TBEL limits.

Federal regulation 40 CFR Part 125.3(c) and 40 CFR Part 125.3(d) are the basis for establishing technology-based effluent limits and BPJ TBELs. To better understand these regulations, the EPA's Permit Writers Manual 5.2.3.2 discusses how to identify the need for case-by-case TBELs. In this section of the EPA Permit Writers Manual, it is the fourth bullet point that is specific to power plant industries with regard to the 2009 Final Report and the 2010 EPA memo. It states, "*When effluent guidelines are available for the industry category, but no effluent guidelines requirements are available for the pollutant of concern (e.g., a facility is regulated by the effluent guidelines for Pesticide Chemicals [Part 455] but discharges a pesticide that is not regulated by these effluent guidelines). The permit writer should make sure that the pollutant of concern is not already controlled by the effluent guideline and was not considered by the EPA when the Agency developed the effluent guideline.*"

In order to develop BPJ TBEL, POC should be determined first. The EPA Permit Writers Manual 5.2.1.2 informs staff to review the *Central Wastewater Treatment Category Technical Development Document,* Chapter 6, Figure 6-1 Pollutant of Concern Methodology (CWT Document). From the CWT Document, Figure 1 – How to Determine a POC has been created.

Figure E- 1: How to Determine a POC



Baseline Values for the CWT Document are established in Chapter 15 of the same document. The baseline values for the potential POCs are located below. In accordance to Figure 1 and Chapter 6 of the CWT document, the baseline is multiplied by 10 prior to comparing with analyzed pollutants.

The below table documents the effluent samples from Outfall 008 and the baseline values (x10) from Chapter 15. Table 1 below clearly documents that the pollutants do not meet the initial determination of being POCs. Aluminum, Iron, Fluoride, and Magnesium are present above the baseline concentration, however are below the 10x the baseline which is what characterizes a pollutant as a pollutant of concern. The boron and molybdenum concentrations are above the baseline*10 concentration but has not demonstrated detection at a concentration 10 times the baseline value to at least 10th of the time since only one sample has been taken.

Table 1: TBEL POC Determination for Outfall 008

Parameter	Units	Outfall 008	Baseline	Baseline*10	Background Concentration	Potential
Biochemical Oxygen Demand	mg/L	2.7	2	20	3.4	no
Chemical Oxygen Demand	mg/L	<10	5	50	11.3	no
Total organic Carbon	mg/L	5.8	1	10	7.5	no
Total Suspended Solids	mg/L	8	4	40	47	no
Ammonia	mg/L	<0.1	0.05	0.5	<0.1	no
bromide	mg/L	<1	NB	NB	<1	no
chlorine, total residual	mg/L	0.056	NB	NB	0.53	no
fluoride	mg/L	0.42	0.1	1	0.23	no
nitrate-nitrite	mg/L	<0.1	0.05	0.5	0.48	no
nitrogen, total organic	mg/L	0.91	NB	NB	1.6	no
oil and grease	mg/L	<5	5	50	<5	no
Phosphorus, total	mg/L	<0.1	0.01	0.1	0.19	no
sulfate	mg/L	536	NB	NB	67.3	no
sulfide	mg/L	0.98	1	10	<0.5	no
sulfite	mg/L	<2	NB	NB	<2	no
surfactants	mg/L	<0.2	NB	NB	<0.2	no
aluminum	mg/L	0.262	0.2	2	1.18	no
barium	mg/L	0.0866	0.2	2	0.0863	no
boron***	mg/L	2.63	0.1	1	0.0673	yes
cobalt	mg/L	<0.0005	0.05	0.5	0.00089	no
iron	mg/L	0.165	0.1	1	1.62	no
magnesium	mg/L	16.9	5	50	10.9	no
molybdenum***	mg/L	0.111	0.001	0.01	0.0018	yes
manganese	mg/L	0.0492	0.015	0.15	0.31	no
tin	mg/L	<0.0005	0.03	0.3	<0.0005	no
titanium	mg/L	0.0045	5	50	0.0175	no
antimony	µg/L	1.2	20	200	<0.5	no
arsenic, total	µg/L	3.6	10	100	2.5	no
beryllium	µg/L	<0.2	5	50	<0.2	no
cadmium, total	µg/L	0.2	5	50	<0.08	no
chromium, total	µg/L	<0.5	10	100	1.7	no
copper, total	µg/L	0.72	25	250	67.2	no
lead, total	µg/L	0.97	50	500	5.5	no
mercury, total	µg/L	<0.2	0.2	2	<0.2	no
nickel, total	µg/L	1.8	40	400	4.7	no
selenium, total	µg/L	0.9	5	50	0.62	no
silver, total	µg/L	<0.5	10	100	<0.5	no
thallium, total	µg/L	<0.1	10	100	<0.1	no
zinc, total	µg/L	7.8	20	200	41.7	no
cyanide, total	µg/L	<5	20	200	11	no
phenols, total	µg/L	<50	50	500	<50	no

* Baseline data is from Chapter 6 of the *Central Wastewater Treatment Category Technical Development Document*

** Background concentrations is based on a lake sample collected by KCP&L in June 2011.

*** Outfall 008 concentration is above the baseline*10 concentration but has not demonstrated detection at a concentration 10 times the baseline value to at least 10th of the time since only one sample has been taken. This portion of the guidance suggest that an evaluation of a dataset is necessary to establish a ranking of the concentration over the baseline*10 value. The POC determination should be reevaluated following the collection of additional data.
NB- no baseline
ND- no background concentration data collected

Boron and Molybdenum are the parameters identified above that needs to go through the Technology based effluent process, as required in 40 CFR 125.3,. The technologies evaluated below have the potential to remove additional pollutants. The summary of factors that need to be considered in developing case by case TBELs are listed in Figure 2 from the NPDES Permit Writer's Manual.

Currently the Best Available Technology does not remove boron or molybdenum but merely concentrates the boron into another waste stream. The concentrate stream creates an even formidable disposal problem. Cost associated with this disposal will be prohibitive. This technology limitation is addressed by several factors in the case by case TBEL development.

Figure 2: Summary of factors in case by case TBEL development[1]

For BPT requirements (all pollutants)
- The age of equipment and facilities involved*
- The process(es) employed*
- The engineering aspects of the application of various types of control techniques*
- Process changes*
- Non-water quality environmental impact including energy requirements*
- The total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application

For BCT requirements (conventional pollutants)
- All items in the BPT requirements indicated by an asterisk (*) above
- The reasonableness of the relationship between the costs of attaining a reduction in effluent and the derived effluent reduction benefits
- The 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)
- All items in the BPT requirements indicated by an asterisk (*) above
- The cost of achieving such effluent reduction

Case by Case TBEL Development Requirements

1. Age of Equipment
   Outfall 008 and the landfill were established in the 1989 permit renewal. The expansion request for the landfill went to the Solid Waste program in 2010. Solid Waste granted the construction permit for the expansion of the landfill with liner and leachate collection system. The existing storm water detention pond associated with Outfall #008 will continue to be used to collect contact storm water and now leachate from the expanded landfill leachate collection system. The samples used for the Antidegradation Review and for the permit modification request were collected prior to the installation of the leachate treatment system. The detention pond works by settling out the insoluble pollutants and solids.

2. Process Employed
   The current process employed at the Montrose Generating Station landfill is the leachate treatment system which collects leachate and stormwater from a portion of the landfill and then settles out the solids and insoluble pollutants. The stormwater from the other portion of the landfill discharges through Outfalls #003 and #004.

3. Engineering Aspects of application of various types of control techniques

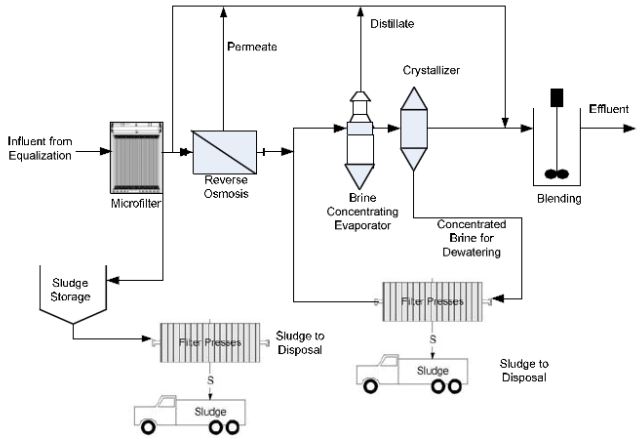
   Transport to the closest treatment plant, would be taking the flows from Montrose Generating Station to the City of Clinton treatment plant. The Clinton WWTF is approximately 15 miles from Montrose. This option is not preferable due to distance, having to pay for disposal, and Clinton possibly not having capacity to handle flows.

   Conventional water treatment (coagulation, sedimentation, and filtration) does not significantly remove boron, and special methods would have to be installed in order to remove boron from waters with high boron concentrations. The treatment technologies available for removal of boron are limited and have not changed from what was documented in a 1976 technology and economic study done by EPA on the removal of Boron from wastewater. Boron is extremely mobile in water and hard to remove. Lime precipitation and filtration was identified as a possible removal method in the 1976 EPA study along with reverse osmosis and ion exchange but was quickly eliminated as a viable treatment method due to less than 25%

effectiveness in laboratory experiments[5]. Treatment options for boron removal evaluated include reverse osmosis and ion exchange technologies.

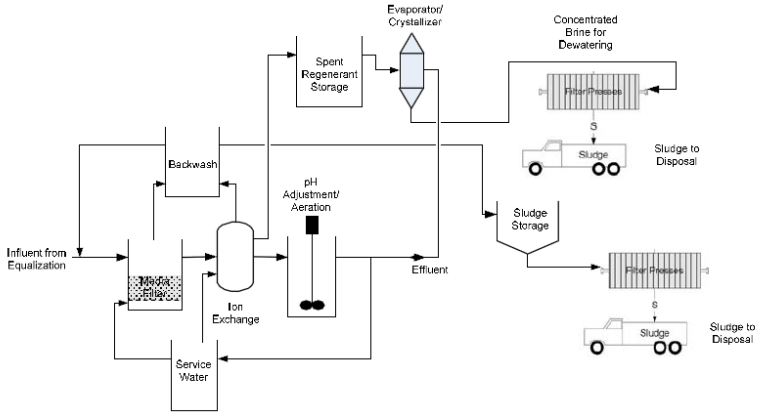
Reverse osmosis is a membrane-technology filtration method that removes large molecules and ions from solutions by applying pressure to the solution when it is on one side of a selective membrane. The result is that the solute is retained on the pressurized side of the membrane and the pure solvent is allowed to pass to the other side (see figure 3[1]). This process will require flow equalization, additional storage, sludge hauling, and addition of chemicals. Reverse osmosis will remove the majority of parameters found in the leachate from the leachate water; however from research on reverse osmosis for boron removal, the process will remove boron down to a range between 1.0 to 2.3 mg/L[3/4]. This is only a slight reduction in boron concentration, the benefits of which are substantially offset by the establishment of a new, more concentrated waste stream that will need to be collected and separately disposed of after the reverse osmosis treatment process.

Figure 3: Reverse Osmosis Plant Diagram[2]



Ion Exchange is a water treatment method where undesirable contaminants are removed from water by exchange with another substance. Both the contaminant and the exchanged substance must be dissolved and have the same type of electrical charge (see figure 4[2]). This process will require flow equalization, additional storage, sludge hauling, and addition of chemicals. The ion exchange system will remove the majority of parameters found in the leachate from the leachate water; however from research on ion exchange systems for boron removal, the process will remove boron down to a range between 1.0 to 2.3 mg/L[3/4]. This is only a slight reduction in boron concentration, the benefits of which are substantially offset by the establishment of a new, more concentrated waste stream that will need to be collected and separately disposed of. According to the World Health Organization, the removal of molybdenum requires an ion exchange system.

Figure 4: Ion Exchange Plant Diagram



Electrocoagulation involves the generation of coagulants in situ by dissolving electrically either aluminum or iron ions from respectively aluminum or iron electrodes. The metal ion generation takes place at the anode; hydrogen gas is released from the cathode. Also, the hydrogen gas would help to float the flocculated particles out of the water. This process sometimes is called electroflocculation. The materials can be aluminum or iron in plate form or packed form of

scraps such as steel turnings, millings, etc. In studies completed, the boron concentration in the influent was investigated with regards to energy consumption. The obtained results shown that increasing boron concentration increased conductivity of solution. Thus, solution with higher boron concentration had more ions at the same volume. The higher conductivity values decreased energy consumption. Thus with low boron concentrations, more energy is required to remove the initial boron concentration. Electrocoagulation has been shown to remove from 80% to over 90% of the initial boron concentrations; however those tests have been run at 12 mg/L to 1000 mg/L.[5/6] The use of an electrocoagulation system at a Vancouver ship yard at 25 gpm (36,000 gpd) batch discharge had an initial boron concentration of 4.9 mg/L had a reduction of 21% to 3.86 mg/L The system also reduced molybdenum from 0.10 mg/L to less than 0.04 mg/L, a reduction of at least 60%.[9] Electrocoagulation requires high power consumption and maintenance, in replacement and cleaning of the electrodes.

Vapor Compression Evaporation is often referred to as a zero liquid discharge system. Vapor Compression Evaporation Systems typically consist of brine concentration in combination with forced circulation crystallizers. Vapor Compression Evaporation has been used to treat cooling tower blowdown at power plants since the 1970s. There are not plants in the country using vapor compression evaporation to treat utility waste landfill leachate and stormwater. Only one plant in the country is using vapor compression evaporation, Kansas City Power and Light- Iatan Unit 2 to treat flue gas desulfurization wastewater. That operation has only been in effect since 2010.[7/8] Treatment using a vapor compression evaporate system is usually accomplished in three strems preconcentration of wastewater into a brine slurry using a brine concentratory, evaporation of the remaining water in the brine slurry using a forced-circulation crystallizer or spray dryer and dewatering of the resulting sludge using a filter press or centrifuge. The dewatered salt cake requires disposal at a classified landfill . Vapor compression evaporation systems require high energy demands with the brine concentrators and crystallizers. Using a vapor compression evaporator system has a high potentiol for scaling and corrosion, thus requiring a pretreatment upstream of brine concentrator to soften the wastewater. Softening the wastewater is usually accomplished by a reverse osmosis plant. Boron can interfer with the operation of the evaporation process by hindering the crystallization process, resulting in soldis that interefere with the crystallizers, thus requiring special provisions are required. [7/8]

While chemical precipitation is not effective means of removing boron, it may work in removing molybdenum from wastewater. This can occur with the addition of ferric sulfate and lime for pH manipulation to get the molybdenum to flocculate out and settle.[12] The water can then be treated or discharged, while the cake formed from molybdenum will need dewatered and disposed of in a landfill. In studies by the World Health Organization, molybdenum is not removed by normal treatment processes, and requires treatment such as ion exchange. [13]

4. Process changes

A potential process change that Montrose could employ is reuse of the water from the landfill. This was attempted at Kansas City Power and Light's (KCPL) Iatan plant; however it did not work. KCPL Iatan attempted for over three years to reuse water from the landfill, however the variability in the amount received and the composition of the water created operational difficulties in the plant processes[9]. KCPL could explore use of the water for dust suppression, however that would not account for the entire flow and would require holding the water until it was needed.

Montrose Lake was created and operates as a cooling water lake; the potential exists that the water discharged from the landfill will be returned to the process, especially since the landfill is upstream of the intake screens.

5. Non-water quality environmental impacts including energy requirements

The non-water quality environmental impacts for installation of a treatment technology for boron or molybdenum removal are great in terms of energy required and creation of additional wastestreams.

- The reverse osmosis system requires flow equalization, brine addition, blending, crystallization, sludge dewatering, and sludge removal, which will increase electricity, gasoline consumption (for trucking concentrated boron solute annual operation and maintenance.
- The requirements for the ion exchange system are very similar to the reverse osmosis plant. Neither the reverse osmosis system nor the ion exchange system will significantly reduce the boron concentration currently present in the water; however both will create a new concentrated waste stream.
- Electrocoagulation requires high energy consumption along with higher operation and maintenance in the cleaning and replacement of the electrodes. Additional polymers may be required to get the floc to precipitate out.
- Vapor Compression Evaporation system is high power users, requiring 70 to 100 kW-hr per 1000 gallons. Besides the high power requirements, the vapor compression system requires disposal of a salt cake in a landfill and often requires the addition of a pretreatment reverse osmosis system to prevent scaling and corrosion of the evaporators and crystallizers. [7]
- Chemical Precipitation requires large amounts of chemicals, such as lime and ferric sulfate for removal of

6. Total cost of application of technology in relation to reduction in effluent
   - The total cost of constructing a reverse osmosis system or an ion exchange system may result in the potential removal of 0.3 to 1.3 mg/L of boron from the leachate system. The cost estimate for a reverse osmosis system for the 33,300 gpd is $4.5 million (2010 dollars[2]). Besides the initial capital cost, the annual cost estimate to operate and maintain the reverse osmosis system is $450,000 (2010 dollars[2]).

   - The cost to construct and install an ion exchange system is $3.85 million (2010 dollars[2]). Besides the initial capital cost, the annual operating and maintenance cost estimate for an ion exchange plant is $450,000 (2010 dollars[2]).

   - Electrocoagulation has high operating costs due to its high energy requirements along with the replacement of electrodes. In the research completed by the department, a capital cost and or annual operating costs were not available. Electrocoagulation appears to work better in higher concentrations than in the lower concentrations present in this discharge.

   - The capital costs associated with the installation and operation of vapor compression evaporator equipment includes brine concentrators, evaporators, and crystallizers are constructed from expensive metals and metal alloys, such as titanium. The evaporators and crystallizers are high power users, requiring 70 to 100 kW-hr per 1000 gallons. [7]

   - The cost for chemical precipitation for molybdenum removal was not found in the literature review conducted by the department.

7. Reasonableness of the cost of the application of technology and the removal of effluent

   The installation of a reverse osmosis plant, ion exchange system, vapor compression evaporator, or electrocoagulation has the potential to reduce the boron concentration down to 1.0 mg/L, along with a reduction in the molybdenum present. To achieve the reduction in concentrations, the plant would be required to spend between $3.85 to $4.5 million to construct the system, plus an annual operating and maintenance cost of $450,000.

   The discharge from Outfall #008 is highly variable as the influent to the detention pond is storm water and leachate; therefore the amount of water that requires treatment is dependent on level of precipitation during a year and the amount of leachate collected from the expanded landfill. Boron and molybdenum do not have a water quality standards at Montrose Lake and as the other metals and parameters in the TBEL POC determination (Figure 1) are not identified as needing a TBEL developed, or requiring a water quality based effluent limit, requiring Kansas City Power and Light to install a reverse osmosis, ion exchange system, vapor compression evaporator or electrocoagulation for the leachate from the landfill is neither reasonable or economically efficient.

8. Comparison of cost and level of reduction

   Boron is currently present in the leachate at a concentration of 2.63 mg/L. The installation of a reverse osmosis plant or an ion exchange system has the potential to remove the boron concentration down to 1.0 to 2.3 mg/L. To achieve the reduction in boron concentrations, the plant would be required to spend between $3.85 to $4.5 million to construct the system, plus an annual operating and maintenance cost of $450,000. The installation of the treatment technologies does not appear to be a cost effective or practical option for the removal of 0.3 to 1.3 mg/L of boron.

9. Cost of achieving effluent reduction

   To utilize a reverse osmosis or an ion exchange system, the plant would be required to spend between $3.85 to $4.5 million to construct the system, plus an annual operating and maintenance cost of $450,000. The vapor compression evaporator would cost even more as it could potentially require a reverse osmosis plant prior to the concentrators. The technologies capable of removing boron from the landfill leachate stream require a significant up-front investment and ongoing operating costs. Electrocoagulation may be more cost effective removal option; however it requires high operating and maintenance costs, along with a byproduct that will need disposed of.

After applying factors 1, 2, 3, 4, 5, and 9 listed above, and considering the technologies and unique circumstances discussed above, the Department has determined, based its best professional judgment, that establishing a monitoring-only requirement (Section 5.2.3.3 NPDES Permit Writers Manual) for boron and molybdenum in the MSOP is the most appropriate mechanism to carry out the provisions of the Clean Water Act at this time. Reevaluation of the TBEL and POC determination will be completed at permit renewal in 2014 when additional sampling results will be provided, allowing a more comprehensive evaluation of a larger dataset.

The Department of Natural Resources' Water Protection Program has determined that the analysis contained in this Appendix E, regarding pollutants of concern is immediately necessary to protect human health, public welfare, or the environment. In regards to boron and molybdenum, monthly monitoring is required and will be reevaluated at permit renewal in 2014.

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