

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-0101729

Owner: Kyowa Hakko Bio
Address: P.O. Box 1550, Cape Girardeau, MO 63702

Continuing Authority: Kyowa Hakko Bio
Address: P.O. Box 1550, Cape Girardeau, MO 63702

Facility Name: Biokyowa, Inc
Facility Address: 5469 Nash Road, Cape Girardeau, MO 63702

Legal Description: See Page 2
UTM Coordinates: See Page 2

Receiving Stream: See Page 2
First Classified Stream and ID: See Page 2
USGS Basin & Sub-watershed No.: See Page 2

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 Page 2-4

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 640.013, 621.250, and 644.051.6 of the Law.

March 20, 2012 May 20, 2013
Effective Date Revised Date

Sara Parker Pauley
Sara Parker Pauley, Director, Department of Natural Resources

March 19, 2017
Expiration Date

John Madras
John Madras, Director, Water Protection Program

FACILITY DESCRIPTION

Industrial Manufacturer of Amino Acids, SIC # 2048

The wastewater treatment facility utilizes a million gallon load and pH equalization basin, two activated sludge aeration basins, secondary clarifiers, high rate outfall diffuser (Outfall 001) and dissolved air floatation for solids handling.

Outfall #001 – Industrial Manufacturer of Amino Acids, SIC # 2048

Discharge of treated process wastewater to diffuser in Mississippi River. Sampling location is at the Wastewater Treatment Plant prior to entry into the pipeline leading to the Mississippi River. Wastewater Treatment facilities consist of a flow equalization basin where pH adjustment takes place, two complete activated sludge processes operated in parallel (aeration basins and final clarifiers), and membrane filtration. Sludge is thickened with dissolved air flotation process.

Design sludge production is 2,467 dry tons per year. See Outfall #003 for sludge disposal.

Design flow is 2.0 MGD

Actual flow is 1.37 MGD

Legal description: NW ¼, SE ¼, Sec. 20, T30N, R14E, Cape Girardeau County

UTM Coordinates: X= 809275, Y= 4128646

Receiving Stream: Mississippi River (P)

First Classified Stream and ID: Mississippi River (P)(3701) 303(d) listed stream

USGS Basin & Sub-watershed No.: 07140105-0503

Outfall #002 – Industrial Manufacturer of Amino Acids, SIC # 2048

Discharge of non-contact cooling water, barometric condenser water, and stormwater which are collected in a stormwater basin. The expansion of Outfall #002 will include the addition of non-process wastewater from the reverse osmosis (RO) system and the iron filtration system. The wastewater will be composed of well water treatment backwash water from four iron filtration vessels (cation exchange resin system) and reject water from two RO membrane units. Biokyowa uses three primary wells to provide blended well water to the well water treatment system (RO system and iron filtration system). Outfall sampling location is at the discharge point into the diversion channel

Design flow is 9.135 MGD

Actual flow is 4.4 MGD

Legal description: Land Grant 3282, Cape Girardeau County

UTM Coordinates: X= 801391, Y= 4127528

Receiving Stream: Headwaters Diversion Channel (P)

First Classified Stream and ID: Headwater Diversion Channel (P)(2196)

USGS Basin & Sub-watershed No.: 07140107-0604

Outfall #003 – Industrial Manufacturer of Amino Acids, SIC # 2048

Land Application System

Legal description: NW ¼, SE ¼, Sec. 20, T30N, R14E, Cape Girardeau County

UTM Coordinates: X= 809275, Y= 4128646

Receiving Stream: Mississippi River (P)

First Classified Stream and ID: Mississippi River (P)(3701) 303(d) listed stream

USGS Basin & Sub-watershed No.: 07140105-0503

Land Application Design

Facility type: No-discharge Storage and Land Application System for year-round residuals production. Residuals removed during wastewater treatment under Outfall #001 are stored and then land applied to farmland. Residuals are land applied at nutrient fertilization rates onto agricultural sites. Application rate is based on land application of residuals using a nutrient loading rate (Nitrogen and Phosphorus) and pollutant loading rate. The receiving stream watersheds for the application sites are gaining streams.

Four (4) residual storage tanks located at the wastewater treatment plant have storage capacity of 995,617 gallons for 62-98 days storage of residuals production.

Design residual production after dewatering is 16,070 gallons/day and 5,785,550 gallons per year at 10% solids (2,467 dry tons/year). A five-year average of actual residual production after dewatering is 10,120 gallons/day and 6,644,640 gallons per year at 7.2% solids (861 dry tons/year)

Design Application rates/acre/year are approximately 1-2 dry tons/acre or 2,344 – 6,665 gallons/acre. Actual rates are based on a nutrient management plan using current residuals laboratory testing results and realistic yield goals of intended crops grown for each field.

FACILITY DESCRIPTION continued

Land application site(s) total 8,328.7 acres located in Cape Girardeau, Scott, New Madrid and Mississippi Counties as listed in the permit application. The permittee owns 1,108.4 acres and another 7,220.3 acres are under spreading agreements with Stallings Brothers on farm land owned by Stallings Brothers Farms, Shelton Farms, Hall Farms and Vince Draper Farms.

Application site(s) have field slopes of less than 8.0 percent.

Vegetation grown on the application sites in the year of residual application are hay and row crops. Residual application can be made to field sites one year before vegetables whether surface or rooted crops are to be grown for consumption. Application equipment consists of a 3,500 gallon tank truck with subsurface injectors and three 6,000 gallon trailer nurse tanks.

SM1 – Eliminated

SM2 – In-stream Monitoring

Upstream of the discharge point of Outfall #002 into the Diversion Channel

Legal description: Land Grant 3282, Cape Girardeau County

UTM Coordinates: X= 801234, Y= 4127512

Receiving Stream: Headwaters Diversion Channel (P)

First Classified Stream and ID: Headwater Diversion Channel (P)(2196)

USGS Basin & Sub-watershed No.: 07140107-0604

SM3 – In-stream Monitoring

Downstream of the discharge point of Outfall #002 into the Diversion Channel

Legal description: NE ¼, NE ¼, Sec. 27, T30N, R13E, Cape Girardeau County

UTM Coordinates: X= 801514, Y= 4127658

Receiving Stream: Headwaters Diversion Channel (P)

First Classified Stream and ID: Headwater Diversion Channel (P)(2196)

USGS Basin & Sub-watershed No.: 07140107-0604

MW1 – Monitoring Wells

Headlight Farm Irrigation Wells; BIO-1A

Legal description: Sec. 01, T27N, R14E, Scott County

UTM Coordinates: X= 812549, Y= 4103438

Receiving Stream: Tributary to Muddy Ditch (U)

First Classified Stream and ID: Blue Ditch (P) 3146

USGS Basin & Sub-watershed No.: 08020201-0303

MW2 – Monitoring Wells

Headlight Farm Irrigation Wells; BIO-2A

Legal description: Sec. 01, T27N, R14E, Scott County

UTM Coordinates: X= 811572 Y= 4102784

Receiving Stream: Tributary to Muddy Ditch (U)

First Classified Stream and ID: Blue Ditch (P) 3146

USGS Basin & Sub-watershed No.: 08020201-0303

MW3 – Monitoring Wells

Headlight Farm Irrigation Wells; BIO-3A

Legal description: Sec. 01, T27N, R14E, Scott County

UTM Coordinates: X= 812381, Y= 4102826

Receiving Stream: Tributary to Muddy Ditch (U)

First Classified Stream and ID: Blue Ditch (P) 3146

USGS Basin & Sub-watershed No.: 08020201-0303

MW4 – Monitoring Wells

Headlight Farm Irrigation Wells; BIO-4A

Legal description: Sec. 01, T27N, R14E, Scott County

UTM Coordinates: X= 812418, Y= 4102016

Receiving Stream: Tributary to Muddy Ditch (U)

First Classified Stream and ID: Blue Ditch (P) 3146

USGS Basin & Sub-watershed No.: 08020201-0303

FACILITY DESCRIPTION continued

MW5 – Monitoring Wells

Green Farm Irrigation Well; BIO-10A
Legal description: Sec. 12, T27N, R14E, Scott County
UTM Coordinates: X= 812727, Y= 4100059
Receiving Stream: Tributary to Blue Ditch (U)
First Classified Stream and ID: Blue Ditch (P) 3146
USGS Basin & Sub-watershed No.: 08020201-0303

MW6 – Monitoring Wells

Headquarters Farm Wells; IW/ST-1A
Legal description: Sec. 12, T27N, R14E, Scott County
UTM Coordinates: X= 811382, Y= 4098938
Receiving Stream: Tributary to Blue Ditch (U)
First Classified Stream and ID: Blue Ditch (P) 3146
USGS Basin & Sub-watershed No.: 08020201-0303

MW7 – Groundwater Monitoring

Headquarters Farm Wells; HW/ST-1A
Legal description: Sec. 14, T27N, R14E, Scott County
UTM Coordinates: X= 811140, Y= 4099747
Receiving Stream: Tributary to Blue Ditch (U)
First Classified Stream and ID: Blue Ditch (P) 3146
USGS Basin & Sub-watershed No.: 08020201-0303

MW8 – Irrigation Wells

Fox Meadow Farm Irrigation Wells, N/ST-2A
Legal description: Sec. 18, T27N, R15E, Scott County
UTM Coordinates: X= 814065, Y= 4099205
Receiving Stream: Tributary to Blue Ditch (U)
First Classified Stream and ID: Blue Ditch (P) 3146
USGS Basin & Sub-watershed No.: 08020201-0303

MW9 – Irrigation Wells

Fox Meadow Farm Irrigation Wells, S/ST-2A
Legal description: Sec. 19, T27N, R15E, Scott County
UTM Coordinates: X= 814166, Y= 4097203
Receiving Stream: Tributary to Blue Ditch (U)
First Classified Stream and ID: Blue Ditch (P) 3146
USGS Basin & Sub-watershed No.: 08020201-0303

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

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PERMIT NUMBER MO-0101729

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective upon issuance and remain in effect until December 30, 2013. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #001</u> - Process wastewater, Tier 1, 0-500 Tons/month (Note 3)						
Flow	MGD	*		*	daily	24 hr. total
Biochemical Oxygen Demand ₅ (BOD)	lbs/day	12,147		4,674	once/week	24 hr. composite**
	mg/L	*		*	once/week	24 hr. composite**
Chemical Oxygen Demand (COD)	lbs/day	39,318		21,551	once/week	24 hr. composite**
	mg/L	*		*	once/week	24 hr. composite**
Total Suspended Solids (TSS)	lbs/day	18,431		13,033	once/week	24 hr. composite**
	mg/L	*		*	once/week	24 hr. composite**
pH - Units	SU	***		***	once/week	grab
Ammonia as N	lbs/day	14,143		9,631	once/week	grab
	mg/L	*		*	once/week	grab
Diffuser pressure reading (Note 2)	PSI	*		*	once/day	reading from gauge
E. coli (Note 4)	#/100 mL	*		*	once/week	grab
BOD Removal Efficiency (Note 1)	%	*		70	once/week	calculated
COD Removal Efficiency (Note 1)	%	*		50	once/week	calculated
TSS Removal Efficiency	%	*		*	once/week	calculated
Ammonia as N Removal Efficiency	%	*		*	once/week	calculated

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE NEXT REPORT IS DUE JULY 28, 2013.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

PAGE NUMBER 6 of 18

PERMIT NUMBER MO-0101729

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 December 31, 2013. 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
<u>Outfall #001</u> - Process wastewater, Tier 1, 0-500 Tons/month (Note 3)						
Flow	MGD	*		*	daily	24 hr. total
Biochemical Oxygen Demand ₅ (BOD)	lbs/day mg/L	12,147		4,674	once/week	24 hr. composite**
		*		*	once/week	24 hr. composite**
Chemical Oxygen Demand (COD)	lbs/day mg/L	39,318		21,551	once/week	24 hr. composite**
		*		*	once/week	24 hr. composite**
Total Suspended Solids (TSS)	lbs/day mg/L	18,431		13,033	once/week	24 hr. composite**
		*		*	once/week	24 hr. composite**
pH - Units	SU	***		***	once/week	grab
Ammonia as N	lbs/day mg/L	14,143		9,631	once/week	grab
		*		*	once/week	grab
Diffuser pressure reading (Note 2)	PSI	*		*	once/day	reading from gauge
E. coli (Note 4)	#/100 mL	1,030		206	once/week	grab
BOD Removal Efficiency (Note 1)	%	*		70	once/week	calculated
COD Removal Efficiency (Note 1)	%	*		50	once/week	calculated
TSS Removal Efficiency	%	*		*	once/week	calculated
Ammonia as N Removal Efficiency	%	*		*	once/week	calculated

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE FEBRUARY 28, 2014.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

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PERMIT NUMBER MO-0101729

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective upon issuance and remain in effect until December 30, 2013. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #001</u> - Process wastewater, Tier 2, More than 500 tons/month (Note 3)						
Flow	MGD	*		*	daily	24 hr. total
Biochemical Oxygen Demand ₅ (BOD)	lbs/day mg/L	18,107 *		11,686 *	once/week once/week	24 hr. composite** 24 hr. composite**
Chemical Oxygen Demand (COD)	lbs/day mg/L	37,647 *		36,026 *	once/week once/week	24 hr. composite** 24 hr. composite**
Total Suspended Solids (TSS)	lbs/day mg/L	18,887 *		14,112 *	once/week once/week	24 hr. composite** 24 hr. composite**
pH - Units	SU	***		***	once/week	grab
Ammonia as N	lbs/day mg/L	15,748 *		14,965 *	once/week once/week	grab grab
Diffuser pressure reading (Note 2)	PSI	*		*	once/day	reading from gauge
E. coli (Note 4)	#/100 mL	*		*	once/week	grab
BOD Removal Efficiency (Note 1)	%	*		70	once/week	calculated
COD Removal Efficiency (Note 1)	%	*		50	once/week	calculated
TSS Removal Efficiency	%	*		*	once/week	calculated
Ammonia as N Removal Efficiency	%	*		*	once/week	calculated

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE NEXT REPORT IS DUE JULY 28, 2013.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 8 of 18	
					PERMIT NUMBER MO-0101729	
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 December 31, 2013. 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
<u>Outfall #001</u> - Process wastewater, Tier 2, More than 500 tons/month (Note 3)						
Flow	MGD	*		*	daily	24 hr. total
Biochemical Oxygen Demand ₅ (BOD)	lbs/day mg/L	18,107 *		11,686 *	once/week once/week	24 hr. composite** 24 hr. composite**
Chemical Oxygen Demand (COD)	lbs/day mg/L	37,647 *		36,026 *	once/week once/week	24 hr. composite** 24 hr. composite**
Total Suspended Solids (TSS)	lbs/day mg/L	18,887 *		14,112 *	once/week once/week	24 hr. composite** 24 hr. composite**
pH - Units	SU	***		***	once/week	grab
Ammonia as N	lbs/day mg/L	15,748 *		14,965 *	once/week once/week	grab grab
Diffuser pressure reading (Note 2)	PSI	*		*	once/day	reading from gauge
E. coli (Note 4)	#/100 mL	1,030		206	once/week	grab
BOD Removal Efficiency (Note 1)	%	*		70	once/week	calculated
COD Removal Efficiency (Note 1)	%	*		50	once/week	calculated
TSS Removal Efficiency	%	*		*	once/week	calculated
Ammonia as N Removal Efficiency	%	*		*	once/week	calculated
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>FEBRUARY 28, 2014</u> .						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PERMIT NUMBER MO-0101729	
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 for Whole Effluent Toxicity testing 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 Tier 1 and 2						
Whole Effluent Toxicity (WET) test	% Survival	See Special Conditions			twice/year	24 hr. composite**
MONITORING REPORTS SHALL BE SUBMITTED <u>TWICE PER YEAR</u> ; THE NEXT REPORT IS DUE <u>OCTOBER 28, 2013</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

C. INFLUENT MONITORING REQUIREMENTS

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PERMIT NUMBER MO-0101729

The facility is required to meet removal efficiency of expressed in the Outfall 001 Tier 1 and 2 Effluent Limitations tables. The monitoring requirements shall become effective upon issuance and remain in effect until expiration of the permit. To determine removal efficiencies, the influent wastewater shall be monitored by the permittee as specified below:

SAMPLING LOCATION AND PARAMETER(S)	UNITS	MONITORING REQUIREMENTS			
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	SAMPLE TYPE
<u>Outfall 001</u>					
<u>Influent</u>					
Biochemical Oxygen Demand ₅	lbs/day mg/L	*		*	once/week 24 hr. composite**
		*		*	once/week 24 hr. composite**
Total Suspended Solids	lbs/day mg/L	*		*	once/week 24 hr. composite**
		*		*	once/week 24 hr. composite**
Chemical Oxygen Demand	lbs/day mg/L	*		*	once/week 24 hr. composite**
		*		*	once/week 24 hr. composite**
Ammonia as N	lbs/day mg/L	*		*	once/week 24 hr. composite**
		*		*	once/week 24 hr. composite**

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE NEXT REPORT IS DUE JULY 28, 2013.

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 for two (2) years and 364 days. 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
<u>Outfall #002</u>						
Flow	MGD	*		*	daily	24 hr. total
Biochemical Oxygen Demand ₅	mg/L	*		*	once/month	grab
Total Suspended Solids	mg/L	*		*	once/month	grab
pH	SU	***		***	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
Ammonia as N	mg/L	*		*	once/month	grab
Temperature	°F	*		*	once/month	grab
Aluminum, Total Recoverable	µg/L	*		*	once/month	grab
Aluminum, Total Recoverable	lbs/day	46.37			once/month	grab
Chloride as Cl	mg/L	*		*	once/month	grab
Chloride as Cl	lbs/day	26,568.41			once/month	grab
Fluoride	Mg/L	*		*	once/month	grab
Fluoride	lbs/day	232.20			once/month	grab
Iron, Total Recoverable	µg/L	*		*	once/month	grab
Iron, Total Recoverable	lbs/day	218.96			once/month	grab
Selenium, Total Recoverable	µg/L	*		*	once/month	grab
Selenium, Total Recoverable	lbs/day	0.59			once/month	grab
Sulfate as SO ₄	mg/L	*		*	once/month	grab
Sulfate as SO ₄	lbs/day	61,400.73			once/month	grab
Copper, Total Recoverable	µg/L	26.0		16.4	once/month	grab
Copper, Total Recoverable	lbs/day	2.18			once/month	grab
Total Residual Chlorine (Note 5)	µg/L	7.5		5.0	once/month	grab
		(130 ML)		(130 ML)		
Total Residual Chlorine	lbs/day	0.54			once/month	grab
Lead, Total Recoverable	µg/L	*		*	once/month	grab
Lead, Total Recoverable	lbs/day	0.78			once/month	grab
Nitrate	mg/L	*		*	once/month	grab
Nitrate	lbs/day	524.40			once/month	grab
Barium, Total Recoverable	µg/L	*		*	once/month	grab
Barium, Total Recoverable	lbs/day	238.76			once/month	grab

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE NEXT REPORT IS DUE JULY 28, 2013. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

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 three (3) years from the date of 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
<u>Outfall #002</u>						
Flow	MGD	*		*	daily	24 hr. total
Biochemical Oxygen Demand ₅	mg/L	*		*	once/month	grab
Total Suspended Solids	mg/L	*		*	once/month	grab
pH	SU	***		***	once/month	grab
Oil & Grease	mg/L	15		10	once/month	grab
Ammonia as N	mg/L					
(April 1 – Sept 30)		13.9		2.9	once/month	grab
(Oct 1 – March 31)		14.1		2.9	once/month	grab
Temperature	°F	*		*	once/month	grab
Aluminum, Total Recoverable	µg/L	*		*	once/month	grab
Aluminum, Total Recoverable	lbs/day	46.37			once/month	grab
Chloride as Cl	mg/L	*		*	once/month	grab
Chloride as Cl	lbs/day	26,568.41			once/month	grab
Fluoride	Mg/L	*		*	once/month	grab
Fluoride	lbs/day	232.20			once/month	grab
Iron, Total Recoverable	µg/L	*		*	once/month	grab
Iron, Total Recoverable	lbs/day	218.96			once/month	grab
Selenium, Total Recoverable	µg/L	*		*	once/month	grab
Selenium, Total Recoverable	lbs/day	0.59			once/month	grab
Sulfate as SO ₄	mg/L	*		*	once/month	grab
Sulfate as SO ₄	lbs/day	61,400.73			once/month	grab
Copper, Total Recoverable	µg/L	26.0		16.4	once/month	grab
Copper, Total Recoverable	lbs/day	2.18			once/month	grab
Total Residual Chlorine (Note 5)	µg/L	7.5		5.0	once/month	grab
		(130 ML)		(130 ML)		
Total Residual Chlorine	lbs/day	0.54			once/month	grab
Lead, Total Recoverable	µg/L	*		*	once/month	grab
Lead, Total Recoverable	lbs/day	0.78			once/month	grab
Nitrate	mg/L	*		*	once/month	grab
Nitrate	lbs/day	524.40			once/month	grab
Barium, Total Recoverable	µg/L	*		*	once/month	grab
Barium, Total Recoverable	lbs/day	238.76			once/month	grab

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

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 11 of 18	
					PERMIT NUMBER MO-0101729	
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>SM2 and SM3 Instream monitoring</u>						
Upstream Temperature	°F	*		*	once/month	grab
Downstream Temperature	°F	*		*	once/month	grab
Net Temperature Difference	°F	*		*	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE _____. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS						
<u>Outfall # MW1, MW2, MW3, MW4, MW5, MW6, MW7, MW8, MW9 -</u> (Note: See Special Conditions for additional land application requirements)						
Groundwater depth*****	feet	*			once/year*****	Measured
Nitrate/Nitrite as N	mg/L	10			once/year*****	grab
pH - Units	SU	***		***	once/year*****	grab
Total Dissolved Solids	mg/L	*			once/year*****	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>ANNUALLY</u> ; THE FIRST REPORT IS DUE _____. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
B. STANDARD CONDITIONS						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Part I & III</u> STANDARD CONDITIONS DATED <u>October 1, 1980 & August 15, 1994</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.						

- * Monitoring requirement only.
- ** A 24-hour composite sample is composed aliquots (subsamples) collected at intervals by an automatic sampling device. The maximum time interval between aliquots shall be 30 minutes
- *** pH is measured in pH units and is not to be averaged. The pH is limited to the range of 6.5-9.0 pH units.
- ***** Sample each well once per year during the month of May.
- ***** Depth of water table below ground surface.
- Note 1 - Efficiency shall be determined based on the total mass measured in the influent to the head works of the treatment plant in comparison with the total mass measured in the effluent. When the production is biased by plant shut down and removal efficiencies are not met, the permittee has the option of demonstrating as a defense that the plant was operated properly at the time the removal efficiency was not met.
- Note 2 - Pressure readings for diffuser shall be recorded daily and reported with Discharge Monitoring Reports.
- Note 3 - Permittee must indicate on DMR whether Tier 1 or 2 production conditions exist. The permittee shall report "No Discharge" or "No Flow" for the Tier production that is not effective.
- Note 4 - Final limitations and monitoring requirements for *E. coli* are applicable only during the recreational season from April 1 through October 31. The Monthly Average Limit for *E. coli* is expressed as a geometric mean. Disinfection is maybe necessary when final limitations and monitoring requirements for *E. coli* are applicable. This is only during the recreational season from April 1 through October 31.
- Note 5 - 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 TRC to be 130 µg/L when using the DPD Colorimetric Method #4500 – CLG from standard methods for examination of report actual analytical values. Measured values greater than or equal to the minimum quantification level of 130 µg/L will be considered violations of the permit and values less than the ML level of 130 µg/L will be considered to be in compliance with the permit limitation.

C. SPECIAL CONDITIONS

1. 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.
2. All outfalls must be clearly marked in the field.
3. The permittee shall maintain the existing continuous pressure recording device installed on the discharge pipeline to the river diffuser. This device is located at the wastewater treatment plant control room so the operator can determine the normal operating pressure range of the diffuser system. Abnormalities such as a broken line or disrupted diffuser shall be noted quickly for repair and reporting purposes, and will also sound an alarm. All detected abnormalities shall be reported with pressure readings as noted in Table A.

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

C. SPECIAL CONDITIONS continued

7. The permittee shall comply with any applicable requirements listed in 10 CSR 20-8 and 10 CSR 20-9, unless the facility has received written notification that the Department has approved a modification to the requirements. The monitoring frequencies contained in this permit shall not be construed by the permittee as a modification of the monitoring frequencies listed in 10 CSR 20-9. If a modification of the monitoring frequencies listed in 10 CSR 20-9 is needed, the permittee shall submit a written request to the department for review and, if deemed necessary, approval.
8. The permittee shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must be kept on-site and should not be sent to the Department unless specifically requested. 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 Storm water 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:

- (a) An assessment of all storm water discharges 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.
 - (b) 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 CONDITION #9 below.
 - (c) The SWPPP must include a schedule for monthly site inspections and a brief written report. The inspections must include observation and evaluation of BMP effectiveness, deficiencies, and corrective measures that will be taken. The Department must be notified within fifteen (15) days by letter of any corrections of deficiencies. Deficiencies that consist of minor repairs or maintenance must be corrected within seven (7) days. Deficiencies that require additional time or installation of a treatment device to correct should be detailed in the written notification. Installation of a treatment device, such as an oil water separator, may require a construction permit. Inspection reports must be kept on site with the SWPPP. These must be made available to the Department personnel upon request.
 - (d) A provision for designating an individual to be responsible for environmental matters.
 - (e) 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 the Department.
9. 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 solid waste from entry into waters of the state.
 - (e) Provide sediment and erosion control sufficient to prevent or control sediment loss off of the property.
10. The purpose of the SWPPP and the BMPs listed therein is to prevent pollutants from entering waters of the state. A deficiency of a BMP means it was not effective in preventing pollution [10 CSR20-2.010(56)] of waters of the state, or failed to achieve compliance with benchmarks. Corrective action means the facility took steps to eliminate the deficiency.
11. All spills must be **cleaned up** within 24 hours or as soon as possible, and a written report of the incident supplied with the facility's Discharge Monitoring Report. The following spills must be **reported** to the department at the earliest practicable moment, but no greater than 24 hours after BioKyowa becomes aware that a spill has occurred:

- (a) Any spill, of any material, that leaves the property of the facility;
- (b) Any spill, of any material outside of secondary containment and exposed to precipitation, greater than 25 gallons or equivalent volume of solid material.

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C. SPECIAL CONDITIONS continued

The department may require the submittal of a written report detailing measures taken to clean up the spill within 5 days of the spill. Whether the written report is submitted with the Discharge Monitoring Report or required to be submitted within 5 days, it must include the type of material spilled, volume, date of spill, date clean-up completed, clean-up method, and final disposal method. If the spill occurs outside of normal business hours, or if the permit holder cannot reach regional office staff for any reason, the permit holder is instructed to report the spill to the department's 24 hour Environmental Emergency Response hotline at (573) 634-2436. Leaving a message on a department staff member voice-mail does not satisfy this reporting requirement. These reporting requirements apply whether or not the spill results in chemicals or materials leaving the permitted property or reaching waters of the state. This requirement is in addition to the Noncompliance Reporting requirement found in Standard Conditions Part I.

Federal Regulations (CERCLA) requires reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

12. Industrial Residuals – General

- (a) **Residuals Responsibility.** The responsibility for residuals management lies with the Permittee, and none of that responsibility can be delegated to other parties. The term residuals in this permit is meant to include the thickened treated solids from the diffused air flotation units that is applied to agricultural land acreage identified in the current Nutrient Management Plan and permit application Form R. Records of the amount of concentrated molasses solids (CMS), Mother Liquor (ML) and Nitrogen Cake (N Cake) that is produced and sold as a by-product for other uses must be submitted upon request of the Department. By products generated for land application as fertilizers are to be licensed under the Missouri Fertilizer Law as required under 10 CSR 20-6.015(3)(B)8.
- (b) **Adding Application Sites.** A permit modification is required to add new sites acquired, by purchase, lease, agreement or contract, for land application of residuals. Permittee should submit a revised application Form A, mailing addresses for first down stream landowners of each site, geologic report, topographic maps and other pertinent information for the proposed sites.
- (c) **Construction of Residuals Storage.** If additional residuals storage facilities become necessary, a construction permit shall be obtained before construction of such facilities begins, and the facilities shall be built in accordance with the appropriate design guides.
- (d) **Testing requirements.** Testing will be performed on the residuals as follows: daily for pH and total solids content when land application takes place; monthly for nutrients including organic nitrogen as N, ammonia nitrogen as N, nitrate nitrogen as N, total phosphorus as P and total potassium as K; quarterly for heavy metals content; and yearly for toxicants [Priority Pollutant Scan (PPS)].
- (e) **Geologic Evaluations.** A geological evaluation will be made on each application site by a Geologist registered in the State of Missouri. All limiting geological features shall be identified.
- (f) **Topographic Site Maps.** Site maps of land application areas shall be submitted to the Regional Office and Water Protection Program Central Office. The maps shall show topographic contours, drainage courses, sink holes, ponds, wells, buffer areas, property boundary, legal description and other pertinent features. The maps should use a base map such as the USGS 7.5 minute quad sheets or equivalent at a scale of at least one inch equals 1000 feet or 2000 feet (1"= 1000' to 2000'). In addition, an overall location map should be included showing the locations of all sites using a smaller scale such as 1" = 2 miles as is used on the county maps in the Missouri Conservation Atlas by the Missouri Department of Conservation.
- (g) **Land Application Rate.** Permittee shall operate the land application system for residuals in accordance with the design parameters listed in the Facility Description and Special Conditions sections of this permit. Application rates shall be based on the Plant Available Nitrogen (PAN) procedures and Nutrient Management Plan.
- (h) **Saturated/Frozen Conditions.** There shall be no land application during frozen, snow covered or saturated soil conditions. There shall be no land application when there is observation by operator of an imminent or impending rainfall event. When 0.2 inch of precipitation has occurred, an on-site visual investigation of the field's soil moisture condition, followed by analytical testing of the soils, will be made to determine whether land application of residuals can occur. The visual and analytical soil test procedures will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
- (i) **Buffer Zones.** There shall be no land application within 300 feet of any down gradient pond, lake, sinkhole, losing stream or water supply withdrawal and within 150 feet of dwelling. For surface application, there shall be no land application within 100 feet of gaining streams (Class P and C classified streams listed in Water Quality Standard rule under 10 CSR 20-7.031); 50 feet of wet weather gaining streams and tributaries (unclassified streams); or 50 feet of the property line. For subsurface injection, buffer zones may be reduced to 25 feet from gaining streams (classified and unclassified).

- (j) Storm Water Runoff. There shall be no contaminants discharged from the land application sites by storm water that cause violation of the Water Quality Standards rules for general criteria and specific criteria under 10 CSR 20-7.031.

C. SPECIAL CONDITIONS continued

- (k) Metals Loading Limitations. Annual loading of trace metals shall not exceed 10% of the maximum cumulative limits for each metal as specified in University of Missouri publication WQ 425, revised 4/95 (or later addition if published). When the cumulative limit is reached, residuals addition will be halted. Each time residuals are spread on a site, the remaining metals capacity of the site will be calculated.
- (l) Log Sheets. Log sheets shall be prepared and kept for each application site showing amounts of residuals applied per acre, dates of application, nutrients applied, and crop yields.
- (m) Soil Testing Requirements. Testing will be performed on the soils of each application site every five years for nitrate nitrogen, pH, lime requirement, cation exchange capacity, percent organic matter, and available soil test phosphorus (Bray 1P test).
- (n) Annual Report. An annual report shall be submitted with the last regular report of each calendar year, which is due by January 28th of the following year. The annual report shall summarize the residuals management operations for requirements listed in the permit and Residuals Management Plan. This includes: who removed the sludge, the number of gallons or quantity of residuals removed, the percent solids of the residuals, the amount of residuals applied per acre, nutrients applied per acre, crop yields, the dates and locations of the applications, the cumulative amount of residuals applied per acre, the testing results for residuals, soils and groundwater wells, and daily precipitation amounts. Report forms for the annual report shall be approved by the department and included in the Residuals Management Plan.

13. Whole Effluent Toxicity (WET) Test shall be conducted as follows:

SUMMARY OF ACUTE WET TESTING FOR THIS PERMIT						
OUTFALL	AEC		FREQUENCY		SAMPLE TYPE	MONTH
001	0.05%		Twice/year		24 hr. composite**	Any
Dilution Series						
4X AEC	2X AEC	AEC	½ AEC	¼ AEC	(Control) 100% upstream, if available	(Control) 100% Lab Water, also called synthetic water
0.20% effluent	0.10% effluent	0.05% effluent	0.025% effluent	0.0125% effluent		

$$AEC = \frac{\text{Design Flow of Outfall \#001}}{(ZID + D.F. OF 001)} = \frac{3.1}{6,165.9 + 3.1} = 0.0005 = 0.05\%$$

The zone of initial dilution (ZID) is based on the 2004 Diffuser Study which stated that 1989:1 dilution was achieved in the zone of initial dilution.

- (a) Test Schedule and Follow-Up Requirements
- (1) Perform a MULTIPLE-dilution acute WET 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) For discharges of storm water, samples shall be collected within three hours from when discharge first occurs.
- (b) Samples submitted for analysis of storm water discharges shall be collected as a grab.
- (c) For discharges of non-storm water, 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 storm water samples.
- (d) A twenty-four hour composite sample shall be submitted for analysis of non-storm water discharges.
- (e) Upstream receiving water samples, where required, shall be collected upstream from any influence of the effluent where downstream flow is clearly evident.
- (f) 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.
- (g) 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.

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C. SPECIAL CONDITIONS continued

- (h) 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.
 - (i) 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.
 - (j) Where flow-weighted composite sample is required for analysis, the samples shall be composited at the laboratory where the test is to be performed.
 - (k) 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.
 - (l) 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.
 - (m) 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 for BOTH test species within 30 calendar days and biweekly thereafter (for storm water, tests shall be performed on the next and subsequent storm water discharges as they occur, but not less than 7 days apart) 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.
- (4) The permittee shall submit a summary of all test results for the test series along with complete copies of the test reports as received from the laboratory to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the third failed test.
- (5) 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 Department's direction to perform either a TIE or TRE. This plan must be approved by the Department before the TIE or TRE is begun. A schedule for completing the TIE or TRE shall be established in the plan approval.
- (6) 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 the Department for this period.
- (7) 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.
- (b) PASS/FAIL procedure and effluent limitations:
- (1) 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 LC₅₀ 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

C. SPECIAL CONDITIONS continued

- (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 "Allowable Effluent Concentration" (AEC) specified above.
 - (5) 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 Department upon request.
 - (6) Unless otherwise specified above, 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.
 - (7) If reconstituted-water control mortality for a test species exceeds 10%, the entire test will be rerun.
 - (8) If upstream control mortality exceeds 10%, the entire test will be rerun using reconstituted water as the dilutant.

D. SCHEDULE OF COMPLIANCE

1. E. coli
 - a. The permittee must attain compliance with the final E. coli effluent limits no later than December 31, 2013.
 - b. Within one year of issuance of this permit, the permittee shall report progress made in attaining compliance with the final E. coli effluent limits.
 - c. Within two years of issuance of this permit, the permittee shall submit a report detailing progress made in attaining compliance with the final E. coli effluent limits.
 - d. If the permittee fails to meet any of the interim dates above, the permittee shall notify the Department in writing of the reason for non compliance no later than 14 days following each interim date.
 - e. Upon completion of construction, the permittee shall submit a Statement of Work Complete signed by the owner and a Professional Engineer that is registered in the state of Missouri. (Only required if construction is required)
2. Outfall 002
 - a. On Outfall 002 the permittee must attain compliance with the final effluent limits no later than three years after issuance of this permit.
 - b. Within one year of issuance of this permit, the permittee shall submit a report detailing progress made in attaining compliance with the Outfall 002 final effluent limits.
 - c. Within two years of issuance of this permit, the permittee shall submit a report detailing progress made in attaining compliance with the Outfall 002 final effluent limits.

Missouri Department of Natural Resources
FACT SHEET
FOR THE PURPOSE OF MODIFICATION OF
MO-0101729
BIOKYOWA, INC.

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. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)2.] a Factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

A Factsheet is not an enforceable part of an operating permit.

This Factsheet is for an Industrial Facility

Part I – Facility Information

Facility Type: Industrial
Facility SIC Code(s): 2048

Facility Description:

BioKyowa, Inc. is a manufacturer of amino acids. These amino acids are utilized for animal feed, health foods, and as a raw material by other chemical manufacturers that utilize the "crude grade" product and further refine it. BioKyowa operates two manufacturing facilities in Cape Girardeau. The facilities are currently able to manufacture twelve (12) amino acids with the possibility of manufacturing other products in the future. The amino acids currently being produced are as follows:

Plant 1	Plant 2
Tryptophan	Glutamine
Threonine	Ornithine
Valine	Histidine
Leucine	Arginine (also produced in Plant 1)
Isoleucine	Lysine Monohydrochloride
Phenylalanine	

The process for manufacturing all of the different amino acids is basically the same, as are the raw materials used. The manufacturing process is based on the fermentation of sugars by a pure bacteria culture with a nitrogen source for amino acid production (ammonium sulfate). Each amino acid has its own specific bacteria culture, and all of these are non-pathogenic fecal coliforms. After completion of the fermentation, an extraction processes is used to remove the amino acid from the fermented broth. The amino acid is then taken from a liquid to a crystal and then dried. Once it is in the dried state it is packaged for distribution to our customers. Wastewater is generated from tank cleaning, and the extraction process. Process wastes consist primarily of chemical oxygen demand (COD)/biochemical oxygen demand (BOD), total suspended solids (TSS), and ammonia. The process wastewater also includes fecal coliform bacteria from the fermentation process. The process wastewater is sent to an activated sludge treatment facility prior to discharge to the Mississippi River (Outfall 001). Outfall 002 discharges to the Headwaters Diversion Channel and is composed of cooling water, barometric condenser water and storm water which is collected in our storm water basin. The wastewater treatment facilities utilized by BioKyowa include a one million gallon load and pH equalization basin, two activated sludge aeration basins, secondary clarifiers, dissolved air floatation for solids handling and a high rate outfall diffuser. These facilities routinely provide a high degree of treatment to the organic wastes generated by the manufacturing facility. However, the facilities do not remove ammonia.

2013 MODIFICATION

Biokyowa, Inc. facility uses purified well water in its operations and needs to increase its production of purified well water to meet additional supply demands. Biokyowa wants to switch from an ion exchange system to iron filtration and a reverse osmosis system for the purification of water. The new system would consist of four iron filtration vessels and two RO membrane units. As a result, the generation of additional non-process wastewater for disposal would increase. The company wants to discharge non-process wastewater from Outfall #002. The company stated that discharging the backwash from the iron and RO system through Outfall #001 would washout the treatment facility.

Application Date: 08/19/2010
Expiration Date: 02/23/2011
Last Inspection: 05/13/2009 In Compliance

OUTFALL(S) TABLE:

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	3.1	Industrial	Secondary Process Wastewater	0.0
002	14.2	None	RO Reject, noncontact cooling water and stormwater	0.0
003	-	Land Application System	-	-

Receiving Water Body’s Water Quality and Facility Performance History

The Mississippi River is a classified P stream, Waterbody ID #01707. The designated uses for the Mississippi River, at this stretch, are Protections of Aquatic Life and Human Health – Fish Consumption, Livestock & Wildlife Watering, Drinking Water Supply, Industrial, Irrigation, and Whole Body Contact Recreation (B).

Discharge Monitoring Reports (DMRs) from January 2006 to February 2010 were reviewed for the Facility Performance.

Comments:

When developing effluent limits for a NPDES permit, the Department must consider limits based on the technology available to treat the pollutants (technology based effluent limits), limits that are protective of the designated use of the receiving water (water quality based effluent limits), or as in the case of Biokyowa’s Outfall #001, technology based limits based on reasonably available and relevant data (Best Professional Judgment).

Technology based effluent limits for industrial facilities are derived from effluent guidelines. The intent of effluent guidelines is to require a minimum level of treatment for industrial point sources based on currently available treatment technology. Water quality based effluent limits are developed by the State of Missouri to protect the beneficial uses of the receiving waters. Best Professional Judgment Technology limits are established in cases where effluent limit guidelines are not available for, or do not regulate, a particular pollutant of concern. Best Professional Judgment technology based limits are defined as the highest quality technical opinion developed by the permit writer after consideration of all reasonably available and pertinent data or information that forms the basis for the terms and conditions of the NPDES permit.

The technology-based limits are compared to the water quality based limits and the more stringent are chosen to develop the permit limits. The derived technology based limits identified for outfall 001 were compared to applicable water quality criteria. It was determined that the Best Professional Judgment technology based limits will be more protective of water quality.

Since Biokyowa’s production rates are expected to change significantly during the life of the permit, it is appropriate to include tiered (alternate) Professional Judgment technology based limits as allowed by § 122.45(b)(2)(ii)(A)(i) and implemented in the previous NPDES permit.

Part II – Operator Certification Requirements

As per [10 CSR 20-6.010(8) Terms and Conditions of a Permit], permittees shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions and regulations. Operators or supervisors of operations at regulated wastewater treatment facilities shall be certified in accordance with [10 CSR 20-9.020(2)] and any other applicable state law or regulation. As per [10 CSR 20-9.010(2)(A)], requirements for operation by certified personnel shall apply to all wastewater treatment systems, if applicable, as listed below:

Operator's Name: Kenneth R. Lashley
Certification Number: 5545
Certification Level: A

The listing of the operator above only signifies that staff drafting this operating permit have reviewed appropriate Department records and determined that the name listed on the operating permit application has the listed Certification Level.

This facility is not required to obtain the services of a certified operator.

Part III – 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 seven (7) categories. Each category lists 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. Below are the waters applicable to this permit.

Missouri or Mississippi River [10 CSR 20-7.015(2)]: Outfall 001
All Other Waters [10 CSR 20-7.015(8)]: Outfall 002

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*	12-DIGIT HUC
Mississippi River	P	01707	IRR, LWW, AQL, DWS, IND, WBC*** (B)	07140105-0503
Headwaters Diversion Channel	P	02196	LWW, SCR, DWS, AQL, WBC*** (A)	07140105-0503

* - 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), Groundwater (GRW).

** - Ecological Drainage Unit

*** - UAA has not been conducted.

RECEIVING STREAM(S) LOW-FLOW VALUES TABLE:

RECEIVING STREAM (U, C, P)	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
Mississippi River (P)	52,006	54,306	60,037
Headwaters Diversion Channel (P)	79.9	86.3	100.9

OUTFALL 001 MIXING CONSIDERATIONS:

Prior to the installation of a diffuser at outfall 001 the Zone of Initial Dilution (ZID) was 31CFS. This is based on 10 CSR 20-7.031(4)(A)4.B.(III)b which states that facility is allowed a ZID that is 10 times the design flow. In 2003 the facility installed a diffuser on outfall 001. A diffuser dye study was conducted at outfall 001 in December 2003 and reported mixing at the ZID and MZ of 0.05% and .023% respectively was achieved. Since the outfall currently discharges via a diffuser the maximum ZID is allow as per 10 CSR 20-7.031(4)(A)4.B.(III)b.

The Mixing Zone Analysis as reported in the diffuser study stated that the diffuser achieved 4297:1 dilution at the end of the regulatory mixing zone, and 1989:1 dilution at the edge of the Zone of Initial Dilution (ZID).

MIXING CONSIDERATIONS TABLE OUTFALL 002:

MIXING ZONE (CFS) [10 CSR 20-7.031(4)(A)4B(III)(a)]			ZONE OF INITIAL DILUTION (CFS) [10 CSR 20-7.031(4)(A)4B(III)(b)]	
1Q10	7Q10	30Q10	1Q10	7Q10
21.3	21.5	25.2	2.0	2.2

RECEIVING STREAM MONITORING REQUIREMENTS:

Outfall SM2 and SM3

PARAMETER(S)	SAMPLING FREQUENCY	SAMPLE TYPE	LOCATION
Upstream Temperature (°C)	once/month	grab	Up and down stream of Outfall 002
Downstream Temperature (°C)	once/month	grab	
Net Temperature Difference (°C)	once/month	grab	

Outfall MW1, MW2, MW3, MW4, MW5, MW6, MW7, MW8, MW9 – Groundwater Monitoring Well

PARAMETER(S)	SAMPLING FREQUENCY	SAMPLE TYPE	LOCATION
Ground Water Depth (Ft)	once/year	Vertical Measurement	Wells at land application sites: See special conditions for additional land application requirements.
Nitrate/Nitrite as N (mg/L)	once/year	grab	
pH Units	once/year	grab	
Total Dissolved Solids	once/year	grab	

Part IV – 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); 40 CFR Part 122.44(I)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

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

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.

- Renewal no degradation proposed and no further review necessary.

AREA-WIDE WASTE TREATMENT MANAGEMENT & CONTINUING AUTHORITY:

As per [10 CSR 20-6.010(3)(B)], ...An applicant may utilize a lower preference continuing authority by submitting, as part of the application, a statement waiving preferential status from each existing higher preference authority, providing the waiver does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or any other regional sewage service and treatment plan approved for higher preference authority by the Department.

BIOSOLIDS, SLUDGE, & SEWAGE SLUDGE:

Bio-solids are solid materials resulting from wastewater treatment that meet federal and state criteria for beneficial uses (i.e. fertilizer). Sludge is any solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effect. Sewage sludge is solids, semi-solids, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works. Additional information regarding biosolids and sludge is located at the following web address: <http://dnr.mo.gov/env/wpp/pub/index.html>, items WQ422 through WQ449.

- Permittee land applies biosolids in accordance with a Department approved biosolids management plan.

COMPLIANCE AND ENFORCEMENT:

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

Not Applicable;
The permittee/facility is not currently under Water Protection Program enforcement action.

REASONABLE POTENTIAL ANALYSIS (RPA):

Federal regulation [40 CFR Part 122.44(d)(1)(i)] requires effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above narrative or numeric water quality standard.

In accordance with [40 CFR Part 122.44(d)(iii)] if the permit writer determines that any given pollutant has the reasonable potential to cause, or contribute to an in-stream excursion above the WQS, the permit must contain effluent limits for that pollutant.

Applicable;
A RPA was conducted for ammonia for outfall 001 and 002. It was determined that a reasonable potential to exceed the Missouri Water Quality Standards for ammonia does not exist at outfall 001 taking into consideration the regulatory mixing zone and the regulatory zone of initial dilution. It was determined that a reasonable potential to exceed the Missouri Water Quality Standard for ammonia does exist at outfall 002. See Appendix 2, RPA result are available upon request of the department.

REMOVAL EFFICIENCY:

Removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to Biochemical Oxygen Demand 5-day (BOD₅) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals.

Applicable
This wastewater treatment facility is not a POTW; however, influent monitoring is being required to determine percent removal. Efficiency shall be determined based on the total mass measured in the influent to the head works of the treatment plant in comparison with the total mass measured in the effluent. When the production falls below 50 tons per month and removal efficiencies are not met, the permittee has the option of demonstrating as a defense that the plant was operated properly at the time of the removal efficiency exceedances.

SCHEDULE OF COMPLIANCE (SOC):

A schedule of remedial measures included in a permit, including an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit.

Applicable
The time given for effluent limitations of this permit listed under Interim Effluent Limitation and Final Effluent Limitations were established in accordance with [10 CSR 20-7.031(10)].

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 Storm water 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.

Not Applicable;

This operating permit is not drafted under premises of a petition for variance.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:

As per [10 CSR 20-2.010(78)], the amount of pollutant each discharger is allowed by the Department to release into a given stream after the Department has determined total amount of pollutant that may be discharged into that stream without endangering its water quality.

Applicable;

Wasteload allocations were calculated where applicable using water quality criteria or water quality model results and the dilution equation below:

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

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

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).

Number of Samples "n":

Additionally, in accordance with the TSD for water quality-based permitting, effluent quality is determined by the underlying distribution of daily values, which is determined by the Long Term Average (LTA) associated with a particular Wasteload Allocation (WLA) and by the Coefficient of Variation (CV) of the effluent concentrations. Increasing or decreasing the monitoring frequency does not affect this underlying distribution or treatment performance, which should be, at a minimum, be targeted to comply with the values dictated by the WLA. Therefore, it is recommended that the actual planned frequency of monitoring normally be used to determine the value of "n" for calculating the AML. However, in situations where monitoring frequency is once per month or less, a higher value for "n" must be assumed for AML derivation purposes. Thus, the statistical procedure being employed using an assumed number of samples is "n = 4" at a minimum. For Total Ammonia as Nitrogen, "n = 30" is used.

WLA MODELING:

There are two general types of effluent limitations, technology-based effluent limits (TBELs) and water quality based effluent limits (WQBELs). If TBELs do not provide adequate protection for the receiving waters, then WQBEL must be used.

Not Applicable;

A WLA study was either not submitted or determined not applicable by Department staff.

WATER QUALITY STANDARDS:

Per [10 CSR 20-7.031(3)], General Criteria shall be applicable to all waters of the state at all times including mixing zones. Additionally, [40 CFR 122.44(d)(1)] directs the Department to establish in each NPDES permit to include conditions to achieve water quality established under Section 303 of the Clean Water Act, including State narrative criteria for water quality.

WHOLE EFFLUENT TOXICITY (WET) TEST:

A WET test is a quantifiable method of determining if a discharge from a facility may be causing toxicity to aquatic life by itself, in combination with or through synergistic responses when mixed with receiving stream water.

Applicable;

Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures that the provisions in the 10 CSR 20-6.010(8)(A)7 and the Water Quality Standards 10 CSR 20-7.031(3)(D),(F),(G),(I)2.A & B are being met. Under [10 CSR 20-6.010(8)(A)4], the Department may require other terms and conditions that it deems necessary to assure compliance with the Clean Water Act and related regulations of the Missouri Clean Water Commission. In addition the following MCWL apply: §§644.051.3 requires the Department to set permit conditions that comply with the MCWL and CWA; 644.051.4 specifically references toxicity as an item we must consider in writing permits (along with water quality-based effluent limits, pretreatment, etc. . .); and 644.051.5 is the basic authority to require testing conditions. WET test will be required by all facilities meeting the following criteria:

- Facility is a designated Major.
- Facility (industrial) that alters its production process throughout the year
- Facility handles large quantities of toxic substances, or substances that are toxic in large amounts.

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

Applicable;

The Mississippi River is listed on the 1998 Missouri 303(d) List for Lead and Zinc.

– This facility is not considered to be a source of the above listed pollutant(s) or considered to contribute to the impairment of Mississippi River.

Part V – Effluent Limits Determination

Outfall #001 – Main Facility Outfall Tier 1

The BioKyowa facility has varying production depending on the products that are being produced at a given time. Because of the variability in effluent concentration and volume, it is necessary to tier the effluent limitations. Tier 1 effluent limitations are applicable when the facility’s production is less than 500 tons/month. Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
FLOW	GPD	*		*	NO	*
BOD ₅	LBS/DAY	12,147		4,674	YES	14,137/4,270
COD	LBS/DAY	39,318		21,551	YES	34,447/19,183
TSS	LBS/DAY	18,431		13,033	YES	18,125/9,512
PH	SU	6.5-9.0		6.5-9.0	YES	6.0-9.0
BOD ₅ REMOVAL EFFICIENCY	%	*		50	NO	*/50
COD ₅ REMOVAL EFFICIENCY	%	*		70	NO	*/70
TSS REMOVAL EFFICIENCY	%	*		*	NO	*
AMMONIA AS N REMOVAL EFFICIENCY	%	*		*	NO	*
DIFFUSER PRESSURE READING	PSI	*		*	NO	*
AMMONIA AS N	LBS/DAY	14,143		9,631	YES	14,143/8,947
ESCHERICHIA COLI	**	PLEASE SEE ESCHERICHIA COLI (E. COLI) IN THE DERIVATION AND DISCUSSION SECTION BELOW.				
WHOLE EFFLUENT TOXICITY (WET) TEST	% SURVIVAL	PLEASE SEE WET TEST IN THE DERIVATION AND DISCUSSION SECTION BELOW.				

* - Monitoring requirement only

** - # of colonies/100mL; the Monthly Average for *E. coli* is a geometric mean

*** - Parameter not previously established in previous state operating permit

Outfall #001 – Main Facility Outfall Tier 2

The BioKyowa facility has varying production depending on the products that are being produced at a given time. Because of the variability in effluent concentration and volume, it is necessary to tier the effluent limitations. Tier 2 effluent limitations are applicable when the facility’s production is more than 500 tons/month. Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
FLOW	GPD	*		*	No	*
BOD ₅	LBS/DAY	18,107		11,686	Yes	14,137/5,769
COD ₅	LBS/DAY	37,647		36,026	Yes	34,447/25,948
TSS	LBS/DAY	18,887		14,112	Yes	18,125/12,904
PH	SU	6.5-9.0		6.5-9.0	Yes	6.0-9.0
BOD ₅ REMOVAL EFFICIENCY	%	*		50	No	*/50
COD REMOVAL EFFICIENCY	%	*		70	No	*/70
TSS REMOVAL EFFICIENCY	%	*		*	No	*
AMMONIA AS N REMOVAL EFFICIENCY	%	*		*	No	*
AMMONIA AS N	LBS/DAY	15,748		14,965	Yes	14,143/11,611
DIFFUSER PRESSURE READING	PSI	*		*	No	*
ESCHERICHIA COLI	**	Please see Escherichia Coli (E. coli) in the Derivation and Discussion Section below.				
WHOLE EFFLUENT TOXICITY (WET) TEST	% Survival	Please see WET Test in the Derivation and Discussion Section below.				

* - Monitoring requirement only.
** - # of colonies/100mL; the Monthly Average for *E. coli* is a geometric mean
*** - Parameter not previously established in previous state operating permit

OUTFALL #001, TIER1 AND TIER 2 – DERIVATION AND DISCUSSION OF LIMITS:

Regulations promulgated at 40 CFR §122.44(a) require technology based effluent limitations to be placed in NPDES permits based on National effluent limitations guidelines and standards, Best Professional Judgment (BPJ), in or combination of the two. Discharge from Outfall 001 was subject to effluent limitations given in 40 CFR Part 439 Subpart A, while it was classified as being a pharmaceutical production facility. This facility has been determined to be a non-categorical industry and thus technological limits must be developed on a Best Professional Judgment (BPJ) basis.

Data during the previous permit operating period obtained by the facility was used to calculate limitations. The result of these calculations and limitation are listed in Appendix 1.

- **Flow.** In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each 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.
- **Biochemical Oxygen Demand (BOD₅).** See Appendix 1
- **Chemical Oxygen Demand (COD).** See Appendix 1
- **Total Suspended Solids (TSS).** See Appendix 1
- **Ammonia as N.** See Appendix 1
- **Biochemical Oxygen Demand (BOD₅) Removal Efficiency.** The removal efficiency determination requirement has been retained from the previous permit. This is to ensure that the treatment facility efficiency is maintained during periods when

production is low and mass limits could be achieved even with little or no actual treatment by the treatment plant. They represent the removal efficiency that the plant should be able to meet 99% of the time. This limit/requirement is because the output of the plant is highly variable causing mass limits during extreme variation to be ineffective.

- **Chemical Oxygen Demand (COD) Removal Efficiency.** The removal efficiency determination requirement has been retained from the previous permit. This is to ensure that the treatment facility efficiency is maintained during periods when production is low and mass limits could be achieved even with little or no actual treatment by the treatment plant. They represent the removal efficiency that the plant should be able to meet 99% of the time. This limit/requirement is because the output of the plant is highly variable causing mass limits during extreme variation to be ineffective.
- **Total Suspended Solids (TSS) Removal Efficiency.** The removal efficiency monitoring requirement has been retained from the previous permit. This is to ensure that the treatment facility efficiency is maintained during periods when production is low and mass limits could be achieved even with little or no actual treatment by the treatment plant. This requirement is because the output of the plant is highly variable causing mass limits during extreme variation to be ineffective.
- **Ammonia as N Removal Efficiency.** The removal efficiency monitoring requirement has been retained from the previous permit. This is to ensure that the treatment facility efficiency is maintained during periods when production is low and mass limits could be achieved even with little or no actual treatment by the treatment plant. This requirement is because the output of the plant is highly variable causing mass limits during extreme variation to be ineffective.
- **pH.** Effluent limitations have been modified from previous state operating permit; the lower range for pH has been changed from 6.0 to 6.5 to be consistent with pH requirements of other wastewater treatment facilities.
- **Escherichia coli (E. coli).** Monthly average of 206 per 100 ml as a geometric mean and Daily Maximum of 1,030 during the recreational season (April 1 – October 31), to protect Whole Body Contact Recreation (B) designated use of the receiving stream, as per 10 CSR 20-7.031(4)(C). The previous water quality standard for bacteria was fecal Coliform. This standard was also based on the geometric mean over the entire recreation season (200 colonies per 100 ml). Under this standard Missouri's effluent rule required average monthly permit limits of 400 fecal Coliform colonies per one hundred milliliters and a daily maximum of 1000 fecal Coliform colonies per one hundred milliliters. The daily maximum limit for fecal Coliform was 5 times the geometric mean standard. This same methodology was used to establish the daily maximum limit for E. coli. Missouri has applied the same ratio (5) to calculate short-term E. coli limits. This method has since been brought in front of Missouri's Clean Water Commission with no objections. This method has been applied to applicable permits since November 2010. Daily Maximum effluent variability will be evaluated in development of a future effluent limit. Additionally, 10 CSR 20-7.015(H)(1) states that a permitted facility may present an evaluation sufficient to show that disinfection is not required to protect one (1) or both designated recreational uses. A use attainability analysis (UAA) may be conducted to demonstrate one (1) or both designated recreational uses are not attainable in the classified waters receiving the effluent.
- **WET Test.** WET Testing schedules and intervals are established in accordance with the Department's Permit Manual; Section 5.2 *Effluent Limits / WET Testing for Compliance Bio-monitoring*. It is recommended that WET testing be conducted during the period of lowest stream flow.
 - Acute
 - No less than TWICE/YEAR:**
 - Facility is subject to production processes alterations throughout the year.
 - Facility handles large quantities of toxic substances, or substances that are toxic in large amounts.

$$\text{AEC} = \frac{\text{Design Flow of Outfall \#001}}{(\text{ZID} + \text{D.F. OF 001})} = \frac{3.1}{6,165.9 + 3.1} = 0.0005 = 0.05\%$$

The zone of initial dilution (ZID) is based on the 2004 Diffuser Study which stated that 1989:1 dilution was achieved in the zone of initial dilution.

Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	UNIT	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	BASIS FOR LIMIT (NOTE 1)	PREVIOUS PERMIT LIMITATIONS
FLOW	GPD	*		*	FSR	*
PH	SU	6.5-9.0		6.5-9.0	FSR	6.0-9.0
BOD ₅	MG/L	*		*	NA	***
TSS	MG/L	*		*	NA	***
AMMONIA AS N (APRIL 1 – SEPT 30)	MG/L	13.9		2.9	WQBEL	*
AMMONIA AS N (OCT 1 – MARCH 31)	MG/L	14.1		2.9	WQBEL	*
OIL & GREASE (MG/L)	MG/L	15		10	No	15/10
TEMPERATURE	°F	*		*	YES	***
ALUMINUM, TOTAL RECOVERABLE	LBS/DAY	46.37			MDEL	
ALUMINUM, TOTAL RECOVERABLE	µG/L	*		*	MDEL	
CHLORIDE AS CL	MG/L	*		*	MDEL	
CHLORIDE AS CL	LBS/DAY	26,568.41			MDEL	
FLUORIDE	MG/L	*		*	MDEL	
FLUORIDE	LBS/DAY	232.2			MDEL	
IRON, TOTAL RECOVERABLE	µG/L	*		*	MDEL	
IRON, TOTAL RECOVERABLE	LBS/DAY	218.96			MDEL	
SELENIUM, TOTAL RECOVERABLE	µG/L	*		*	MDEL	
SELENIUM, TOTAL RECOVERABLE	LBS/DAY	0.59			MDEL	
SULFATE AS SO ₄	MG/L	*		*	MDEL	
COPPER, TOTAL RECOVERABLE	µG/L	26.0		16.4	MDEL	
COPPER, TOTAL RECOVERABLE	LBS/DAY	2.18			WQBEL/MDEL	
TOTAL RESIDUAL CHLORINE	µG/L	7.5 (130 ML)		5.0 (130 ML)	MDEL	
TOTAL RESIDUAL CHLORINE	LBS/DAY	0.54			MDEL	
LEAD, TOTAL RECOVERABLE	µG/L	*		*	MDEL	
LEAD, TOTAL RECOVERABLE	LBS/DAY	0.78			MDEL	
NITRATE	MG/L	*		*	MDEL	
BARIUM, TOTAL RECOVERABLE	µG/L	*		*	MDEL	
BARIUM, TOTAL RECOVERABLE	LBS/DAY	238.76			MDEL	

* - Monitoring requirement 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 Federal/State Regulation—FSR; or Not Applicable—N/A.

OUTFALL #002 – DERIVATION AND DISCUSSION OF LIMITS:

- **Flow.** In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each 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.
- **pH.** Effluent limitations have been modified from previous state operating permit; the lower range for pH has been changed from 6.0 to 6.5 to be consistent with pH requirements of other wastewater treatment facilities.
- **Biochemical Oxygen Demand (BOD₅).** Monitoring is required to determine the presence and/or volume of BOD being discharged.
- **Total Suspended Solids (TSS).** Monitoring is required to determine the presence and volume/or of TSS being discharged.

- **Total Ammonia Nitrogen.** Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(4)(B)7.C. & Table B3] default pH 7.8 SU Background total ammonia nitrogen = 0.01 mg/L .

Season	Temp (°C)	pH (SU)	Total Ammonia Nitrogen CCC (mg/L)	Total Ammonia Nitrogen CMC (mg/L)
Summer	26	7.8	1.5	12.1
Winter	6	7.8	3.1	12.1

1) Summer: May 1 – October 31

Chronic WLA: $C_e = ((13.5 + 25.2)1.5 - (25.2 * 0.01))/13.5$
 $C_e = 4.3 \text{ mg/L}$

Acute WLA: $C_e = ((13.5 + 2.0)12.1 - (2.0 * 0.01))/13.5$
 $C_e = 13.9 \text{ mg/L}$

$LTA_c = 4.3 \text{ mg/L} (0.535) = 2.3 \text{ mg/L}$
 $LTA_a = 13.9 \text{ mg/L} (0.137) = \mathbf{1.9 \text{ mg/L}}$

[CV = 1.602, 99th Percentile, 30 day avg.]
 [CV = 1.602, 99th Percentile]

Use most protective number of LTA_c or LTA_a .

MDL = 1.9 mg/L (7.29) = 13.9 mg/L
 AML = 1.9 mg/L (1.54) = 2.9 mg/L

[CV = 1.602, 99th Percentile]
 [CV = 1.602, 95th Percentile, n =30]

2) Winter: November 1 – April 30

Chronic WLA: $C_e = ((13.5 + 25.2)3.1 - (25.2 * 0.01))/13.5$
 $C_e = 8.9 \text{ mg/L}$

Acute WLA: $C_e = ((13.5 + 2.0)12.1 - (2.0 * 0.01))/13.5$
 $C_e = 13.9 \text{ mg/L}$

$LTA_c = 8.9 \text{ mg/L} (0.507) = 4.5 \text{ mg/L}$
 $LTA_a = 13.9 \text{ mg/L} (0.128) = \mathbf{1.8 \text{ mg/L}}$

[CV = 1.757, 99th Percentile, 30 day avg.]
 [CV = 1.757, 99th Percentile]

Use most protective number of LTA_c or LTA_a .

MDL = 1.8 mg/L (7.81) = 14.1 mg/L
 AML = 1.8 mg/L (1.59) = 2.9 mg/L

[CV = 1.757, 99th Percentile]
 [CV = 1.757, 95th Percentile, n =30]

- **Oil & Grease.** Conventional pollutant, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.
- **Total Residual Chlorine.** Warm-water Protection of Aquatic Life CCC = 10 µg/L, CMC = 19 µg/L [10 CSR 20-7.031, Table A]. This effluent limit is below the minimum quantification level (ML) of the most common and practical EPA approved CLTRC methods. The ML value lends to uncertainty in the actual discharge concentration, therefore limits apply.
- **Temperature.** Monitoring is required to determine compliance with 10 CSR 20-7.031(4)(D)1. Past DMR data has not indicated temperatures in excess of 90°F. No reasonable potential to excess WQS exists for ΔT.

- **Chloride.** Protection of Aquatic Life Chronic and Acute Criteria ($\mu\text{g/L}$) are listed in Table 3, 4, and 7. Hardness was 193 mg/L and sulfate, 18.19 mg/L. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.
- **Sulfate.** Protection of Aquatic Life Chronic Criteria ($\mu\text{g/L}$) is listed in Table 3, 4, and 7. Hardness was 193 mg/L and chloride, 11.86 mg/L. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.
- **Fluoride, Total Recoverable.** Protection of Aquatic Life Chronic Criteria (mg/L) is listed in Table 3, 4, and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.
- **Nitrate.** Drinking water criteria is listed in Table 3, 4, and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.

Metals

Non-hardness Dependent Metals:

Note: Minimally degrading effluent limits were determined for these metals. Limits were determined using the method described in the beginning of the Derivation and Discussion of Limits section and below Table 6 and 7 of this section. These Maximum Daily Limits will be compared to the reasonable potential analysis upon renewal, i.e., these limits will be compared to the calculated receiving water concentration (from future discharge monitoring data). No monitoring is available for the current discharge concentrations. No RPA was conducted.

- **Selenium, Total Recoverable.** Protection of Aquatic Life Chronic ($\mu\text{g/L}$) is listed in Table 3, 4, and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.
- **Aluminum, Total Recoverable.** Protection of Aquatic Life Acute Criteria ($\mu\text{g/L}$) is listed in Table 3, 4, and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.
- **Iron, Total Recoverable.** Protection of Aquatic Life Chronic Criteria ($\mu\text{g/L}$) is listed in Table 3, 4, and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. The FAC ratio is close to the threshold; Monitoring only will be applied until a RPTE is determined. Staff believes limits should be imposed if the mass limitation is exceeded.
- **Barium, Total Recoverable.** Drinking water criteria ($\mu\text{g/L}$) is in Table 3, 4, and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.

METAL	CONVERSION FACTORS	
	ACUTE	CHRONIC
Copper	0.960	0.960
Lead	0.695	0.695

Conversion factor for Pb is hardness dependent. Values calculated using equation found in Section 1.3 of EPA 823-B-96-007 and hardness = 193 mg/L.

- **Copper, Total Recoverable.** Protection of Aquatic Life Chronic and Acute Criteria ($\mu\text{g/L}$) are listed in Table 3, 4 and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. The discharge has a potential to exceed water quality criteria with the proposed discharge concentration values used in the MDEL calculations, therefore limits are applied.
- **Lead, Total Recoverable.** Protection of Aquatic Life Chronic and Acute Criteria ($\mu\text{g/L}$) are listed in Table 3, 4 and 7; 14.5 mg/L average monthly limit and 9.7 mg/L maximum daily limit. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.

The next step in the limit determination process is the comparison of the water quality-based effluent limit (WQBEL) and the minimally degrading maximum daily limit as a concentration value. Table 7 shows the WQBEL for the POCs. By comparison, all minimally degrading effluent limits in Table 6 are less than the WQBELs. Therefore mass-based maximum daily value will apply.

Upon renewal, a reasonable potential analysis will be conducted to determine the need for limits. The RPA should be conducted such that the receiving water concentration will not exceed water quality standard and the MDEL mass-based maximum daily limit. No RPA was conducted during this review due to the lack of effluent monitoring data.

Part VI – Administrative Requirements

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

PERMIT SYNCHRONIZATION:

The Department of Natural Resources is currently undergoing a synchronization process for operating permits. Permits are normally issued on a five-year term, but to achieve synchronization many permits will need to be issued for less than the full five years allowed by regulation. The intent is that all permits within a watershed will move through the Watershed Based Management (WBM) cycle together will all expire in the same fiscal year. This will allow further streamlining by placing multiple permits within a smaller geographic area on public notice simultaneously, thereby reducing repeated administrative efforts. This will also allow the department to explore a watershed based permitting effort at some point in the future.

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.

This permit has been placed on public notice three times during this latest renewal. Changes were made to the permit during the first two public notices that resulted in the permit being replaced on public notice. Comments were received from the facility during the third public notice. The following summarized the comments and the Department's responses from the third public notice.

1. BioKyowa Inc. in their comment letter dated February 3, 2012 request that the Department identify the conditions under which bacterial mixing zones would be allowed and indicate how BioKyowa's discharge does not meet these conditions. The Department maintains that a bacterial mixing is not applicable for this facility based on EPA policy guidance memorandum dated November 12, 2008 from Ephraim King which advises permitting authorities to refrain from allowing bacterial mixing in NPDES permits. (Appendix 4) Additionally, the Department maintains that bacterial mixing zones are not applicable based on an interim objection from EPA Region VII received on August 15, 2008 (Appendix 5) regarding operating permit MO-0058351. This objection was a result of the Department drafting bacterial mixing into the operating permit. The Department subsequently withdrew the draft permit and modified it to not include bacterial mixing.
2. BioKyowa Inc. also commented in their letter dated February 3, 2012 on the derivation of the daily maximum E. coli limitation drafted in this permit. The Department maintains that this limitation is in accordance with the current procedure for establishing short term E. coli limitations in the absence of a short term water quality standard. This derivation remains unchanged in this permit and is referenced in part V of this factsheet.
3. BioKyowa Inc. also commented in their letter dated February 3, 2012 requesting the addition of a formula establishing the time it takes effluent to travel from the plant to outfall 001 for the purpose of future disinfection needs. This permit currently does not address disinfection therefore the addition of a travel time formula is not necessary at this time. Future modification or construction permitting actions are the appropriate time for this type of inclusion.
4. BioKyowa Inc. also commented in their letter dated February 3, 2012 requesting that the composite sampling language be changed to establish that the maximum time interval between aliquots be 30 minutes. The Department agrees with this request and the permit has been changed.
5. BioKyowa Inc. also commented in their letter dated February 3, 2012 requesting that average monthly limitations for ammonia at outfall 002 be calculated utilizing a multiplying factor derived from the TSD utilizing an n=4. The Department's policy was set to use n=30 when calculating average monthly limitations based on the Federal Register Notice on Implementation of the Final 1999 Ammonia Criteria. In which it states, "Since the 1999 update recommends a 30-day averaging period for deriving the CCC, the equation for determining the LTAc, should be modified as follows:the value of "n" used in the AML calculation should not be less than the averaging period upon which the criterion is based." (Federal

Register, Volume 63, No. 245, Wednesday, December 22, 1999, page 71976) By using n= 30, the Department ensures that at default calculations, the stream and its aquatic life are protected.

6. BioKyowa Inc. commented in their letter dated February 3, 2012 on the monitoring frequency established in this permit for outfall 002, SM2, and SM3 stating that the increased frequency is problematic when occurring during dangerous river conditions. The Department has changed the permit to reflect the frequency from the previous permit from outfall 002, SM2, and SM3.
7. BioKyowa Inc. commented in their letter dated February 3, 2012 that Special Condition D.4 in the draft permit was inappropriate. The Department agrees and the condition has been removed.
8. BioKyowa in their letter dated February 3, 2012 requested that the language “as soon as possible” be deleted from the schedule of compliance section of the permit. The Department has granted this request and changed the language.
9. BioKyowa in their letter dated February 3, 2012 requested clarification in the fact sheet regarding the applicability of the facility needing a certified operator. The Department has added the following language to the factsheet in part II. “This facility is not required to obtain the services of a certified operator.”

- The Public Notice period for this operating permit is tentatively scheduled to begin in March 2013.

The Public Notice period for this operating permit was from March 29, 2013 to April 29, 2013. No comments received.

DATE OF FACT SHEET: NOVEMBER 14, 2011

COMPLETED BY:

**CHRIS WIEBERG, ENVIRONMENTAL SPECIALIST
NPDES PERMITS UNIT
PERMITTING AND ENGINEERING SECTION
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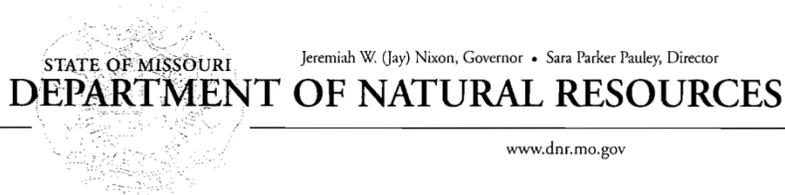
REVISED DATE: MAY 7, 2013

REVISED BY:

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NPDES PERMITS UNIT
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APPENDIX #1 WATER QUALITY AND ANTIDEGRADATION REVIEW

BioKyowa, Inc. WWTF
MO-0101729, Cape Girardeau County



JAN 08 2013

BioKyowa Inc.
Attn: David Jennings
PO Box 1550
Cape Girardeau, MO 63702-1550

RE: Water Quality Review / Antidegradation Review Preliminary Determination on the *August 7, 2012, Evaluation of Significant Degradation in Relation to BioKyowa's Proposed New Well Water Treatment System*, BioKyowa, Inc. Facility – MO-0101729, Cape Girardeau County

Dear Mr. Jennings:

Enclosed please find the finalized Water Quality and Antidegradation Review (WQAR) for the *BioKyowa, Inc.* Facility discharge in Cape Girardeau 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 Implementation Procedure* (AIP) dated May 2, 2012, 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, Water Protection Program (Department), 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 modification permit and antidegradation review public notice. 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. At the time of drafting of this review, no effluent limit guidelines applicable to the permittee have been developed. EPA requires an evaluation of the need for case-by-case TBELs or Best Professional Judgment (BPJ) limitations. BPJ limits have not been established and the need for limitations should be further evaluated during the permit modification.



**Missouri Department of Natural Resources
Water Protection Program
Water Pollution Control Branch
NPDES Permits and Engineering Section**

Water Quality and Antidegradation Review

*For the Protection of Water Quality
and Determination of Effluent Limits for Discharge to
Headwater Diversion Channel*

by
BioKyowa, Inc



December 2012

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1. FACILITY INFORMATION

FACILITY NAME: BioKyowa Inc NPDES #: MO-0101729

FACILITY TYPE/DESCRIPTION: BioKyowa, Inc. is a manufacturer of amino acids. These amino acids are used for animal feed, health foods, and as a raw material by other chemical manufacturers that further refine it. BioKyowa operates two manufacturing facilities in Cape Girardeau. The facilities manufacture twelve (12) amino acids and may manufacture other products in the future.

The process for manufacturing all of the different amino acids is basically the same, as are the raw materials used. Wastewater is generated from tank cleaning and the extraction process. Process wastes consist primarily of chemical oxygen demand (COD)/biochemical oxygen demand (BOD), total suspended solids (TSS), and ammonia. The process wastewater also includes fecal coliform bacteria from the fermentation process. This process wastewater is sent to an activated sludge treatment facility prior to discharge to the Mississippi River via Outfall 001. BioKyowa's wastewater treatment facilities include a one (1) million gallon load and pH equalization basin, two activated sludge aeration basins, secondary clarifiers, dissolved air floatation for solids handling and a high rate outfall diffuser. These facilities routinely provide a high degree of treatment to the organic wastes generated by the manufacturing facility; however, the facilities do not remove ammonia.

BioKyowa, Inc. facility uses purified well water in its operations and needs to increase its production of purified well water to meet additional supply demands. BioKyowa wants to switch from an ion exchange system to iron filtration and a reverse osmosis (RO) system for the purification of water.

Outfall 002 discharges non-contact cooling water, barometric condenser water and storm water which is collected in a storm water basin. The expansion of Outfall 002 will include the addition of non-process wastewater from the reverse osmosis system and the iron filtration system. The wastewater will be composed of well water treatment backwash water from four iron filtration vessels (cat-ion exchange resin systems) and reject water from two reverse osmosis (RO) membrane units. BioKyowa uses three primary wells to provide blended well water to the well water treatment system (RO system and iron filtration system). Outfall 002 has a current design flow of 8.7 MGD and an actual flow of 4.4 MGD. The schematic illustration presented on page 3 of the August 7, 2012, Antidegradation Review report shows 1.515 MGD of raw well water withdrawn from wells and 0.435 MGD of waste water generated from the well water treatment system. The waste water generated from the well water treatment system will added to the 8.7 MGD flow for a new design flow of 9.135 MGD.

COUNTY:	<u>Cape Girardeau</u>	UTM COORDINATES:	<u>X= 801391/ Y=4127528 – Outfall 002</u>
12- DIGIT HUC:	<u>071401050503</u>	LEGAL DESCRIPTION:	<u>Land Grant 3282 – Outfall 002</u>
EDU*:	<u>Ozark/Upper St. Francis/Castor</u>	ECO-REGION:	<u>Ozark Border</u>

* - 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 Implementation Procedure (AIP)* for new and expanded wastewater discharges.

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2.1. WATER QUALITY HISTORY:

Headwater Diversion Channel is not 303 (d) listed as impaired. During permit renewal 2011, a reasonable potential analysis was conducted for ammonia from Outfall 002, and the facility has a reasonable potential to exceed water quality standards for ammonia.

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	RECEIVING WATERBODY	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	3.1	Secondary (Process Wastewater)	Headwater Diversion Channel	0.0
002	14.2	None (RO Reject, Noncontact Cooling and Storm Water)	Mississippi River	0.0
003	-	Land Application System	-	-
Numerous instream monitoring stations and groundwater monitoring wells				

3. RECEIVING WATERBODY INFORMATION

WATERBODY NAME	CLASS	WBID	LOW-FLOW VALUES (CFS)*			DESIGNATED USES**
			1Q10	7Q10	30Q10	
Headwater Diversion Channel	P	02196	79.9	86.3	100.09	LWW, SCR, DWS, AQL, WBC*** (A)
Mississippi River	P	01707	52,006	54,306	60,037	IRR, LWW, AQL, DWS, IND, WBC(B)***

* Stream flow values for the Headwater Diversion Channel and Mississippi River were obtained from the BioKyowa NPDES permit dated March 20, 2012.

** 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: BioKyowa Outfall in Headwater Diversion to Mouth of Headwater Diversion

Upper end segment* UTM coordinates: X= 801391/ Y=4127528 – Outfall 002

Lower end segment* UTM coordinates: X= 809275/ Y=4128646 (Confluence with Mississippi River)

*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.

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4. GENERAL COMMENTS

Hall and Associates prepared, on behalf of Mr. David Jennings, BioKyowa, Inc, the *Evaluation of Significant Degradation in Relation to BioKyowa's Proposed New Well Water Treatment System*, BioKyowa, Inc. Waste Water Facility, Cape Girardeau County dated August 7, 2012, and revised September 21, 2012. Applicant elected to determine that all pollutants of concern (POC) are minimally degrading the receiving stream using existing water quality. This analysis was conducted to fulfill the requirements of the *Missouri's Antidegradation Implementation Procedure (AIP)*. Information that was provided by the applicant in the submitted report and summary forms in Appendix C was used to develop this review document.

BioKyowa, Inc. facility uses purified well water in its operations and needs to increase its production of purified well water to meet additional supply demands. BioKyowa wants to switch from an ion exchange system to iron filtration and a reverse osmosis (RO) system for the purification of water. The new system would consist of four iron filtration vessels and two reverse osmosis membrane units. As a result, the generation of additional non-process waste water for disposal would increase. The company wants to discharge the non-process waste water from Outfall #002. The company stated that discharging the backwash from the iron and RO systems through Outfall #001 would washout the treatment facility.

Raw mixed well water is fed to the iron filter with the addition of a small amount of sodium hypochlorite. The filter must be backwashed once per day, creating a backwash stream of approximately 75,000 gallons per day (gpd). The filtrate from the iron vessels are then fed to the RO system. Anti-scalant to prevent fouling and sodium meta-bisulfite to remove residual chlorine are added. The reject stream from the RO back wash is a concentrated flow of the well water constituents. The flow from the RO system will be approximately 360,000 gpd. The total flow from both the iron filtration vessel and the RO system is 435,000 gpd.

BioKyowa uses three primary wells to provide blended well water to the well water treatment system (RO system and iron filtration system). The wastewater will be composed of well water treatment backwash water from four iron filtration vessels (cat-ion exchange resin systems) and reject water from two reverse osmosis (RO) membrane units. The reject water will be concentrated well water that is characterized in the antidegradation report from BioKyowa. Some of the sample results of the well testing were below quantitation level; however, the waste water reject water was characterized using the well testing results and a scale-up factor of 3.48. Table 2 below has the scaled-up reject water concentration before mixing with the Outfall 002 flows.

A Geohydrological Evaluation was not submitted with the request. The receiving stream is gaining for discharge purposes (Appendix A: Map). A Missouri Department of Conservation Natural Heritage Review was obtained by the applicant; and no records of endangered species were found near the discharge.

5. ANTIDegradation REVIEW INFORMATION

The following is a review of the *Evaluation of Significant Degradation in Relation to BioKyowa's Proposed New Well Water Treatment System*, BioKyowa, Inc. Waste Water Facility dated August 7, 2012, and revised September 21, 2012.

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5.1. TIER DETERMINATION

Below is a list of pollutants of concern reasonably expected to be in the discharge (see Appendix C: 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). The POCs will be present in the RO reject water that will be concentrated from well water. POCs that had water quality criteria were retained for assimilative capacity analysis and limit determination. Pollutants were determined to be Tier 2 for all POCs (see Appendix C).

Table 1. Pollutants of Concern and Tier Determination

POLLUTANTS OF CONCERN	TIER	DEGRADATION	COMMENT
Aluminum	2	Minimal	
Chloride	2	Minimal	
Fluoride	2	Minimal	
Iron	2	Minimal	
Selenium	2	Minimal	
Sulfate	2	Minimal	
Copper	2	Minimal	
Chlorine, Total Res.	2	Minimal	
Lead	2	Minimal	
Nitrate	2	Minimal	Designated drinking water use at Mississippi River
Barium	2	Minimal	Designated drinking water use at Mississippi River

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

- Tier Determination and Effluent Summary
- For pollutants of concern, the attachments are:
- Attachment B, Tier 2 with minimal degradation.

5.2. EXISTING WATER QUALITY

Existing water quality data for the Headwater Diversion Channel were based upon a review of analytical data obtained from 1) the water quality monitoring station on the Castor River at Greenbriar, Mo (USGS 07021020), 2) Missouri DNR sampling on the White River, 3) Missouri DNR sampling on Hubble Creek, and 4) Missouri DNR sampling at the mouth of the Headwater Diversion. Table 9 of the *Evaluation of Significant Degradation in Relation to BioKyowa's Proposed New Well Water Treatment System* summarizes the average water quality characteristics at low flow conditions. These data were obtained from the department's Water Quality Assessment online database and the USGS website.

For the Castor River dataset, each parameter sampling concentration was plotted against stream flow to obtain an appropriate low flow concentration. The 7Q10 for the Headwater Diversion Channel is 86.3 cfs. For the Castor River and other above mentioned sampling data, BioKyowa conducted a sampling event at the SM2 sampling location on May 30, 2012, for the purpose of providing insight on how to evaluate monitoring data obtained from the Headwater Diversion Channel drainage area.

Table 6 and 7 below have the existing water quality value for each parameter and references the source of the data.

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5.3. ASSIMILATIVE CAPACITY CALCULATIONS

The calculated facility assimilative capacities for most POCs were much less than 9.6 %. *Missouri's Antidegradation Implementation Procedure* considers the use of less than 10% of the facility's available assimilative capacity as insignificant degradation (Table 3). All POCs were insignificant. The procedures indicate that cumulative degradation as reflected in the segment assimilative capacity is measured from the time that existing water quality is first determined; therefore, the net increase in loading will only be those of BioKyowa's discharge (Table 4). Because this antidegradation review serves to establish the existing water quality, the proposed expansion of POCs in Outfall 002 amounts to the sum total of the degradation. All POCs were less than 10% of the segment's available assimilative capacity.

Effluent regulation 10 CSR 20-7.015(9)(B) discusses the use of dilution (with cooling water or other less contaminated water) before discharge to receiving stream to meet limitations. When attempting to meet water quality-based effluent limits, dilution (before discharge or mixing with receiving water body flow volume of a lake or classified stream with 7Q10 flow greater than 0.1 cfs) is allowed. The regulation prohibits the use of dilution when developing technology-based effluent limits or attempting to meet effluent regulations of the state Clean Water Law or federal effluent limit guidelines.

Regarding the use of dilution before discharge to address the facility or segment assimilative capacity determination under the Antidegradation Implementation Procedure, dilution before discharge will be allowed. The assimilative capacity determination is based on a mass loading; therefore, to qualify for minimally degrading determination, there should be less than 10% increase loading in the stream on a pollutant-by-pollutant basis.

Table 2. Diluting RO reject water with current effluent flow in Outfall 002.

$$Cd2 = ((Cd_{ro} * Q_{ro}) + (Cd1 * Qd1)) / (Q_{ro} + Qd1)$$

Current flow = 13.5

RO flow = 0.7

Units: Metals, TRC = ug/L; Flouride, Chloride, nitrate, Sulfate = mg/L	Current Effluent Concentration (Cd1)	Reverse Osmosis Reject Water Concentration (Cd _{ro})	Proposed Discharge Concentration (Cd2)
Aluminum	100	348.3	111.79
Chloride	64	224	71.60
Fluoride	0.30	1.05	0.34
Iron	2550.00	8881.00	2850.63
Selenium	5.00	12.00	5.33
Sulfate	76.00	265.00	84.97
Copper	50.00	174.00	55.89
Chlorine, Total Res.	0.01	10.00	0.48
Lead	6.00	6.00	6.00
Nitrate	0.10	0.35	0.11
Barium	2000.00	6966.00	2235.81

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Table 3. Facility Assimilative Capacity (FAC) Calculations for the Headwater Diversion Channel Segment.

$FAC = Cc * (Q_s + Q_{d2}) - C_s(Q_s + Q_{d1}) * CF$

Cd1 = current effluent concentration
Cc = downstream concentration, the Water Quality Standard (WQS)
Cs = Stream 7Q10 flow (ft³/s)
Cd1 = Current effluent design flow (ft³/s)
Cd2 = Proposed effluent design flow (ft³/s)
Cs = combined stream concentrations (see Footnote 1 below)
Cd2 = proposed effluent concentration

CF = correction factor-see below*
FACratio = facility assimilative capacity ratio

Dissolved components for all metals, except Cd1, Cd2 are total metals for Fe, Al, Se, Pb.

Qd1 = 13.5
Qd2 = 14.2

P streams only
BioKiyowa Facility
MO-0101729
Headwater Division

Qs 1Q10 = Not applicable
Qs 30Q10 = Not applicable
Qs 7Q10 = 86.3

Units: Metals, TRC = ug/L;	Chronic Drinking Water Standard or WBC	Aquatic Life Chronic (Cc)	Aquatic Life Acute (Cc)	Current Effluent Concentration (Cd1)	Proposed Effluent Concentration (Cd2)	Existing Water Quality	Receiving Stream Concentration (Cs)	FAC (Chronic)	FAC (Acute)	FAC Increase provided (lbs/day)*	FACratio or Net Increase provided (lbs/day)
Aluminum ¹		750.0		100	111.8	10.20	22.35	40970.47	73107.24	394.8	1.3
Chloride ²		684.0	423.0	64	71.6	7.60	15.23	67187.92	221240.5	805.4	0.0036
Fluoride ¹			4.0	0.30	0.33	0.05	0.08	393.44	2124.5	3.3	0.0016
Iron ¹		1000.0		2550.00	2851.00	48.30	386.71	61856.71	334.0	31.9	0.0857
Selenium ¹			5.0	5.00	5.33	0.10	0.76	426.12	2.3	0.043	0.0186
Sulfate ²		1061.0		76.00	85.00	12.30	20.92	104489.96	564245.8	954.5	0.0017
Copper ²		25.0	15.7	20.00	22.90	0.40	3.05	1272.55	2206.73	6.9	0.3
Chlorine, Total Res.		19.00	10.00	0.01	0.50	0.01	0.01	1003.50	1907.55	5.4	0.037
Lead		131.0	5.1	6.00	6.00	0.10	0.90	422.61	13069.26	2.3	0.0092
Nitrate ²			10.0	0.10	0.11	0.42	0.38	966.90	5221.3	1.3	0.0002
Barium			2000.0	2000.00	2236.00	0.10	270.63	173891.37	939.0	25.1	0.0267

Footnote 1: Up stream water quality was obtained from the USGS water quality sampling station - Castor River at Greenbriar, MO.
Cs represents a combination of existing water quality data and the current permitted discharge levels (Cd1) from BioKiyowa's Antidegradation Review, Table 2.)

Footnote 2: Copper value from USGS sampling on L. Whitewater River, near Millersville, Mo.
Nitrate from the MDNR sampling on the Whitewater River.
Chloride, sulfate -- from the MDNR sampling database Headwater Diversion Channel Mouth.
Upstream water quality for Barium, Lead and TRC were assumed. *Conversion factor to change FAC to pound per day were as follows: ug/L units -- 0.0054; mg/L units -- 5.4.

Discharge Concentrations:
Cd2 was obtained from BioKiyowa's Antidegradation Review, Table 6 maximum concentration conditions. Cd2 is the result of diluting the water treatment reject water with Outfall 002 flow.
Cd1,2 values for TRC were assumed based on dechlorination.
Cd1,2 values for Lead were assumed based on reject water from one pass RO membrane filter received from BioKiyowa, Inc. during applicability review.

WQ Criteria:
Aquatic life chronic and acute standards were dissolved components
Hardness of 193 mg/L was used to calculate criteria for metals, including Cl and SO4, that are hardness dependent.
Chloride, sulfate -- calculated based upon values from BioKiyowa's September 21 letter of CL = 11.86 and SO4 = 18.19 mg/L and hardness of 193 mg/L.
Hardness represents an estimated value provided by the BioKiyowa in their September 21 letter for maximum discharge conditions.
Stream Flow and Mixing Zone Determination (does not apply for Minimally Degradation):
Stream flow value for the Headwater Diversion Channel was obtained from the BioKiyowa NPDES permit dated March 20, 2012.

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Table 4. Segment Assimilative Capacity (SAC) Calculations for the Headwater Diversion Channel Segment.

$$SAC = Cc^*(Q_s + Q_{d2} + Q_{d1}) - C_s(Q_s) * CF$$

Outfall #002
 Classified P streams only
 Facility Name Biokyowa Facility
 Permit Number MO-0101729
 Stream name Headwater Diversion
 Qd1 = 13.5
 Qd2 = 14.2

Units: Metals, TRC = ug/L;
 Fluoride, Chloride, nitrate, Sulfate = mg/L
 Aquatic Life Chronic (Cc) WBC
 Aquatic Life Acute (Cs) 50.0
 Aquatic Life Chronic (Cc) 423.0
 Aquatic Life Acute (Cs) 4.0
 Aquatic Life Chronic (Cc) 1000.0
 Aquatic Life Acute (Cs) 5.0
 Aquatic Life Chronic (Cc) 1061.0
 Aquatic Life Acute (Cs) 25.0
 Aquatic Life Chronic (Cc) 19.00
 Aquatic Life Acute (Cs) 131.0

Qd3 = 0.96
 Qs 1Q10 = Not applicable
 Qs 30Q10 = Not applicable
 Qs 7Q10 = 86.3

Cc = downstream concentration, the Water Quality Standard (WQS)
 Cs = Stream 7Q10 flow (ft³/s)
 Qd1 = Current effluent design flow (ft³/s)
 Qd2 = Proposed effluent design flow (ft³/s)
 Qd3 = Cumulative effluent design flow of other NPDES permits (ft³/s)
 CF = correction factor-see below*
 FACRatio = facility assimilative capacity ratio
 Qd3 = Cumulative effluent design flow of other NPDES permits (ft³/s)
Dissolved components for all metals, except Cd1, Cd2 are total metals for Fe, Al, Se, Pb.

	Chronic Drinking Water Standard or WBC	Proposed Effluent Concentration (Cd1)	Proposed Effluent Concentration (Cd2)	Existing Water Quality	Receiving Stream Concentration (Cs)	SAC (Chronic)	SAC (Acute)	SAC (lbs/day)*	Net Increase (lbs/day)	SAC ratio or provided
Aluminum ¹	750.0	100	111.8	10.20	23.31	41315.11	73731.24	398.1	1.3	0.0031
Chloride ²	684.0	64	71.6	7.60	15.84	67783.12	223101.6	805.4	0.0036	0.0036
Fluoride ¹	4.0	0.30	0.33	0.05	0.09	396.99	0.00	2143.7	3.3	0.0016
Iron ¹	1000.0	2550.00	2851.00	48.30	411.24	60388.71	0.00	326.0	31.9	0.0980
Selenium ¹	5.0	5.00	5.33	0.10	0.81	426.12	0.00	2.3	0.0	0.0186
Sulfate ²	1061.0	76.00	85.00	12.30	21.65	105435.56	0.00	569352.0	954.5	0.0017
Copper ²	15.7	20.00	22.90	0.40	3.24	1268.42	2211.53	6.8	0.3	0.0426
Chlorine, Total Res.	19.00	0.01	0.50	0.01	0.01	1013.09	1925.78	5.5	0.0	0.0069
Lead	5.1	6.00	6.00	0.10	0.96	421.74	13189.26	2.3	0.0	0.0092
Nitrate ²	10.0	0.10	0.11	0.42	0.38	976.41	0.00	5272.6	1.3	0.0002
Barium	2000.0	2000.00	2236.00	0.10	289.87	173891.37	0.00	939.0	25.1	0.0267

Footnote 1: Up stream water quality was obtained from the USGS water quality sampling station - Castor River at Greenbriar, MO.
 Cs represents existing water quality data, current permitted discharge levels (Cd1), and other permitted discharges from Biokyowa's Antidegradation Review Sept 21 letter, Table 2.)
Footnote 2: Copper value from USGS sampling on L. Whitewater River, near Millersville, Mo.
 Nitrate from the MDNR sampling on the Whitewater River.
 Chloride, sulfate -- from the MDNR sampling database Headwater Diversion Channel Mouth.

Upstream water quality for Barium, Lead and TRC were assumed. *Conversion factor to change FAC to pound per day were as follows: ug/L units -- 0.0054; mg/L units -- 5.4.
Discharge Concentrations:
 Cd2 was obtain from Biokyowa's Antidegradation Review, Table 6 maximum concentration conditions. Cd2 is the result of diluting the water treatment reject water with Outfall 002 flow.
 Cd1,2 values for TRC were assumed based on dechlorination.
 Cd1,2 values for Lead were assumed based on reject water from one pass RO membrane filter received from Biokyowa, Inc. during applicability review.

WQ Criteria:
 Aquatic life chronic and acute standards were dissolved components
 Hardness of 193 mg/L was used to calculate criteria for metals, including CL and SO4, that are hardness dependent.
 Chloride, sulfate -- calculated based upon values from Biokyowa's September 21 letter of CL = 11.86 and SO4 = 18.19 mg/L and hardness of 193 mg/L.
 Hardness represents an estimated value provided by the Biokyowa in their September 21 letter for maximum discharge conditions.
Stream Flow and Mixing Zone Determination (does not apply for Minimally Degradation):
 Stream flow value for the Headwater Diversion Channel was obtained from the Biokyowa NPDES permit dated March 20, 2012.

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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.

7. MIXING CONSIDERATIONS

Mixing Zone (MZ): One-quarter (1/4) of the stream volume of flow; length one-quarter (1/4) mile. [10 CSR 20-7.031(4)(A)4.B.(III)(a)].

Zone of Initial Dilution (ZID): One-tenth (0.1) of the mixing zone volume of flow, not to exceed 10 times the effluent design flow. [10 CSR 20-7.031(4)(A)4.B.(III)(b)].

Stream flow values for the Headwater Diversion Channel were obtained from the BioKyowa NPDES permit dated March 20, 2012.

	Flow (cfs)	MZ (cfs)	ZID (cfs)
7Q10	86.0	21.5	2.2
1Q10	79.9	21.3	2.0
30Q10	100.9	25.2	-

8. PERMIT LIMITS AND MONITORING INFORMATION

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

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OUTFALL #001 – Process wastewater - Treatment facilities consist of a flow equalization basin facilitating pH adjustment, two complete activated sludge processes operated in parallel.

No changes are proposed for this outfall; therefore, this outfall will not be addressed in the antidegradation review. Please reference to the factsheet of the permit for more information.

OUTFALL #002 – Non contact cooling water /storm water/reverse osmosis reject water

WET TEST (Y OR N): Y FREQUENCY: ONCE/YEAR AEC: 86.6% METHOD: MULTIPLE

TABLE 5. EFFLUENT LIMITS FOR OUTFALL #002

PARAMETER	UNITS	DAILY MAXIMUM	MONTHLY AVERAGE	UNITS	DAILY MAXIMUM	BASIS FOR LIMIT (NOTE 1)	MONITORING FREQUENCY		
FLOW	MGD	*	*	SEE CURRENT PERMIT. NOT AN EXPANDED POC IN THE REVIEW.		FSR	ONCE/MONTH		
PH	SU	6.5-9.0	6.5-9.0			FSR	ONCE/MONTH		
BOD5	MG/L	*	*			NA	ONCE/MONTH		
TSS	MG/L	*	*			NA	ONCE/MONTH		
AMMONIA AS N (APRIL 1 – SEPT 30)	MG/L	*	*			WQBEL	ONCE/MONTH		
AMMONIA AS N (OCT 1 – MARCH 31)	MG/L	*	*			WQBEL	ONCE/MONTH		
OIL AND GREASE	MG/L	15	10			FSR	ONCE/MONTH		
TEMPERATURE	°F	*	*			NA	ONCE/MONTH		
ALUMINUM	µG/L	*	*			LBS/DAY	46.37	MDEL	ONCE/MONTH
CHLORIDE	MG/L	*	*			LBS/DAY	26568.41	MDEL	ONCE/MONTH
FLUORIDE	MG/L	*	*	LBS/DAY	232.20	MDEL	ONCE/MONTH		
IRON	µG/L	*	*	LBS/DAY	218.96	MDEL	ONCE/MONTH		
SELENIUM	µG/L	*	*	LBS/DAY	0.59	MDEL	ONCE/MONTH		
SULFATE	MG/L	*	*	LBS/DAY	61400.73	MDEL	ONCE/MONTH		
COPPER	µG/L	26.0	16.4	LBS/DAY	2.18	WQBEL/MDEL	ONCE/MONTH		
CHLORINE, TOTAL RES.	µG/L NOTE 2	7.5 (130 ML)	5.0 (130 ML)	LBS/DAY	0.54	MDEL	ONCE/MONTH		
LEAD	µG/L	*	*	LBS/DAY	0.78	MDEL	ONCE/MONTH		
NITRATE	MG/L	*	*	LBS/DAY	524.20	MDEL	ONCE/MONTH		
BARIUM	µG/L	*	*	LBS/DAY	238.76	MDEL	ONCE/MONTH		
ADDITIONAL PARAMETERS	BioKyowa submitted an MSDS for water treatment products likely to be used as part of the reverse osmosis water treatment. See Appendix B. Acute WET testing will be necessary due to the potential toxicity of the anti-scalant and potential for misapplication.								

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.**

NOTE 2 -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 130 µG/L WHEN USING THE DPD COLORIMETRIC METHOD #4500 – CL G. FROM STANDARD METHODS FOR THE EXAMINATION OF WATERS AND WASTEWATER. THE PERMITTEE WILL CONDUCT ANALYSES IN ACCORDANCE WITH THIS METHOD, OR EQUIVALENT, AND REPORT ACTUAL ANALYTICAL VALUES. MEASURED VALUES GREATER THAN OR EQUAL TO THE MINIMUM QUANTIFICATION LEVEL OF 130 µG/L WILL BE CONSIDERED VIOLATIONS OF THE PERMIT AND VALUES LESS THAN THE MINIMUM QUANTIFICATION LEVEL OF 130 µG/L WILL BE CONSIDERED TO BE IN COMPLIANCE WITH THE PERMIT LIMITATION.

* - MONITORING REQUIREMENTS ONLY.

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OUTFALL #003 – Land Application System

No discharge system. Antidegradation review does not apply.

9. RECEIVING WATER MONITORING REQUIREMENTS

See permit factsheet for receiving water monitoring requirements.

10. DERIVATION AND DISCUSSION OF LIMITS

Wasteload allocations and limits were calculated using two methods:

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

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

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:

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

Where: C_c = downstream concentration, the Water Quality Standard (WQS)
Q_s = Stream 7Q10 flow (ft³/s)
Q_{d1} = Current effluent **design** flow (ft³/s)
Q_{d2} = Proposed effluent **design** flow (ft³/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.

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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 used or determined in the absence of applicable chronic criteria. For most toxic and conventional POCs, the minimally-degrading maximum daily limits are determined by applying the WLA_c as the maximum daily (MDL) mass limitation. The WLA mass limitation must be applied as the maximum daily limit because the Antidegradation Implementation Procedure applies the FAC as pounds per day.

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

10.1. OUTFALL #001 – DISCHARGE OF TREATED PROCESS WASTEWATER TO DIFFUSER IN MISSISSIPPI RIVER

Outfall #001 is not part of the antidegradation review. Please refer to the permit for more information.

10.2. OUTFALL #002 – NON-CONTACT COOLING/STORM WATER / REVERSE OSMOSIS REJECT WATER OUTFALL

10.3. LIMIT DERIVATION

The process for limit derivation for Table 1 POCs is as follows:

- 1) EPA has established national standards based on the performance of treatment and control technologies for wastewater discharges to surface waters for certain industrial categories. Effluent limitations guidelines represent the greatest pollutant reductions that are economically achievable for an industry, and are based on Best Practicable Control Technology (BPT), Best Conventional Pollutant Control Technology (BCT), and Best Available Technology Economically Achievable (BAT). (Sections 304(b)(1), 304(b)(4), and 304(b)(2) of the CWA respectively)

At the time of drafting of this review, no effluent limit guidelines applicable to the permittee have been developed. EPA requires an evaluation of the need for case-by-case TBELs or Best Professional Judgment (BPJ) limitation. The regulation at § 125.3(c)(2) specifically cites the Clean Water Act, stating that technology-based treatment requirements may be imposed in a permit “on a case-by-case basis under section 402(a)(1) of the Act, to the extent that EPA-promulgated effluent limitations are inapplicable.”

BPJ limits have not been established and the need for limitations should be further evaluated during the permit modification. According to the Hall and Associates in an email dated 10/25/12, there is no additional treatment to reduce the dissolved contaminants in the reject water from reverse osmosis water treatment system that does not result in more concentrated brine, also requiring disposal. Consequently, this waste is managed to minimize the impact of discharge on the receiving water by enhancing dilution. Adequate dilution is considered BPT in this case. In a letter dated 10/26/2012, Hall and Associates conducted a BPJ analysis and concluded that adequate dilution should be considered the best disposal method and therefore BPT. The permit writer will further evaluate the proposed BPJ management practices outlined in the 10/26/2012 letter.

- 2) Determine using limit derivation method #2 outlined above for all applicable POCs the minimally degrading wasteload allocation and effluent limit (MDEL) that retains the remaining assimilative

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capacity and does not exceed 10% of the FAC. This MDEL value is first a concentration that is converted to a mass-based limitation and applied as a maximum daily limit.

- 3) The next step is to develop water quality-based effluent limits. The water quality-based maximum daily and average monthly limit will be compared to the MDEL maximum daily limit as a concentration value. If the MDEL concentration value is greater than the water quality-based maximum and average monthly limits, only the water quality limits will apply. If the MDEL concentration value is less than the water quality-based maximum and average monthly limits, the water quality-based limits and the MDEL maximum daily as a mass limit will apply.
- 4) 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 POCs receiving water concentration will exceed water quality standards or the maximum daily limit (MDL) of the MDEL in pounds per day.

The Table 6 below contains the minimally-degrading maximum daily limit for the pollutants of concern. Discussion of the assumptions and basis for the limits can be found below the table. The area in yellow in the table is a confirmation that the maximum daily limit (MDL) is less than 10 % degradation. Both the maximum daily mass limit and the concentration value are provided. The maximum daily limit as a concentration value will be compared to the water quality-based maximum daily and average monthly limit found in Table 7.

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- **Flow.** In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each 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.
- **Biochemical Oxygen Demand (BOD₅).** BOD₅ limits are monitoring only as indicated in the permit renewal. No antidegradation review is required for this pollutant.
- **Total Suspended Solids (TSS).** TSS limits are monitoring only as indicated in the permit renewal. No antidegradation review is required for this pollutant.
- **pH.** pH shall be maintained in the range from 6.5 to nine (6.5 – 9.0) standard units [10 CSR 20-7.015 (8)(A)2.]. pH is not a pollutant of concern for this antidegradation review.
- **Temperature.** Monitoring requirement only. See permit for more information.
- **Total Ammonia Nitrogen.** Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(4)(B)7.C. & Table B3]. Background total ammonia nitrogen = 0.01 mg/L. We are applying the water quality-based limits below with ammonia decay in the classified stream. The wasteload allocation was increase slightly to account for decay that will take place in the unclassified stream.

Ammonia is not a pollutant of concern in the antidegradation review; however, the hydraulic loading may result in changes to the final limitations. The current permit has monitoring only for 3 years from the issuance of the permit.

Season	Temp (°C)	pH (SU)	Total Ammonia Nitrogen CCC (mg N/L)	Total Ammonia Nitrogen CMC (mg N/L)
Summer	26	7.8	1.5	12.1
Winter	6	7.8	3.1	12.1

Summer: April 1 – September 30, Winter: October 1 – March 31.

$$C_e = (((Q_e + Q_s) * C) - (Q_s * C_s)) / Q_e$$

Summer:

Chronic WLA: $C_e = ((14.2 + 25.2)1.5 - (25.2 * 0.01)) / 14.2$
 $C_e = 4.1 \text{ mg/L}$

Acute WLA: $C_e = ((14.2 + 2.0)12.1 - (2.0 * 0.01)) / 14.2$
 $C_e = 13.8 \text{ mg/L}$

$LTA_c = 4.1 \text{ mg/L} (0.535) = 2.2 \text{ mg/L}$

[CV = 1.602, 99th Percentile, 30 day avg.]

$LTA_a = 13.8 \text{ mg/L} (0.137) = 1.9 \text{ mg/L}$

[CV = 1.602, 99th Percentile]

Use most protective number of LTA_c or LTA_a.

MDL = 1.9 mg/L (7.29) = 13.9 mg/L

[CV = 1.602, 99th Percentile]

AML = 1.9 mg/L (1.54) = 2.9 mg/L

[CV = 1.602, 95th Percentile, n =30]

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Winter:

Chronic WLA: $C_e = ((14.2 + 25.2)3.1 - (25.2 * 0.01))/14.2$
 $C_e = 8.6 \text{ mg/L}$

Acute WLA: $C_e = ((14.2 + 2.0)12.1 - (2.0 * 0.01))/14.2$
 $C_e = 13.9 \text{ mg/L}$

$LTA_c = 8.6 \text{ mg/L} (0.507) = 4.4 \text{ mg/L}$

[CV = 1.757, 99th Percentile, 30 day avg.]

$LTA_a = 13.9 \text{ mg/L} (0.128) = 1.8 \text{ mg/L}$

[CV = 1.757, 99th Percentile]

Use most protective number of LTA_c or LTA_a .

MDL = $1.8 \text{ mg/L} (7.81) = 14.1 \text{ mg/L}$

[CV = 1.757, 99th Percentile]

AML = $1.8 \text{ mg/L} (1.59) = 2.9 \text{ mg/L}$

[CV = 1.757, 95th Percentile, n=30]

As a result of the increased hydraulic flow from the RO reject water, there is no change in the ammonia permit limitations.

Season	Maximum Daily Limit (mg/l)	Average Monthly Limit (mg/l)
Summer	13.9	2.9
Winter	14.1	2.9

- **Oil & Grease.** Conventional pollutant, [10 CSR 20-7.031, Table A]. Oil and Grease is not a POC in the antidegradation review. As with the permit renewal, effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.
- **Total Residual Chlorine (TRC).** Warm-water Protection of Aquatic Life CCC = 10 µg/L, CMC = 19 µg/L [10 CSR 20-7.031, Table A]. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. This effluent limit is below the minimum quantification level (ML) of the most common and practical EPA approved CLTRC methods. See Note 2 below Table 5. The ML value lends to uncertainty in the actual discharge concentration, therefore, limits apply.
- **Chloride.** Protection of Aquatic Life Chronic and Acute Criteria (µg/L) are listed in Table 3, 4, and 7. Hardness was 193 mg/L and sulfate, 18.19 mg/L. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.
- **Sulfate.** Protection of Aquatic Life Chronic Criteria (µg/L) is listed in Table 3, 4, and 7. Hardness was 193 mg/L and chloride, 11.86 mg/L. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.
- **Fluoride, Total Recoverable.** Protection of Aquatic Life Chronic Criteria (mg/L) is listed in Table 3, 4, and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.

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- **Nitrate.** Drinking water criteria is listed in Table 3, 4, and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.

Metals

Non-hardness Dependent Metals:

Note: Minimally degrading effluent limits were determined for these metals. Limits were determined using the method described in the beginning of the Derivation and Discussion of Limits section and below Table 6 and 7 of this section. These Maximum Daily Limits will be compared to the reasonable potential analysis upon renewal, i.e., these limits will be compared to the calculated receiving water concentration (from future discharge monitoring data). No monitoring is available for the current discharge concentrations. No RPA was conducted.

- **Selenium, Total Recoverable.** Protection of Aquatic Life Chronic ($\mu\text{g/L}$) is listed in Table 3, 4, and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.
- **Aluminum, Total Recoverable.** Protection of Aquatic Life Acute Criteria ($\mu\text{g/L}$) is listed in Table 3, 4, and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.

Iron, Total Recoverable. Protection of Aquatic Life Chronic Criteria ($\mu\text{g/L}$) is listed in Table 3, 4, and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. The FAC ratio is close to the threshold; Monitoring only will be applied until a RPTE is determined. Staff believes limits should be imposed if the mass limitation is exceeded.

- **Barium, Total Recoverable.** Drinking water criteria ($\mu\text{g/L}$) is in Table 3, 4, and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.

Hardness Dependent Metals:

Effluent limitations for total recoverable metals were developed using methods and procedures outlined in EPA/505/2-90-001 and "The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion" (EPA 823-B-96-007). General warm-water fishery criteria apply and water hardness = 193 mg/L. Hardness was determined from data submitted with the September 21, 2012, revision of the *Antidegradation Report*.

Due to the absence of contemporaneous effluent and instream data for total recoverable metals, dissolved metals, hardness, and total suspended solids with which to calculate metals translators, partitioning between the dissolved and adsorbed phases was assumed to be minimal (Section 5.7.3, EPA/505/2-90-001). Freshwater criteria conversion factors for dissolved metals were used as the metals translator as recommended in guidance (Section 1.3, 1.5.3, and Table 1, EPA 823-B-96-007). If concurrent site-specific data for total recoverable metals, dissolved metals, hardness, and total

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suspended solids are provided to the department, partitioning evaluations may be considered and site-specific translators developed.

METAL	CONVERSION FACTORS	
	ACUTE	CHRONIC
Copper	0.960	0.960
Lead	0.695	0.695

Conversion factor for Pb is hardness dependent. Values calculated using equation found in Section 1.3 of EPA 823-B-96-007 and hardness = 193 mg/L.

- **Copper, Total Recoverable.** Protection of Aquatic Life Chronic and Acute Criteria ($\mu\text{g/L}$) are listed in Table 3, 4 and 7. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. The discharge has a potential to exceed water quality criteria with the proposed discharge concentration values used in the MDEL calculations, therefore limits are applied.
- **Lead, Total Recoverable.** Protection of Aquatic Life Chronic and Acute Criteria ($\mu\text{g/L}$) are listed in Table 3, 4 and 7; 14.5 mg/L average monthly limit and 9.7 mg/L maximum daily limit. Derived limitations in Table 6 and 7 were compared; MDEL is lower than the WQBEL; therefore, the both the mass-based MDEL and WQBELs apply. Monitoring only will be applied until a RPTE is determined.

The next step in the limit determination process is the comparison of the water quality-based effluent limit (WQBEL) and the minimally degrading maximum daily limit as a concentration value. Table 7 shows the WQBEL for the POCs. By comparison, all minimally degrading effluent limits in Table 6 are less than the WQBELs. Therefore mass-based maximum daily value will apply.

Upon renewal, a reasonable potential analysis will be conducted to determine the need for limits. The RPA should be conducted such that the receiving water concentration will not exceed water quality standard and the MDEL mass-based maximum daily limit. No RPA was conducted during this review due to the lack of effluent monitoring data.

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Table 7. Water Quality-based Effluent Limits for POCs discharge from Outfall 002.

Outfall #002
 Classified P streams only
 Facility Name BioKyowa Facility
 Permit Number MO-0101729
 Stream name Headwater Division

Allowable discharge is equal to $Ce = ((Qe + Qs)(Cc - (Qs + Cs)) / Qe)$
 Cc = downstream concentration, the Water Quality Standard
 Qs = Stream flow (ft³/s), or 1Q10, or 30Q10
 Qe = proposed effluent design flow (ft³/s)
 Cs = combined stream concentrations (see Footnote 1)
 Ce = effluent concentration
 * Qs decreased by 0.25 for mixing zone and 0.025 for zone of initial dilution considerations

WLAAs= Ce using the chronic WQS
 WLAc= Ce using the acute WQS
 LTAA = WLA acute * LTAa multiplier
 LTAC = WLA chronic * LTAc multiplier
 MDL ug/L = the more protective LTA (LTAa or LTAc) * AML multiplier
 AML ug/L = the more protective LTA (LTAa or LTAc) * MDL multiplier

Units: Metals, TRC = ug/L; Fluoride, Chloride, nitrate, Sulfate = mg/L	Acute (Cc)		Chronic Drinking Water Standard or WBC		Existing Water Quality		WLAa		WLAc		LTAA		LTAC		MDL		AML	
	Acute (Cc)	Chronic (Cc)	Water Quality	Standard or WBC	Water Quality	WLAa	WLAc	LTAA	LTAC	MDL	AML							
Aluminum ¹	750.0		10.20		0.00	862.40		276.9				0.0	862.4		429.9			
Chloride ²	684.0	423.0	7.60		1054.14	786.77		252.6		556.0		556.0	786.8		392.2			
Fluoride ¹		4.0	0.05		10.00	0.00		0.0		7.8		7.8	24.3		9.3			
Iron ¹		1000.0	48.30		2445.98	0.00		0.0		1290.1		1290.1	4017.9		2002.8			
Selenium ¹		5.0	0.10	50.0	12.44	0.00		0.0		6.6		6.6	20.4		10.2			
Sulfate ²		1061.0	12.30		2654.36	0.00		0.0		1400.0		1400.0	4360.2		2173.4			
Copper ²	26.0	16.4	0.40	1300.0	40.71	29.89		9.6		21.5		21.5	29.9		14.9			
Chlorine, Total Res.	19.0	10.0	0.01		25.18	21.89		7.0		13.3		13.3	31.0		10.9			
Lead	188.4	7.3	0.10	15.0	18.24	217.01		69.7		9.6		9.6	30.0		14.9			
Nitrate ²			10.0		0.42	0.00		NA		NA		NA	49.3		24.6			
Barium			2000.0		0.10	0.00		NA		NA		NA	10108.3		5038.6			

Footnote 1: Up stream water quality was obtained from the USGS water quality sampling station - Castor River at Greenbriar, MO.

Footnote 2: Copper value from USGS sampling on L. Whitewater River, near Millersville, Mo.

Nitrate from the MDNR sampling on the Whitewater River.

Chloride, sulfate -- from the MDNR sampling database Headwater Diversion Channel Mouth.

Upstream water quality for Barium, Lead and TRC were conservatively assumed.

Assumptions and Basis:

CV = 0.6

For LTA, MDL the 95th Percentile was used.

For AML, the 95th Percentile was used.

Metals Multiplier:

LTAA = 0.321

LTAC = 0.527

MDL = WLA

AML = AML * 2.01

Mixing Zone Determination:

Mixing Zone (MZ): One-quarter (1/4) of the stream volume of flow, length one-quarter (1/4) mile. [10 CSR 20-7.031(4)(A)4.B.(III)(a)].

Zone of Initial Dilution (ZID): One-tenth (0.1) of the mixing zone volume of flow, not to exceed 10 times the effluent design flow. [10 CSR 20-7.031(4)(A)4.B.(III)(b)].

Explanation of Limits:

Because the discharge has potential to impact Mississippi River which has drinking water designated uses nitrate and barium were retained.

The lesser of the LTAA or LTAC was used to determine MDL and AML (shown in bold letters above on table).

The presence of zeros in the WLA and LTA columns indicates that no water quality criteria available.

Nitrate and Barium follow EPA TSD Section 5.4.4 WQBEL procedure.

Hardness provided by the BioKyowa in their September 21 letter for maximum discharge conditions.

WQ Criteria:

Acute life chronic and acute standards were dissolved components

Hardness of 193 mg/L was used to calculate criteria for metals, including CL and SO4, that are hardness dependent.

Chloride, sulfate -- calculated based upon values from BioKyowa's September 21 letter of CL=11.86 and SO4=18.19 mg/L and hardness of 193 mg/L.

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11. ANTIDegradation REVIEW PRELIMINARY DETERMINATION

Biokyowa's proposed discharge from Outfall #002, 9.135 MGD or 14.2 cfs, will result in minimal degradation of the segment identified in the antidegradation review. 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. The permit writer will further evaluate the proposed BPJ management practices outlined in the 10/26/2012 letter. MDNR has determined that the submitted review is sufficient to meet the requirements of the AIP.

Reviewer: Todd J. Blanc

Date: December 20, 2012

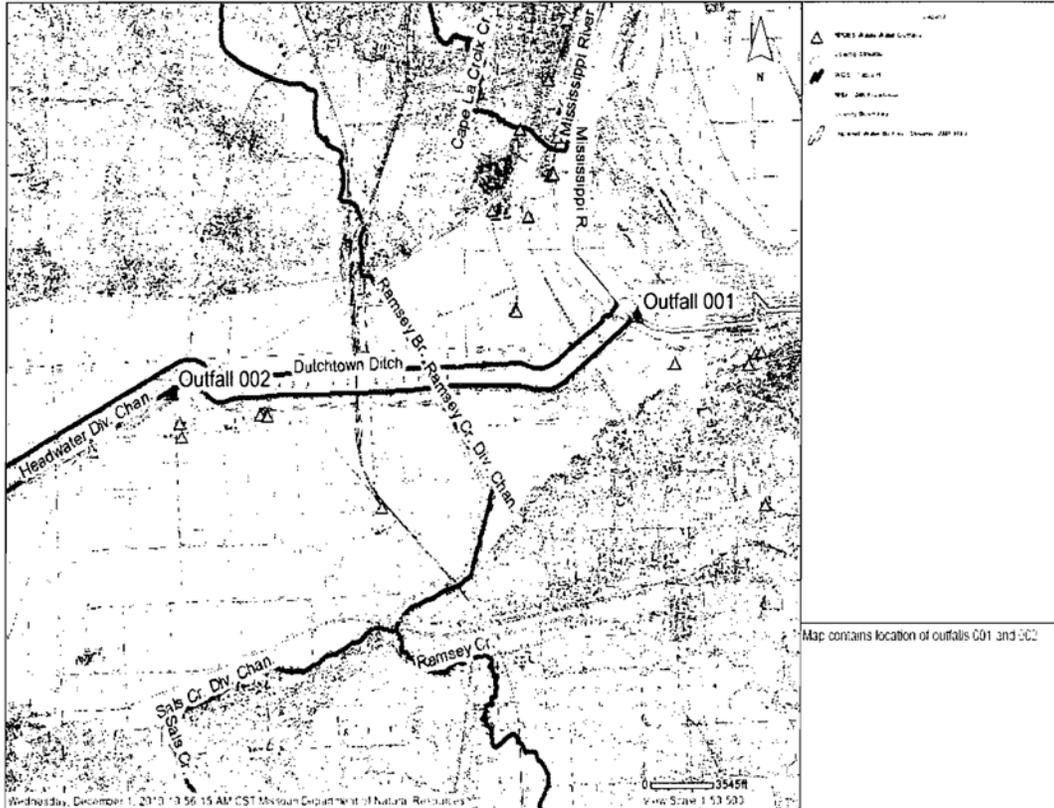
Unit Chief: John Rustige, P.E.



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Appendix A: Map of Discharge Location

Biokyowa Inc. MO-0101729 Outfall Map



Missouri
Department of
Natural Resources

Disclaimer: Although this map has been compiled by the Missouri Department of Natural Resources, no warranty, expressed or implied, is made by the department as to the accuracy of the data and related materials. The act of distribution shall not constitute any such warranty, and no responsibility is assumed by the department in the use of these data or related materials.

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Appendix C: Antidegradation Review Summary Attachments

The attachments that follow contain summary information provided by the applicant, Biokyowa, Inc. 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: The applicant checked "yes" for the non-degrading box on page 24 below. The degradation is insignificant, therefore the answer should have been "no." Effluent limits on page 26 that were provided by the applicant were developed by a different method; therefore, they were not used.
- 2) Attachment B: No changes needed.

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MISSOURI DEPARTMENT OF NATURAL RESOURCES
 WATER PROTECTION PROGRAM
ANTIDEGRADATION REVIEW SUMMARY
TIER DETERMINATION AND EFFLUENT LIMIT SUMMARY

1. FACILITY

NAME BioKyowa, Inc.		TELEPHONE NUMBER WITH AREA CODE 573 335-4849 x127	
ADDRESS (PHYSICAL) 5469 Nash Road	CITY Cape Girardeau	STATE MO	ZIP CODE 63702-1550

2. RECEIVING WATER BODY SEGMENT #1

NAME
Headwater Diversion Channel

2.1 UPPER END OF SEGMENT (Location of discharge)
 UTM _____ OR Lat 37.2, Long 89.6

2.2 LOWER END OF SEGMENT
 UTM _____ OR Lat 37.3, Long 89.5

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

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

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.

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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.

Data 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
	Aluminum, Barium	
	Total Residual Chlorine, Copper	
	Iron, Lead, Selenium	
	Chloride, Fluoride	
	Nitrate, Sulfate	

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?

Not Applicable

Wet Weather Design Summary:

Not Applicable

MO 780-2025 (05-09)

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9. SUMMARY OF THE PROPOSED ANTI-DEGRADATION 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)		(lbs/d)		
Aluminum/Barium	ug/L	23.3/187.3	305/2,455	612/4,926
TRC/Copper	ug/L	0.54/0.96	7.1/12.6	14.3/25.4
Iron/Lead	ug/L	152.5/0.60	1,999/7.86	4,011/15.8
Selenium	ug/L	0.59	7.78	15.6
Chloride/Fluoride	mg/L	24,802/233.8	325/3.06	652/6.15
Nitrate/Sulfate	mg/L	523/62,602	6.85/820	13.8/1,646

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: William T. Hall DATE: 09/17/2012

NAME AND OFFICIAL TITLES: William T. Hall

COMPANY NAME: Hall & Associates

ADDRESS: 1620 I Street, NW CITY: Washington STATE: DC ZIP CODE: 20006

TELEPHONE NUMBER WITH AREA CODE: 202 463-1166 E-MAIL ADDRESS: bhall@hall-associates.com

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

SIGNATURE: Dave Jennings DATE: 9-19-12

NAME AND OFFICIAL TITLES: For Biokyowa Inc. Dave Jennings, Supt. of Environ. Affairs

ADDRESS: 5469 NASH ROAD CITY: CAPE GIRARDEAU STATE: MO ZIP CODE: 63701

TELEPHONE NUMBER WITH AREA CODE: 573-335-4849 x-127 E-MAIL ADDRESS: dave.jennings@biokyowa.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/csricument/10csr/10c20-6a.pdf.

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

SIGNATURE: Dave Jennings DATE: 9-19-12

NAME AND OFFICIAL TITLES: For Biokyowa Inc. Dave Jennings Supt of Environ. Affairs

ADDRESS: 5469 NASH ROAD CITY: CAPE GIRARDEAU STATE: MO ZIP CODE: 63701

TELEPHONE NUMBER WITH AREA CODE: 573-335-4849 x-127 E-MAIL ADDRESS: dave.jennings@biokyowa.com

BioKyowa Inc.
 December 2012
 Page 28



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH
ANTIDEGRADATION REVIEW SUMMARY
ATTACHMENT B: TIER 2 – MINIMAL DEGRADATION

1. FACILITY

NAME BioKyowa, Inc.		TELEPHONE (WITH AREA CODE) (573) 335-4849	
ADDRESS (PHYSICAL) 5469 Nash Road	CITY Cape Girardeau	STATE MO	ZIP CODE 63702

2. RECEIVING WATER BODY SEGMENT #1

NAME Headwater Diversion Channel

3. WATER BODY SEGMENT #2 (IF APPLICABLE)

NAME N/A

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	New Load	Percent of Facility Assimilative Capacity
	(lbs/day)	(lbs/day)	(%)
Aluminum (dissolved)	395	<1.27	<0.32
Chloride	208,197	815.4	0.39
Fluoride	2,124	3.74	0.18
Iron (dissolved)	352.7	29.1	8.25
Selenium (dissolved)	1.88	<0.063	<3.36
Sulfate	332,040	960	0.29

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
Aluminum (dissolved)	400	<1.27	<0.32			
Chloride	210,892	815.4	0.39			
Fluoride	2,154	3.74	0.17			
Iron (dissolved)	342.2	29.1	8.51			
Selenium (dissolved)	1.88	<0.063	<3.36			
Sulfate	336,521	960	0.29			

Assimilative Capacity Summary

See attached report.

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

See attached report

MINIMAL DEGRADATION CALCULATIONS

See attached report

BioKyowa Inc.
 December 2012
 Page 29

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

See attached report

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
	08/01/2012

PRINT NAME
 William T. Hall

TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
(202) 463-1166	bhall@hall-associates.com

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

SIGNATURE	DATE

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

SIGNATURE	DATE

APPENDIX # 2 – DERIVATION AND DISCUSSION OF LIMITS FOR 001 TIER 1 AND 2

Procedure for Developing Effluent Limits for BioKyowa

1. Segregate daily performance data into Tier 1 and Tier 2 performance based on production.
2. Calculate monthly averages from daily monitoring data for each Tier.
3. Prepare statistical evaluations for daily observations based on TSD approach assuming data are log-normally distributed.
4. Prepare independent statistical evaluations for monthly average results as in Item 3.
5. Plot data and TSD model distribution.
6. Visually inspect charts for goodness of fit.
7. Where the log-normal distribution does not provide a good fit to the data at the upper end of the distribution that we are trying to estimate, calculate an alternative best-fit line for the upper end of the distribution by estimating a slope (equal to the log standard deviation) and passing the line through a point at the upper end of the distribution. In most cases this results in an effluent limit that is significantly less than the limit calculated using the TSD method.
8. Evaluate the results as follows:
 - a. If the TSD model provides a good fit to the data at the upper end of the distribution, calculate the 99th percentile value. This is the revised limit for Tier 1. For Tier 2, adjust the 99th percentile value for production at the maximum Tier 2 production level. The Tier 2 data from Step 1 includes production rates up to 703 MT/month. Tier 2 had an initial capacity of 775 MT/month as indicated in the 2005 permit renewal. The scale-up ratio is 1.102 (i.e., 775/703).
 - b. If the TSD model does not provide a good fit, use the alternative fit line to determine the 99th percentile value and adjust as indicated in Step 8a.
 - c. If the TSD model does not provide a good fit and the alternative fit line yields a result that shows a permit exceedance, the final limit should be set at either the current effluent limit or the maximum observed discharge load.
9. The selected values in accordance with step 8 are presented in the tables below in bold.

Examples

A. TSD Model provides a good fit to the data.

See analyses for Tier 1 MDL – COD, BOD5; Tier 1 AML – BOD5, Ammonia; Tier 2 MDL – BOD5; Tier 2 AML – COD

B. Alternate Best-Fit Line provides a better fit than the TSD Model

See analyses for Tier 1 MDL – TSS; Tier 1 AML – TSS, COD; Tier 2 MDL – TSS, COD, Ammonia; Tier 2 MDL – TSS, BOD5, and Ammonia

C. Neither the TSD Model or the Alternative Best-Fit Line provide an appropriate final limit. See analysis for Tier 1 MDL – Ammonia. The TSD model overshoots the limit (28,017 lbs/d), the Alternate Best-Fit Line under-estimates the limit (13,694 lbs/d). The actual performance was 14,104 lbs/d and the current limit is 14,143 lbs/day. Retain the current effluent limit.

BioKyowa Performance Evaluation Summary

Tier 1 MDL	TSS	COD	BOD5	Ammonia
Parameter				
2005 NPDES Limit	18,125	34,447	14,137	14,143
2006-2010 Maximum	16,735	34,833	10,411	14,104
TSD 99th Percentile	31,320	39,318	12,147	28,017
Alt 99th Percentile	18,431	24,441	10,381	13,694

Tier 1 AML	TSS	COD	BOD5	Ammonia
Parameter				
2005 NPDES Limit	9,512	19,183	4,270	8,947
2006-2010 Maximum	9,114	16,543	3,981	7,304
TSD 99th Percentile	14,365	15,796	4,674	9,631
Alt 99th Percentile	13,033	21,551	4,795	9,892

Tier 2 MDL	TSS	COD	BOD5	Ammonia
Parameter				
2005 NPDES Limit	18,125	34,447	14,137	14,143
2006-2010 Maximum	17,368	35,448	13,825	14,436
TSD 99th Percentile	34,717	54,074	16,425	83,736
Alt 99th Percentile	17,123	34,149	13,412	14,285
Scale-Up TSD	38,272	59,612	18,107	92,312
Scale-Up Alt	18,877	37,647	14,786	15,748

Tier 2 AML	TSS	COD	BOD5	Ammonia
Parameter				
2005 NPDES Limit	12,904	25,948	5,769	11,611
2006-2010 Maximum	11,103	19,495	10,455	10,872
TSD 99th Percentile	16,180	32,679	8,248	21,053
Alt 99th Percentile	12,801	35,228	10,600	13,574
Scale-Up TSD	17,837	36,026	9,093	23,209
Scale-Up Alt	14,112	38,836	11,686	14,965

APPENDIX # 3 RPA RESULTS:

RPA RESULTS: OUTFALL 001

Parameter	CMC*	RWC Acute*	CCC*	RWC Chronic*	n**	Range max/min	CV***	MF	RP Yes/No
Total Ammonia as Nitrogen (Summer) mg/L	12.10	6.63	1.50	0.58	115	1,850/1.0	0.814513	4.075	No
Total Ammonia as Nitrogen (Winter) mg/L	12.10	4.56	3.10	0.40	129	1,343/13.0	0.681833	3.477	No

RPA RESULTS: OUTFALL 002

Parameter	CMC*	RWC Acute*	CCC*	RWC Chronic*	n**	Range max/min	CV***	MF	RP Yes/No
Total Ammonia as Nitrogen (Summer) mg/L	12.10	12.54	1.50	5.02	21	2.7/0.02	1.601786	7.29	Yes
Total Ammonia as Nitrogen (Winter) mg/L	12.10	47.20	3.10	18.89	18	8.24/0.05	1.757214	7.80	Yes

N/A – Not Applicable

* - Units are (µg/L) unless otherwise noted.

** - If the number of samples is greater than 10, then the CV value must be used in the WQBEL for the applicable constituent.

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

RWC – Receiving Water Concentration. It is the concentration of a toxicant or the parameter toxicity in the receiving water after mixing (if applicable).

n – Is the number of samples.

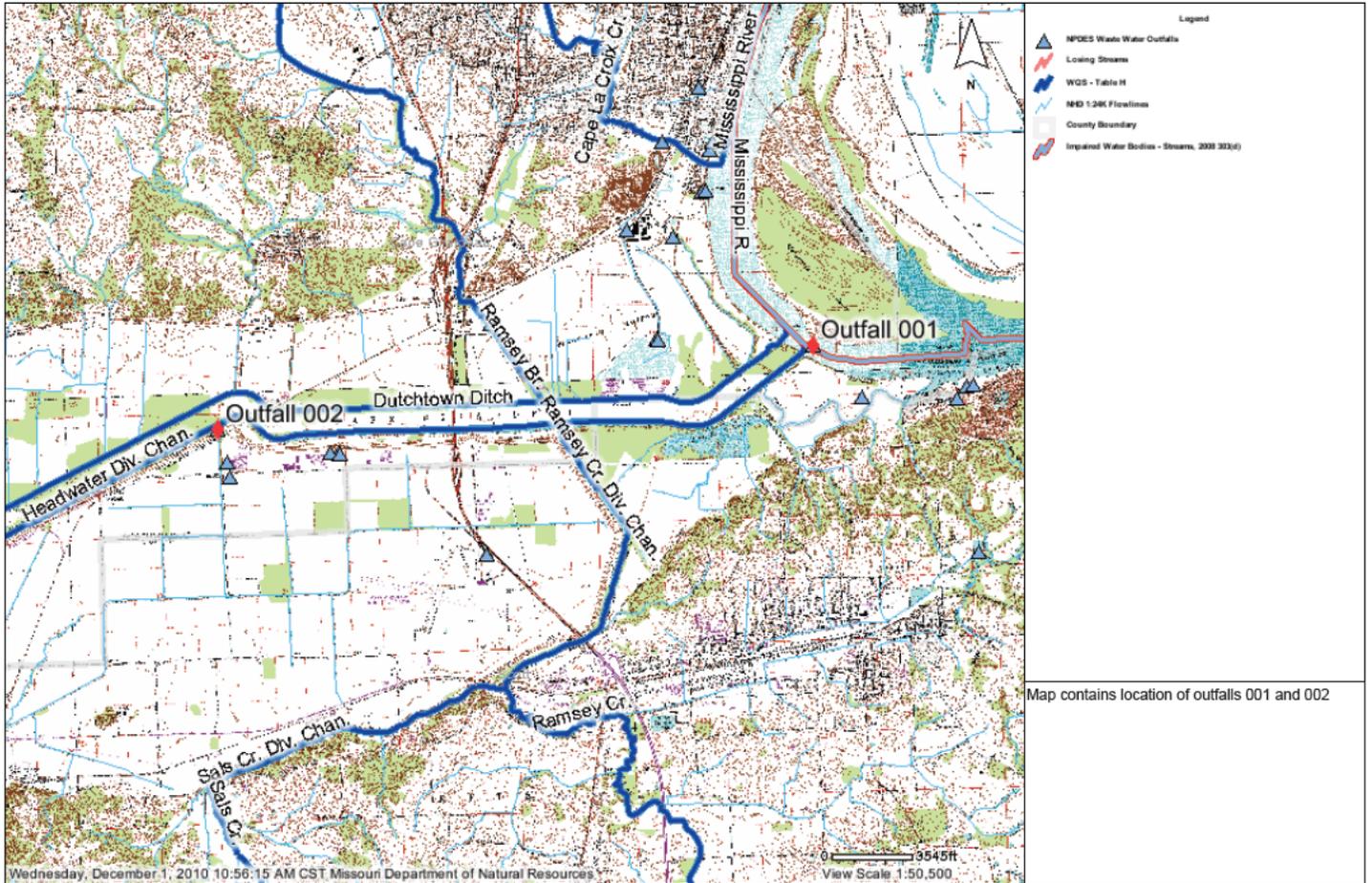
MF – Multiplying Factor. 99% Confidence Level and 99% Probability Basis.

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

Reasonable Potential Analysis is conducted as per (TSD, EPA/505/2-90-001, Section 3.3.2). A more detailed version including calculations of this RPA is available upon request.

APPENDIX # 4 – OUTFALL MAP

Biokyowa Inc. MO-0101729 Outfall Map



Disclaimer: Although this map has been compiled by the Missouri Department of Natural Resources, no warranty, expressed or implied, is made by the department as to the accuracy of the data and related materials. The act of distribution shall not constitute any such warranty, and no responsibility is assumed by the department in the use of these data or related materials.

APPENDIX #5 -- Initial Zones of Dilution for Bacteria in Rivers and Streams Designated for Primary Contact Recreation

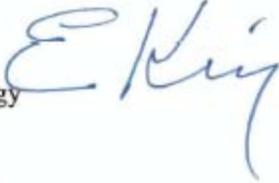


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 12 2008

OFFICE OF
WATER

MEMORANDUM

FROM: Ephraim S. King, Director
Office of Science and Technology 

TO: William Spratlin, Director
Water, Wetlands and Pesticides

SUBJECT: **Initial Zones of Dilution** for Bacteria in Rivers and Streams
Designated for Primary Contact Recreation

I understand that Region 7 is receiving inquiries regarding the appropriateness of initial zones of dilution (i.e., mixing zones¹) for bacteria criteria in rivers and streams designated for primary contact recreation. This memorandum provides our perspective on this issue. In brief, the presumption in a river or stream segment designated for primary contact recreation is that primary contact recreation can safely occur throughout the segment, and, therefore that bacteria levels will not exceed criteria throughout the segment. Given this, mixing zones that allow for elevated levels of bacteria in rivers and streams designated for primary contact recreation are inconsistent with the designated use and should not be permitted because these could result in a significant health risk. For example, effluent from a wastewater treatment plant that increases bacteria levels ten-fold may be associated with risk that far exceeds those that have been measured in epidemiological studies and judged to be acceptable for protection of human health.

EPA's long-standing policy to ensure protection of human health has been that initial zones of dilution are not appropriate where they may pose "significant health

¹ A mixing zone is a limited, defined area in a waterbody where an effluent discharge undergoes initial dilution and secondary mixing. States and Tribes have discretionary authority to include policies on mixing zones in their water quality standards. 40 C.F.R. 131.13. Such policies are subject to EPA approval. *American Wildlands v. Browner*, 260 F.3d 1192, 1195 (10th Cir. 2001). EPA does not have "mixing zone" regulations; instead, EPA's recommendations regarding mixing zones are expressed in technical and policy guidance. E.g., Water Quality Standards Handbook: Second Edition (EPA-833-B-94-005a, August 1994); EPA's Technical Support Document for Water Quality-based Toxics Control, March 1991 (TSD). The basic concept of a mixing zone is that it may be appropriate to allow for ambient concentrations above the criteria in small areas near outfalls under certain circumstances so long as the existing and designated use of the water body as a whole is maintained. EPA's Water Quality Standards Handbook: Second Edition (EPA-833-B-94-005a, August 1994). Page 5-1. Regarding mixing zones for bacteria, an important consideration is that there are not significant health risks associated with establishing a mixing zone, considering likely pathways of exposure. EPA's Water Quality Standards Handbook: Second Edition (EPA-833-B-94-005a, August 1994). Page 5-7 to 5-8.

APPENDIX #5 Cont.-- Initial Zones of Dilution for Bacteria in Rivers and Streams Designated for Primary Contact Recreation

risks”² or where “they may endanger critical areas (e.g., drinking water supplies, **recreational areas** (emphasis added), breeding grounds, areas with sensitive biota)”³. Such a “significant health risk” could be presented where an initial zone of dilution for bacteria is established in rivers and streams designated for primary contact recreation. This is because recreational uses are typically designated for the whole waterbody or segment and people are assumed to be protected for swimming and other contact recreation activities at an acceptable risk level throughout the waterbody or segment. The underlying principle of these zones is that the designated use will be attained even though there is the potential for organisms to be exposed above the protective criteria level. For aquatic life uses, EPA has been clear in stating that initial zones of dilution should be restricted to avoid exposures leading to an acute endpoint of lethality. With respect to recreation and human health protection, the acute endpoint is gastrointestinal illness. People recreating in or downstream from an initial zone of dilution (where bacteria levels may be elevated above the criteria levels) may be exposed to greater risk of the acute endpoint of gastrointestinal illness than would be allowed by the criteria the State adopted to protect the recreational use of the water.

In large rivers in particular, an assumption of complete, immediate mixing may not be appropriate. EPA has recognized that zones of incomplete lateral mixing may extend for the equivalent of many channel widths downstream before uniformly mixed conditions are attained, if indeed they ever are. This means that there could be areas or plumes of higher bacterial concentrations in the ambient water far from the initial discharge point. Because the fate and transport of bacteria in these areas or plumes can be difficult to reliably predict in a river system (in part because of the day-to-day variability in weather conditions and flow), these areas or plumes of higher bacterial concentrations may migrate into various portions of the water segment, including near shore areas. Because people swimming in such an area may ingest water containing high concentrations of bacteria and potentially pathogens – we cannot envision a circumstance where discharges that elevate bacteria levels beyond criteria can be viewed as protective of the primary recreation use in fresh, flowing waters like rivers and streams.

I hope this clarification is helpful. If you have any questions or need additional information, please do not hesitate to contact me or have your staff call Amy Newman at 202-566-0723.

² EPA's Water Quality Standards Handbook: Second Edition (EPA-833-B-94-005a, August 1994). Page 5-7 to 5-8. EPA's Technical Support Document for Water Quality-based Toxics Control (EPA-505-2-90-001, March 1991). Page 34.

³ EPA's Technical Support Document for Water Quality-Based Toxics Control (EPA-505-2-90-001, March 1991). Page 70.

APPENDIX 6 – Interim Objection to St. Charles River Wastewater Treatment Facility Draft Permit



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 7
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

15 AUG 2008

Mr. Doyle Childers, Director
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, Missouri 65102

**Re: Interim Objection to St. Charles Missouri River Wastewater Treatment Facility
Draft Permit**

Dear Mr. Childers:

In addition to the general objection that Environmental Protection Agency (EPA) has to the draft National Pollutant Discharge Elimination System (NPDES) permit for the St. Charles Missouri River Wastewater Treatment Facility (WWTF), permit number MO-0058351, hereafter referred to as the St. Charles permit, EPA Region 7 requests that information be provided in order to better understand the basis for the terms of the draft St. Charles permit. The EPA is hereby requesting information to determine the appropriateness of mixing zones for *Escherichia coli* (*E. coli*) in the Missouri River and to better understand the alternative effluent limits developed for one of the facility outfalls. Please submit the requested information within 30 days of your receipt of this letter. Please understand that once EPA requests information on a draft permit, the period for EPA's review and additional comment on the draft permit is continued until EPA receives the requested information. Specifically, 40 CFR § 123.44(d)(2) states the following:

If this request is made within 30 days of receipt of the State submittal under Sec. 123.43 (or, in the case of a sewage sludge management program, Sec. 501.21 of this chapter), it will constitute an interim objection to the issuance of the permit, and the full period of time specified in the Memorandum of Agreement for the Regional Administrator's review will recommence when the Regional Administrator has received such record or portions of the record;

The EPA hereby requests additional information on the following matters:

1. A mixing zone is a limited or defined area where applicable water quality criteria may be exceeded as long as certain conditions are met. An important condition is that no significant health risks are associated with establishing a mixing zone, considering likely pathways of exposure. The EPA's *Water Quality Standards Handbook: Second Edition* (EPA-823-B-94-005a, August 1994) and EPA's *Technical Support Document for Water Quality Based*



APPENDIX 6 – Interim Objection to St. Charles River Wastewater Treatment Facility Draft Permit continued

Toxics Control (EPA-505-2-90-001, March 1991), advise against the use of a mixing zone where the location may pose a significant health risk. It is necessary when assessing the risk that the appropriate placement and size of the mixing zone are considered. The Missouri River has been designated a recreational use water including Secondary Contact Recreation and WBC-B. Also, EPA understands that a large public park is located along the Missouri River in front of and adjacent to the St. Charles WWTF. The park includes several trails providing access to the riverfront and a boat ramp located approximately 0.65 miles upstream of the WWTF outfall. Please provide a detailed description of the logic and data used to establish the location and size of the proposed mixing zone for bacteria to assure no significant health risks existed with the establishment of the mixing zone.

2. Provide an explanation of how the use of a mixing zone for bacteria is in accordance with the Missouri Code of State Regulations. Specifically, the general criteria at 10 CSR § 20-7.031(3)(E) applicable to all waters of the state including mixing zones, which states that there shall be no significant human health hazard from incidental contact with the water. Additionally, the specific criteria at 10 CSR § 20-7.031(4)(A)4., requires that mixing zones shall be exempt from chronic criteria requirements when “rendered nontoxic by dilution, dissipation or rapid chemical transformation.” The basic concept of a mixing zone is that sometimes it is appropriate to allow for ambient concentrations above the criteria in small areas near outfalls so long as it protects the designated use of the water body as a whole. However, people are generally protected for swimming and other contact recreation at all locations within a water body. Recreational uses are typically designated for the whole water body. Because dilution only reduces the risk of exposure, it is unclear how the mixing zone would allow for protection of incidental contact with the water and further meet the state’s requirements for exemption from the chronic criteria.
3. Outfall 001 is described as the main facility outfall and Outfall 003 is described as an alternative facility sampling location. The St. Charles permit establishes separate final effluent limits for *E. coli* for each outfall. The *E. coli* effluent limits for Outfall 001 and Outfall 003 are monthly averages of 2400 colonies per 100 mL and 3600 colonies per 100 mL, respectively. Please provide a detailed explanation for the alternative effluent limits for *E. coli* at Outfall 003.

Pursuant to 40 CFR § 123.29, the St. Charles permit may not be issued by the Missouri Department of Natural Resources (MDNR) until the information requested by this letter has been provided to EPA.

APPENDIX 6 – Interim Objection to St. Charles River Wastewater Treatment Facility Draft Permit continued

If you have questions, please contact Pradip L. Dalal, P.E., Chief, Wastewater and
Infrastructure Management Branch, at 913-551-7454.

Sincerely,



William A. Spratlin
Director
Water, Wetlands, and Pesticides Division

cc: Kendall Coleman, St. Charles Missouri River WWTF



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH
**FORM A - APPLICATION FOR CONSTRUCTION OR OPERATING PERMIT
 UNDER MISSOURI CLEAN WATER LAW**

AP 144609

FOR AGENCY USE ONLY	
CHECK NUMBER	137858
DATE RECEIVED	FEE SUBMITTED
1/15/13	\$225.00 <i>8/3</i>

Note ▶ PLEASE READ THE ACCOMPANYING INSTRUCTIONS BEFORE COMPLETING THIS FORM.

1. This application is for:

An operating permit and antidegradation review public notice

A construction permit following an appropriate operating permit and antidegradation review public notice

A construction permit and concurrent operating permit and antidegradation review public notice

A construction permit (submitted before Aug. 30, 2008 or antidegradation review is not required)

An operating permit for a new or unpermitted facility Construction Permit # _____

An operating permit renewal: permit # MO- _____ Expiration Date _____

An operating permit modification: permit # MO- 0101729 Reason: Additional stream source

1.1 Is the appropriate fee included with the application? (See instructions for appropriate fee) YES NO

2. FACILITY

NAME		TELEPHONE WITH AREA CODE	
BioKyowa Inc.		(573) 335-4849	
ADDRESS (PHYSICAL)		FAX (573) 335-1466	
5469 Nash Road	CITY	STATE	ZIP CODE
	Cape Girardeau	MO	63701

3. OWNER

NAME		E-MAIL ADDRESS		TELEPHONE WITH AREA CODE	
Kyowa Hakko Bio				(573) 335-4849	
ADDRESS (MAILING)		CITY		FAX (573) 335-1466	
P.O. Box 1550	Cape Girardeau	STATE	ZIP CODE		
		MO	63702		

3.1 Request review of draft permit prior to public notice? YES NO

4. CONTINUING AUTHORITY

NAME		TELEPHONE WITH AREA CODE	
Same			
ADDRESS (MAILING)		FAX	
	CITY	STATE	ZIP CODE

5. OPERATOR

NAME		CERTIFICATE NUMBER		TELEPHONE WITH AREA CODE	
BioKyowa Inc		NA		(573) 335-4849	
ADDRESS (MAILING)		CITY		FAX (573) 335-1466	
PO Box 1550	Cape Girardeau	STATE	ZIP CODE		
		MO	63702		

6. FACILITY CONTACT

NAME		TITLE		TELEPHONE WITH AREA CODE	
Dave Jennings		Superintendent of Environ. Affair		(573) 335-4849	
				FAX (573) 335-1466	

7. ADDITIONAL FACILITY INFORMATION

7.1 Legal Description of Outfalls. (Attach additional sheets if necessary.)

001 NW ¼ SE ¼ Sec 20 T 30N R 14E Cape County
 UTM Coordinates Easting (X): 809275 Northing (Y): 4128646
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

002 NE ¼ NE ¼ Sec 28 T 30N R 13E Cape County
 UTM Coordinates Easting (X): 809275 Northing (Y): 4127528

003 _____ ¼ _____ ¼ Sec _____ T _____ R _____ _____ County
 UTM Coordinates Easting (X): _____ Northing (Y): _____

004 _____ ¼ _____ ¼ Sec _____ T _____ R _____ _____ County
 UTM Coordinates Easting (X): _____ Northing (Y): _____

7.2 Primary Standard Industrial Classification (SIC) and Facility North American Industrial Classification System (NAICS) Codes.

001 - SIC 2048 and NAICS _____ 002 - SIC _____ and NAICS _____
 003 - SIC _____ and NAICS _____ 004 - SIC _____ and NAICS _____

8. ADDITIONAL FORMS AND MAPS NECESSARY TO COMPLETE THIS APPLICATION (Complete all forms that are applicable.)			
A.	Is your facility a manufacturing, commercial, mining or silviculture waste treatment facility? If yes, complete Form C (unless storm water only, then complete U.S. Environmental Protection Agency Form 2F per Item C below).	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
B.	Is your facility considered a "Primary Industry" under EPA guidelines: If yes, complete Forms C and D.	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
C.	Is application for storm water discharges only? If yes, complete EPA Form 2F.	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D.	Attach a map showing all outfalls and the receiving stream at 1" = 2,000' scale.		
E.	Is wastewater land applied? If yes, complete Form I.	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
F.	Is sludge, biosolids, ash or residuals generated, treated, stored or land applied? If yes, complete Form R.	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
9. DOWNSTREAM LANDOWNER(S) Attach additional sheets as necessary. See Instructions. (PLEASE SHOW LOCATION ON MAP. SEE 8.D ABOVE).			
NAME Little River Drainage District			
ADDRESS 1440 Kurre lane		CITY Cape Girardeau	STATE MO
		ZIP CODE 63701	
10. I certify that I am familiar with the information contained in the application, that to the best of my knowledge and belief such information is true, complete and accurate, and if granted this permit, I agree to abide by the Missouri Clean Water Law and all rules, regulations, orders and decisions, subject to any legitimate appeal available to applicant under the Missouri Clean Water Law to the Missouri Clean Water Commission.			
NAME AND OFFICIAL TITLE (TYPE OR PRINT) Tatsuya Ogawa, President		TELEPHONE WITH AREA CODE (573) 335-4849	
SIGNATURE 		DATE SIGNED 1-23-2013	

MO 780-1479 (01-09)

BEFORE MAILING, PLEASE ENSURE ALL SECTIONS ARE COMPLETED AND ADDITIONAL FORMS, IF APPLICABLE, ARE INCLUDED.

Submittal of an incomplete application may result in the application being returned.

HAVE YOU INCLUDED:

- Appropriate Fees?
- Map at 1" = 2000' scale?
- Signature?
- Form C, if applicable?
- Form D, if applicable?
- Form 2F, if applicable?
- Form I (Irrigation), if applicable?
- Form R (Sludge), if applicable?

**INSTRUCTIONS FOR COMPLETING FORM A
APPLICATION FOR CONSTRUCTION OR OPERATING PERMIT**

1. Check which option is applicable. **Do not check more than one item.** Construction and operating permit refer to permits issued by the Department of Natural Resources' Water Protection Program, Water Pollution Control Branch. Effective Sept. 1, 2008, a facility will be required to use *MISSOURI'S ANTIDEGRADATION RULE AND IMPLEMENTATION PROCEDURE*. For more information, this document can be reviewed at www.dnr.mo.gov/env/wpp/docs/aip-cwc-appr-050708.pdf. This procedure will be applicable to new and expanded wastewater facilities and requires the proposed discharge to a water body to undergo a level of Antidegradation Review, which documents that the use of a water body's available assimilative capacity is justified.

- 1.1 An operating permit and antidegradation review public notice requires a Water Quality/Antidegradation Review Sheet to be submitted with the application (No fee required).

CONSTRUCTION PERMIT FEES

- A. \$750 for a sewage treatment facility with a design flow of less than 500,000 gallons per day.
B. \$2,200 for a sewage treatment facility with a design flow of 500,000 gallons per day or more.
Different application and construction fees are applicable if only sewer and/or lift stations are to be constructed.

OPERATING PERMIT FEES

If the application is for a site-specific permit re-issuance, send no fees. You will be invoiced separately by the department.

Discharges covered by section 644.052.4 RSMo. (Primary or Categorical Facilities)

- \$3,500 for a design flow under 1 mgd
\$5,000 for a design flow of 1 mgd or more

- A. Discharges covered by section 644.052.5 RSMo. (Secondary or Non-Categorical Facilities).

- \$1,500 for a design flow under 1 million gallons per day (mpg)
\$2,500 for a design flow of 1 mgd or more

SITE-SPECIFIC STORM WATER DISCHARGE FEES

- A. \$1,350 for a design flow under 1 mgd.
B. \$2,350 for a design flow of 1 mgd or more.

OPERATING PERMIT MODIFICATIONS, including transfers, are subject to the following fees:

- A. Municipals - \$200 each.
B. All others - 25 percent of annual fee.

Note: Facility name and address changes where owner, operator and continuing authority remain the same are not considered transfers.

Incomplete permit applications and/or related engineering documents will be returned by the department if they are not completed in the time frame established in a comment letter from the department to the owner. Permit fees for returned applications shall be forfeited. Permit fees for applications being processed by the department that are withdrawn by the applicant shall be forfeited.

2. Facility - Provide the name by which this facility is known locally. Example: Southwest Sewage Treatment Plant, Country Club Mobile Home Park, etc. Also include the street address or location of the facility. If the facility lacks a street name or route number, give the names of the closest intersection, highway, county road, etc.
3. Owner - Provide the legal name and address of owner.
- 3.1 Prior to submitting a permit to public notice, the department shall provide the permit applicant 10 days to review the draft permit for nonsubstantive drafting errors. In the interest of expediting permit issuance, permit applicants may waive the opportunity to review draft permits prior to public notice. Check YES to review the draft permit prior to public notice. Check NO to waive the process and expedite the permit.
4. Continuing Authority - Permanent organization that will serve as the continuing authority for the operation, maintenance and modernization of the facility. The regulatory requirement regarding continuing authority is available at www.sos.mo.gov/adrules/csr/current/10csr/10c20-6a.pdf or contact the appropriate Department of Natural Resources Regional Office.
5. Operator - Provide the name, certificate number and telephone number of the person operating the facility.
6. Provide the name, title and work telephone number of a person who is thoroughly familiar with the operation of the facility and with the facts reported in this application and who can be contacted by the department, if necessary.
- 7.1 An outfall is the point at which wastewater is discharged. Outfalls should be given in terms of the legal description of the facility. Global Positioning System, or GPS, is a satellite-based navigation system. The department prefers that a GPS receiver is used at the outfall pipe and the displayed coordinates submitted. If access to a GPS receiver is not available, please use a mapping system to approximate the coordinates; the department's mapping system is available at www.dnr.mo.gov/internetmapviewer/.
- 7.2 List only your primary Standard Industrial Classification, or SIC, and North American Industry Classification System code for each outfall. The SIC system was devised by the U.S. Office of Management and Budget to cover all economic activities. To find the correct SIC code, an applicant may check his or her unemployment insurance forms or contact the Missouri Division of Employment Security, 573-751-3215. The primary SIC code is that of the operation that generates the most revenue. If this information is not available, the number of employees or, secondly, production rate may be used to determine your SIC code. Additional information is on the Web for Standard Industrial Codes at www.osha.gov/pls/imis/sicsearch.html and for the North American Industry Classification System at www.census.gov/naics or contact the appropriate Department of Natural Resources Regional Office.

**INSTRUCTIONS FOR COMPLETING FORM A
APPLICATION FOR CONSTRUCTION OR OPERATING PERMIT
(CONTINUED)**

8. If you answer yes to A, B, C, D, E or F, then you must complete and file the supplementary form(s) indicated. A U.S. Geological Survey 1" = 2,000' scale map must be submitted with the permit application showing all outfalls, the receiving stream and the location of the downstream property owners. This type of map is available on the Web at www.dnr.mo.gov/internetmapviewer/ or from the Missouri Department of Natural Resources' Division of Geology and Land Survey in Rolla at 573-368-2125.
9. Please provide the name and address of the first downstream landowner, different from that of the permitted facility, through whose property the discharge will flow. Also, please indicate the location on the map. For discharges that leave the permitted facility and flow under a road or highway, or along the right-of-way, the downstream property owner is the landowner that the discharge flows to after leaving the right-of-way. For no discharge facilities, provide this information for the location where discharge would flow if there was one. For land application sites, include the owners of the land application sites and all adjacent landowners.
10. Signature - All applications must be signed as follows and the signature must be **original**:
 - A. For a corporation, by an officer having responsibility for the overall operation of the regulated facility or activity or for environmental matters.
 - B. For a partnership or sole proprietorship, by a general partner or the proprietor.
 - C. For a municipal, state, federal or other public facility, by either a principal executive officer or by an individual having overall responsibility for environmental matters at the facility.

This completed form, along with the applicable permit fees, should be submitted to the appropriate Regional Office. Submittal of an incomplete application may result in the application being returned. A map of the department's regional offices with addresses and phone numbers can be viewed on the Web at www.dnr.mo.gov/regions/ro-map.pdf. If there are any questions concerning this form, contact the appropriate Regional Office or the Department of Natural Resources' Water Protection Program, Water Pollution Control Branch, Permits and Engineering Section at 573-751-6825.

BioKyowa, Inc.
P.O. Box 1550
Cape Girardeau
MO 63702-1550
Ph: (573) 335-4849
Fax: (573) 335-1466



January 21, 2013

Chris Weiberg
Department of Natural Resources
Water Protection Program
P.O. Box 176
Jefferson City, MO 65102

JAN 25 2013

Re: Permit Modification for MO-0101729

Chris,

As we've discussed, we just completed the anti-degradation review process for the installation of RO filters at our plant. These will be used to produce purified water through reverse osmosis, which will then be used as a clean water source for the production of our variety of amino acids.

During the production of the purified water a certain amount of reject, or concentrate, is produced that must be discharged. This water stream is essentially made up of the minerals, iron and other impurities that are filtered out from the well water. As sending this stream through our wastewater treatment would not offer any treatment, we are requesting this stream be added to our outfall 002 stream, which discharges directly to the headwater diversion channel. The attached form A, form C and anti-degradation review detail the characteristics of this stream.

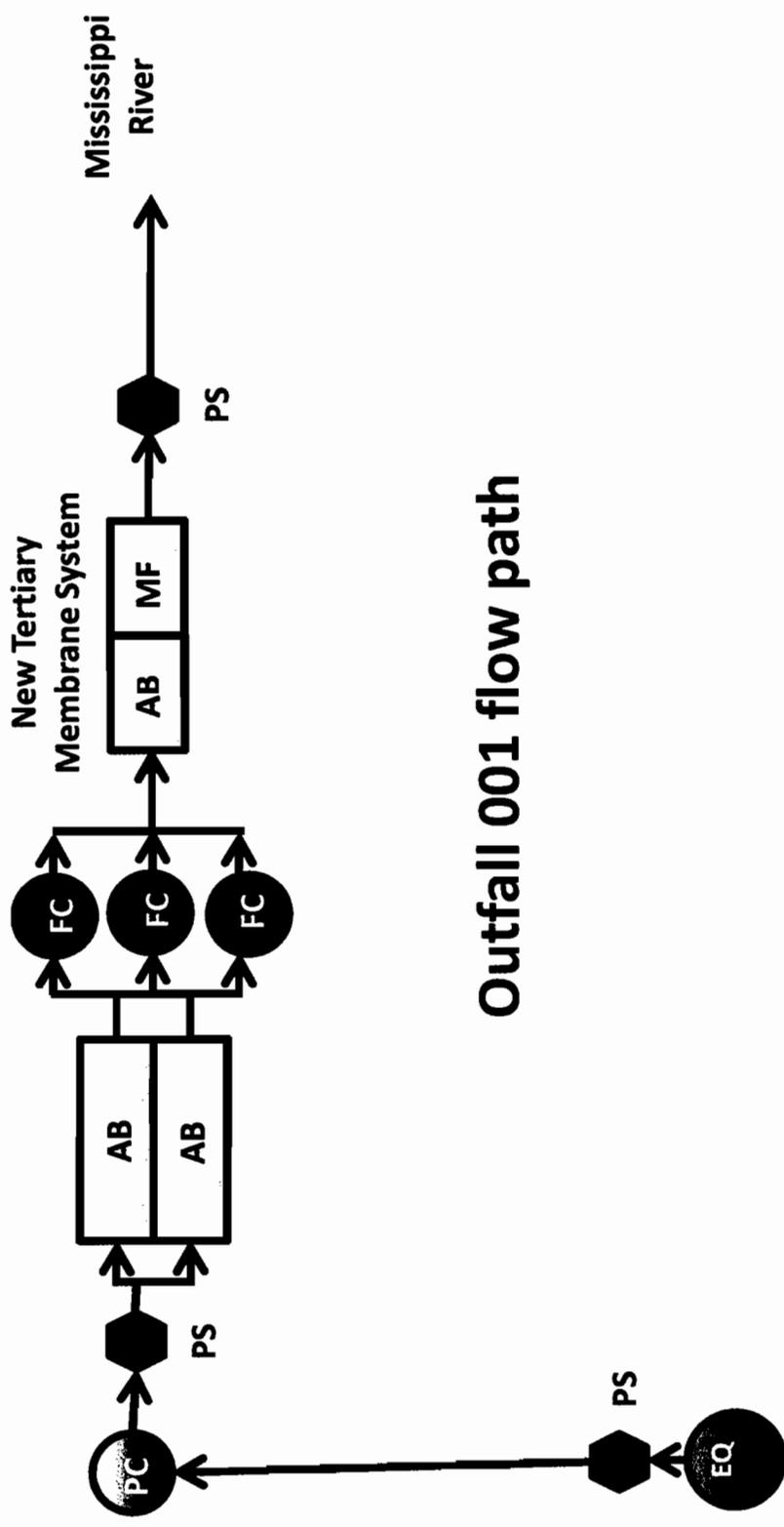
We are also requesting that our permit be modified to incorporate the utilization of Membrane Technology at our wastewater treatment plant. With future e-coli limits becoming effective after December 31, 2013 Biokyowa is making a large financial investment to not only treat e-coli but to also increase our treatment capabilities for BOD, COD and TSS.

The wastewater process improvements will include the addition of a screen filter, aeration basins, membrane filters and associated equipment. This equipment will be utilized in a tertiary fashion and will filter the effluent from our secondary clarifiers before it is discharged to the Mississippi River. This will increase our overall treatment efficiency through the plant. The attached drawing is representative of the future flow path. Engineering details and drawings will be submitted with the application for a construction permit.

If there are any questions or clarification please do not hesitate to call me at 573-335-4849 ext-127.

Biokyowa Inc.
dave.jennings@biokyowa.com

PROPOSED FACILITY FLOW SCHEMATIC



Outfall 001 flow path

MBR utilized as a tertiary process





MISSOURI DEPARTMENT OF NATURAL RESOURCES
 WATER PROTECTION PROGRAM, WATER POLLUTION BRANCH
FORM C – APPLICATION FOR DISCHARGE PERMIT –
MANUFACTURING, COMMERCIAL, MINING,
SILVICULTURE OPERATIONS, PROCESS & STORM WATER

FOR AGENCY USE ONLY	
CHECK NO.	
DATE RECEIVED	FEE SUBMITTED

TE: DO NOT ATTEMPT TO COMPLETE THIS FORM BEFORE READING THE ACCOMPANYING INSTRUCTIONS

1.00 NAME OF FACILITY
 BioKyowa Inc.

1.10 THIS FACILITY IS NOW IN OPERATION UNDER MISSOURI OPERATING PERMIT NUMBER
 MO-0101729

1.20 THIS IS A NEW FACILITY AND WAS CONSTRUCTED UNDER MISSOURI CONSTRUCTION PERMIT NUMBER (COMPLETE ONLY IF THIS FACILITY DOES NOT HAVE AN OPERATING PERMIT).
 NA

2.00 LIST THE STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODES APPLICABLE TO YOUR FACILITY (FOUR DIGIT CODE)

A. FIRST 2048 B. SECOND _____
 C. THIRD _____ D. FOURTH _____

2.10 FOR EACH OUTFALL GIVE THE LEGAL DESCRIPTION.

OUTFALL NUMBER (LIST) NE 1/4 NE 1/4 SEC 28 T 30N R 13E Cape Girardeau COUNTY

2.20 FOR EACH OUTFALL LIST THE NAME OF THE RECEIVING WATER

OUTFALL NUMBER (LIST)	RECEIVING WATER
Outfall 002	Headwater Diversion Channel
Outfall 001	Mississippi River

2.30 BRIEFLY DESCRIBE THE NATURE OF YOUR BUSINESS
 Manufacturing

JAN 25 2013

2.40 CONTINUED

C. EXCEPT FOR STORM RUNOFF, LEAKS OR SPILLS, ARE ANY OF THE DISCHARGES DESCRIBED IN ITEMS A OR B INTERMITTENT OR SEASONAL?
 YES (COMPLETE THE FOLLOWING TABLE) NO (GO TO SECTION 2.50)

1. OUTFALL NUMBER <i>(list)</i>	2. OPERATION(S) CONTRIBUTING FLOW <i>(list)</i>	3. FREQUENCY		4. FLOW				C. DURATION <i>(in days)</i>
		A. DAYS PER WEEK <i>(specify average)</i>	B. MONTHS PER YEAR <i>(specify average)</i>	A. FLOW RATE <i>(in mgd)</i>		B. TOTAL VOLUME <i>(specify with units)</i>		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	4. LONG TERM DAILY	3. MAXIMUM AVERAGE	

2.50 MAXIMUM PRODUCTION
 A. DOES AN EFFLUENT GUIDELINE LIMITATION PROMULGATED BY EPA UNDER SECTION 304 OF THE CLEAN WATER ACT APPLY TO YOUR FACILITY?
 YES (COMPLETE B.) NO (GO TO SECTION 2.60)

B. ARE THE LIMITATIONS IN THE APPLICABLE EFFLUENT GUIDELINES EXPRESSED IN TERMS OF PRODUCTION (OF OTHER MEASURE OF OPERATION)?
 YES (COMPLETE c.) NO (GO TO SECTION 2.60)

C. IF YOU ANSWERED "YES" TO B. LIST THE QUANTITY THAT REPRESENTS AN ACTUAL MEASUREMENT OF YOUR MAXIMUM LEVEL OF PRODUCTION, EXPRESSED IN THE TERMS AND UNITS USED IN THE APPLICABLE EFFLUENT GUIDELINE AND INDICATE THE AFFECTED OUTFALLS.

1. MAXIMUM QUANTITY			2. AFFECTED OUTFALLS <i>(list outfall numbers)</i>
A. QUANTITY PER DAY	B. UNITS OF MEASURE	C. OPERATION, PRODUCT, MATERIAL, ETC. <i>(specify)</i>	

2.60 IMPROVEMENTS
 A. ARE YOU NOW REQUIRED BY ANY FEDERAL, STATE OR LOCAL AUTHORITY TO MEET, ANY IMPLEMENTATION SCHEDULE FOR THE CONSTRUCTION, UPGRADING OR OPERATION OF WASTEWATER TREATMENT EQUIPMENT OR PRACTICES OR ANY OTHER ENVIRONMENTAL PROGRAMS THAT MAY AFFECT THE DISCHARGES DESCRIBED IN THIS APPLICATION? THIS INCLUDES, BUT IS NOT LIMITED TO, PERMIT CONDITIONS, ADMINISTRATIVE OR ENFORCEMENT ORDERS, ENFORCEMENT COMPLIANCE SCHEDULE LETTERS, STIPULATIONS, COURT ORDERS AND GRANT OR LOAN CONDITIONS.
 YES (COMPLETE THE FOLLOWING TABLE) NO (GO TO 3.00)

1. IDENTIFICATION OF CONDITION AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
				A. REQUIRED	B. PROJECTED

B. OPTIONAL: YOU MAY ATTACH ADDITIONAL SHEETS DESCRIBING ANY ADDITIONAL WATER POLLUTION CONTROL PROGRAMS (OR OTHER ENVIRONMENTAL PROJECTS THAT MAY AFFECT YOUR DISCHARGES) YOU NOW HAVE UNDER WAY OR ARE YOU PLANNING. INDICATE WHETHER EACH PROGRAM IS NOW UNDER WAY OR PLANNED, AND INDICATE YOUR ACTUAL OR PLANNED SCHEDULES FOR CONSTRUCTION.
 MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED.

3.10 BIOLOGICAL TOXICITY TESTING DATA

DO YOU HAVE ANY KNOWLEDGE OR REASON TO BELIEVE THAT ANY BIOLOGICAL TEST FOR ACUTE OR CHRONIC TOXICITY HAS BEEN MADE ON ANY OF YOUR DISCHARGES OR ON RECEIVING WATER IN RELATION TO YOUR DISCHARGE WITHIN THE LAST THREE YEARS?

YES (IDENTIFY THE TEST(S) AND DESCRIBE THEIR PURPOSES BELOW.) NO (GO TO 3.20)

Wet test required for outfall 001, wet test for outfall 002 recommended with anti-degradation review.

3.20 CONTRACT ANALYSIS INFORMATION

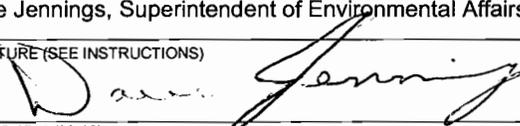
WERE ANY OF THE ANALYSES REPORTED PERFORMED BY A CONTRACT LABORATORY OR CONSULTING FIRM?

YES (LIST THE NAME, ADDRESS AND TELEPHONE NUMBER OF AND POLLUTANTS ANALYZED BY EACH SUCH LABORATORY OR FIRM BELOW.) NO (GO TO 3.30)

A. NAME	B. ADDRESS	C. TELEPHONE (area code and number)	D. POLLUTANTS ANALYZED (list)
Environmental Analysis South	4000 East Jackson Blvd. Jackson, MO 63755	573-204-8817	For outfall 002: Oil & Grease BOD5 TSS pH NH3-N

3.30 CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME AND OFFICIAL TITLE (TYPE OR PRINT) Dave Jennings, Superintendent of Environmental Affairs	TELEPHONE NUMBER WITH AREA CODE (573) 335-4849
SIGNATURE (SEE INSTRUCTIONS) 	DATE SIGNED 1-21-13

PLEASE PRINT OR TYPE. You may report some or all of this information on separate sheet instead of completing these pages.
 (Use the same format)
 SEE INSTRUCTIONS

FORM C
 TABLE 1 FOR 3.00 ITEM A AND B

INTAKE AND EFFLUENT CHARACTERISTICS		OUTFALL NO. 002
-------------------------------------	--	--------------------

PART A – You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT				3. UNITS (specify if blank)				4. INTAKE (optional)	
	A. MAXIMUM DAILY VALUE		B. MAXIMUM 30 DAY VALUE (if available)		D. NO. OF ANALYSES	A. CONCENTRATION	B. MASS	A. LONG TERM AVRG. VALUE		B. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
A. Biochemical Oxygen Demand (BOD)	6.06	306								
B. Chemical Oxygen Demand (COD)	<5	<253								
C. Total organic Carbon (TOC)	5.1	258								
D. Total Suspended Solids (TSS)	5	253								
E. Ammonia (as N)	2.9	126								
F. Flow	VALUE		VALUE					VALUE		
G. Temperature (winter)	VALUE		VALUE					VALUE		
H. Temperature (summer)	VALUE		VALUE					VALUE		
I. pH	MINIMUM 7.05	MAXIMUM 7.88	MINIMUM 7	MAXIMUM 7.88				STANDARD UNITS		

PART B – Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2-a for any pollutant, you must provide the results for at least one analysis for that pollutant. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS				5. INTAKE (optional)	
	A. BELIEVED PRESENT	B. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		B. MAXIMUM 30 DAY VALUE (if available)		D. NO. OF ANALYSES	A. CONCENTRATION	B. MASS	A. LONG TERM AVRG. VALUE		B. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
A. Bromide (24959-67-9)		X										
B. Chlorine Total Residual		X										
C. Color	40							A- units				
D. Fecal Coliform		X										
E. Fluoride (16984-48-8)												
F. Nitrate—Nitrate (as N)	X		0.04	2				mg/l		lb/d		

1. POLLUTANT AND CAS NUMBER <i>(if available)</i>	2. MARK "x"		3. EFFLUENT						4. UNITS			6. INTAKE <i>(optional)</i>		
	A. BELIEVED PRESENT	B. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		B. MAXIMUM 30 DAY VALUE <i>(if available)</i>		C. LONG TERM AVRG. VALUE <i>(if available)</i>		D. NO. OF ANALYSES	A. CONCENTRATION	B. MASS	A. LONG TERM AVRG. VALUE		B. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
G. Nitrogen														
Total Organic (as N)														
H. Oil and Grease														
I. Phosphorus (as P)														
Total (7723-14-0)														
J. Sulfate (as SO ₄)														
(14808-79-8)														
K. Sulfide (as S)														
L. Sulfite (as SO ₃)														
(14265-45-3)														
M. Surfactants														
N. Aluminum														
Total (7429-90-5)														
O. Barium														
Total (7440-39-3)														
P. Boron														
Total (7440-42-8)														
Q. Cobalt														
Total (7440-48-4)														
R. Iron														
Total (7439-89-6)														
S. Magnesium														
Total (7439-95-4)														
T. Molybdenum														
Total (7439-98-7)														
U. Manganese														
Total (7439-96-5)														
V. Tin														
Total (7440-31-5)														
W. Titanium														
Total (7440-32-6)														

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT						4. UNITS			5. INTAKE (optional)		
	A. BELIEVED PRESENT	B. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		B. MAXIMUM 30 DAY VALUE (if available)		C. LONG TERM AVRG. VALUE (if available)		D. NO. OF ANALYSES	A. CONCENTRATION	B. MASS	A. LONG TERM AVRG. VALUE		B. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS						
METALS, AND TOTAL PHENOLS														
1M. Antimony, Total (7440-36-9)														
2M. Beryllium, Total (7440-41-7)														
3M. Magnesium, Total (7439-95-4)														
4M. Molybdenum, Total (7439-98-7)														
5M. Tin, Total (7440-31-5)														
6M. Titanium, Total (7440-32-6)														
7M. Mercury, Total (7439-97-6)														
8M. Selenium, Total (7782-49-2)														
9M. Thallium, Total (7440-28-0)														
10M. Phenols, Total														
RADIOACTIVITY														
(1) Alpha Total	None Expected													
(2) Beta Total														
(3) Radium Total														
(4) Radium 226 Total														

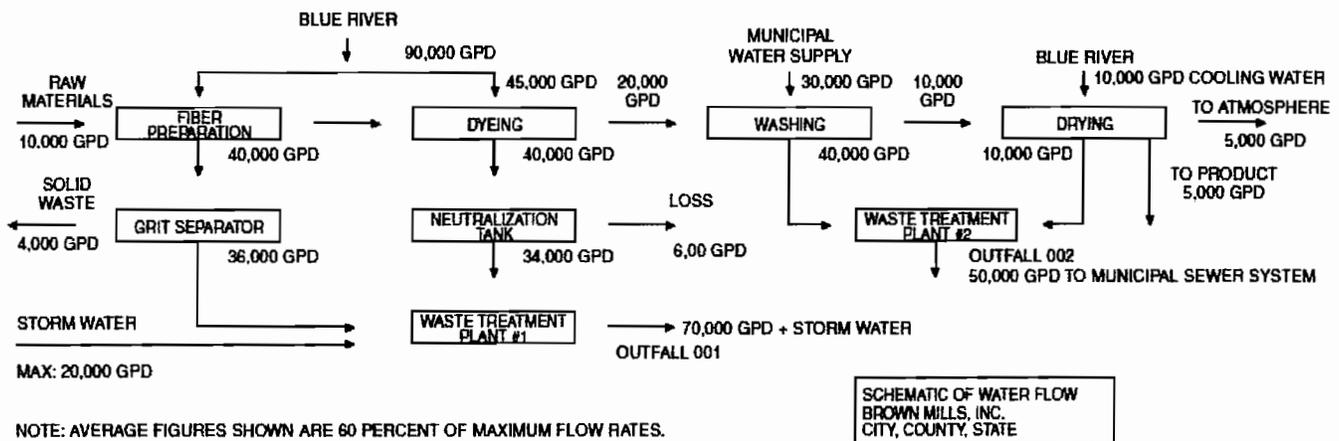
**INSTRUCTIONS FOR FILLING OUT APPLICATION FOR DISCHARGE
PERMIT FORM C – MANUFACTURING, COMMERCIAL,
MINING AND SILVICULTURE OPERATIONS.**

All blanks must be filled in when the application is submitted to the appropriate regional office (see map). The form must be signed as indicated.

This application is to be completed only for wastewater facilities with a discharge. Include any facility with possibility of discharge, even if normally there is no discharge. If this form is not adequate for you to describe your existing operation, then sufficient information should be attached so that an evaluation of the discharge can be made.

- 1.00 Name of Facility – By what title or name is this facility known locally?
- 1.10 and 1.20 Self-explanatory.
- 2.00 List in descending order of significance the four digit Standard Industrial Classification (SIC) codes that best describe your facility in terms of the principal products or services you produce or provide. Also, specify each classification in words.

SIC code numbers are descriptions that may be found in the "Standard Industrial Classification Manual" prepared by the Executive Office of the President, Office of Management and Budget, that is available from the Government Printing Office, Washington, D.C. Use the current edition of the manual. If you have any questions concerning the appropriate SIC code for your facility, contact the Missouri Department of Natural Resources Regional office in your area (see map).
- 2.10 Point of discharge should be given in terms of the legal description of the waste treatment plant, location or sufficient information so that it may be located by the Missouri Clean Water Commission staff.
- 2.20 Receiving Water – the name of the stream to which the discharge is directed and any subsequent tributary until a continuous flowing stream is reached.
- 2.30 Self-explanatory.
- 2.40 A. The line drawing should show generally the route taken by water in your facility from intake to discharge. Show all operations contributing wastewater, including process and production areas, sanitary flows, cooling water and storm water runoff. You may group similar operations into a single unit labeled to correspond to the more detailed listing. The water balance should show average and maximum flows. Show all significant losses of water to products, atmosphere, discharge and public sewer systems. You should use actual measurements whenever available; otherwise, use your best estimate. An example of any acceptable line drawing appears below.



B. List all sources of wastewater to each outfall. Operations may be described in general terms (for example, "dye-making reactor" or a distillation tower"). You may estimate the flow contributed by each source if no data is available, and for storm water, you may use any reasonable measure of duration, volume or frequency. For each treatment unit, indicate its size, flow rate and retention time, and describe the ultimate disposal of any solid or liquid wastes not discharged. Treatment units should be listed in order and you should select the proper code from Table A to fill in column 3B for each treatment unit. Insert "XX" into column 3B if no code corresponds to a treatment unit you list.

TABLE A – CODES FOR TREATMENT UNITS

PHYSICAL TREATMENT PROCESSES

1-A	..... Ammonia Stripping	1-M	..... Grit Removal
1-B	..... Dialysis	1-N	..... Microstraining
1-C	..... Diatomaceous Earth Filtration	1-O	..... Mixing
1-D	..... Distillation	1-P	..... Moving Bed Filters
1-E	..... Electrodialysis	1-Q	..... Multimedia Filtration
1-F	..... Evaporation	1-R	..... Rapid Sand Filtration
1-G	..... Flocculation	1-S	..... Reverse Osmosis (Hyperfiltration)
1-H	..... Flotation	1-T	..... Screening
1-I	..... Foam Fractionation	1-U	..... Sedimentation (Settling)
1-J	..... Freezing	1-V	..... Slow Sand Filtration
1-K	..... Gas-Phase Separation	1-W	..... Solvent Extraction
1-L	..... Grinding (Comminutors)	1-X	..... Sorption

CHEMICAL TREATMENT PROCESSES

2-A	..... Carbon Absorption	2-G	..... Disinfection (Ozone)
2-B	..... Chemical Oxidation	2-H	..... Disinfection (Other)
2-C	..... Chemical Precipitation	2-I	..... Electrochemical Treatment
2-D	..... Coagulation	2-J	..... Ion Exchange
2-E	..... Dechlorination	2-K	..... Neutralization
2-F	..... Disinfection (Chlorine)	2-L	..... Reduction

BIOLOGICAL TREATMENT PROCESSES

3-A	..... Activated Sludge	3-E	..... Pre-Aeration
3-B	..... Aerated Lagoons	3-F	..... Spray Irrigation/Land Application
3-C	..... Anaerobic Treatment	3-G	..... Stabilization Ponds
3-D	..... Nitrification-Denitrification	3-H	..... Trickling Filtration

OTHER PROCESSES

4-A	..... Discharge to Surface Water	4-C	..... Reuse/Recycle of Treated Effluent
4-B	..... Ocean Discharge Through Outfall	4-D	..... Underground Injection

SLUDGE TREATMENT AND DISPOSAL PROCESSES

5-A	..... Aerobic Digestion	5-M	..... Heat Drying
5-B	..... Anaerobic Digestion	5-N	..... Heat Treatment
5-C	..... Belt Filtration	5-O	..... Incineration
5-D	..... Centrifugation	5-P	..... Land Application
5-E	..... Chemical Conditioning	5-Q	..... Landfill
5-F	..... Chlorine Treatment	5-R	..... Pressure Filtration
5-G	..... Composting	5-S	..... Pyrolysis
5-H	..... Drying Beds	5-T	..... Sludge Lagoons
5-I	..... Elutriation	5-U	..... Vacuum Filtration
5-J	..... Flotation Thickening	5-V	..... Vibration
5-K	..... Freezing	5-W	..... Web Oxidation
5-L	..... Gravity Thickening		

2.40 C. A discharge is intermittent unless it occurs without interruption during the operating hours of the facility, except for infrequent shutdowns for maintenance, process changes or other similar activities. A discharge is seasonal if it occurs only during certain parts of the year. Fill in every applicable column in this item for each source of intermittent or seasonal discharges. Base your answers on actual data whenever available; otherwise, provide your best estimate. Report the highest daily value for flow rate and total volume in the "Maximum Daily" columns. Report the average of all daily values measures during days when discharge occurred within the last year in the "Long Term Average" columns.

2.50 A. All effluent guidelines promulgated by EPA appear in the Federal Register and are published annually in 40 CFR Subchapter N. A guideline applies to you if you have any operations contributing process wastewater in any subcategory covered by BPT, BCT, or BAT guidelines. If you are unsure whether you are covered by a promulgated effluent guideline, check with your Missouri Department of Natural Resources' Regional Office. You must check yes if an applicable effluent guideline has been promulgated, even if the guideline limitations are being contested in court. If you believe that a promulgated effluent guideline has been remanded for reconsideration by a court and does not apply to your operations, you may check no.

B. An effluent guideline is expressed in terms of production (or other measure of operation) if the limitations are expressed as mass of pollutant per operational parameter; for example, "pounds of BOD per cubic foot of logs from which bark is removed," or "pounds of TSS per megawatt hour of electrical energy consumed by smelting furnace." An example of a guideline not expressed in terms of a measure of operation is one which limits the concentration of pollutants.

C. This item must be completed only if you checked yes to item B. The production information requested here is necessary to apply effluent guidelines to your facility and you may not claim it as confidential. However, you do not have to indicate how the reported information was calculated.

Report quantities in the units of measurement used in the applicable effluent guideline. The figures provided must be a measure of actual operation over a one month period, such as the production for the highest month during the last twelve months, or the monthly average production for the highest year of the last five years, or other reasonable measure of actual operation, but may not be based on design capacity or on predictions of future increases in operation.

2.60 A. If you check yes to this question, complete all parts of the chart, or attach a copy of any previous submission you have made containing the same information.

B. You are not required to submit a description of future pollution control projects if you do not wish to or if none is planned.

3.00 These items require you to collect and report data on the pollutants discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and must be completed in accordance with the specific instructions for that part. The following general instructions apply to the entire item.

GENERAL INSTRUCTIONS. Part A requires you to report at least one analysis for each pollutant. Part B requires you to mark "X" in either the "Believe Present" column or the "Believe Absent" column (column 2A or 2B, Part B) based on your best estimate, and test for those which you believe to be present. Part C requires you to list any of a group of pollutants which you believe to be present, with a brief explanation of why you believe it to be present. (See specific instructions on the form and below Parts A through C).

Base your determination that a pollutant is present in or absent from your discharge on your knowledge of your raw materials, maintenance chemicals, intermediate and final products and byproducts, and any previous analyses known to you of your effluent or of any similar effluent. (For example, if you manufacture pesticides, you should expect those pesticides to be present in contaminated storm water runoff.) If you would expect a pollutant to be present solely as a result of its presence in your intake water, you must mark "Believe Present" but you are not required to analyze for that pollutant. Instead, mark an "X" in the "Intake" column.

REPORTING. All levels must be reported as a concentration and as total mass. You may report some or all of the required data by attaching separate sheets of paper. (Use the following abbreviations in the columns headed "Units" (column 3, Part A, and column 4, Part B).

CONCENTRATION

ppm parts per million
 mg/L milligrams per liter
 ppb parts per billion
 ug/L micrograms per liter

MASS

lbs pounds
 ton tons (English tons)
 mg Milligrams
 g grams
 kg kilograms
 T tonnes (metric tons)

If you measure only one daily value, complete only the "Maximum Daily Values" columns and insert "1" into the "number of analyses" columns (columns 2A and 2B, Part A, and columns 3A and 3D, Part B). The Missouri Department of Natural Resources may require you to conduct additional analyses to further characterize your discharges.

For composite samples, the daily value is the total mass or average concentration found in a complete sample taken over the operating hours of the facility during a 24 hour period; for grab samples, the daily value is the arithmetic or flow-weighted total mass or average concentration found in a series of at least four grab samples taken over the operating hours of the facility during a 24 hour period.

If you measure more than one daily value for a pollutant, determine the average of all values within the last year and report the concentration and mass under the "Long Term Average Values" columns (column 2C, Part A, and column 3C, Part B), and the total number of daily values under the "Number of Analyses" columns (column 2D, Part A, and column 3D, Part B). Also, determine the average of all daily values taken during each calendar month, and report the highest average of all daily values taken during each calendar month, and report the highest average under the "Maximum 30 Day Values" columns (column 2B, Part A, and column 3B, Part B).

SAMPLING. The collection of the samples for the reported analyses should be supervised by a person experienced in performing sampling of industrial wastewater. You may contact your Missouri Department of Natural Resources' Regional Office for detailed guidance on sampling techniques and for answers to specific questions. Any specific requirements contained in the applicable analytical methods should be followed for sample containers, sample preservation, holding times, the collection of duplicate samples, etc. The time when you sample should be representative of your normal operation, to the extent feasible, with all processes which contribute wastewater in normal operation and with your treatment system operating properly with no system upsets. Samples should be collected from the center of the flow channel, where turbulence is at a maximum, at a site specified in your present permit or at any site adequate for the collection of a representative sample.

Grab and composite samples are defined as follows:

GRAB SAMPLE. An individual sample of at least 100 milliliters collected at a randomly selected time over a period not exceeding 15 minutes.

COMPOSITE SAMPLE. A combination of at least eight sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over a 24 hour period. For volatile pollutants, aliquots must be combined in the laboratory immediately before analysis. The composite must be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically.

ANALYSIS. You must use test methods promulgated in 40 CFR Part 136; however, if none has been promulgated for a particular pollutant, you may use any suitable method for measuring the level of the pollutant in your discharge provided that you submit a description of the method or a reference to a published method. Your description should include the sample holding times, preservation techniques and the quality control measures which you used.

If you have two or more substantially identical outfalls, you may request permission from the Missouri Department of Natural Resources to sample and analyze only one outfall and submit the results of the analysis for other substantially identical outfalls. If your request is granted by the Missouri Department of Natural Resources, on a separate sheet attached to the application form, identify which outfall you did test and describe why the outfalls which you did not test are substantially identical to the outfall which you did test.

REPORTING OF INTAKE DATA. You are not required to report data under the "Intake" columns unless you wish to demonstrate your eligibility for a "net" effluent limitation for one or more pollutants, that is, an effluent limitation adjusted by subtracting the average level of the pollutant(s) present in your intake water. National Pollutant Discharge Elimination System (NPDES) regulations allow net limitations only in certain circumstances. To demonstrate your eligibility, under the Intake columns report the average of the results of analyses on your intake water (if your water is treated before use, test the water after it is treated), and attach a separate sheet containing the following for each pollutant:

1. A statement that the intake water is drawn from the body of water into which the discharge is made. (Otherwise, you are not eligible for net limitations.)
 2. A statement of the extent to which the level of the pollutant is reduced by treatment of your wastewater. (Your limitations will be adjusted only to the extent that the pollutant is not removed.)
 3. When applicable, a demonstration of the extent to which the pollutants in the intake vary physically, chemically, or biologically from the pollutants contained in your discharge. For example, when the pollutant represents a class of compounds. Your limitations will be adjusted only to the extent that the intake pollutants do not vary from the discharged pollutants.
- 3.00 Part A must be completed by all applicants for all outfalls, including outfalls containing only noncontact cooling water or storm runoff. However, at your request, the Missouri Department of Natural Resources may waive the requirements to test for one or more of these pollutants, upon a determination that testing for the pollutant(s) is not appropriate for your effluent.
- Use composite samples for all pollutants in this part, except use grab samples for pH and temperature. See discussion in instructions above for definitions of the columns in Part A. The "Long Term Average Values" column (column 2C) and "Maximum 30 Day Values" column (column 2B) are not compulsory but should be filled out if data is available.
- 3.00 Part B must be completed by all applicants for all outfalls, including outfalls containing only noncontact cooling water or storm runoff.
- Use composite samples for all pollutants you analyze for in this part, except use grab samples for residual chlorine, oil and grease and fecal coliform. The Long Term Average Values column (column 3C) and Maximum 30 Day Values column (column 3B) are not compulsory but should be filled out if data is available.
- 3.00 List any pollutants in Table B that you believe to be present and explain why you believe them to be present in part C. No analysis is required, but you have analytical, you must report it.

TABLE B – TOXIC POLLUTANTS AND HAZARDOUS SUBSTANCES REQUIRED TO BE IDENTIFIED BY APPLICANTS IF EXPECTED TO BE PRESENT

TOXIC POLLUTANT	HAZARDOUS SUBSTANCES	HAZARDOUS SUBSTANCES
Asbestos	Dichlorvos	Nalad
	Diethylamine	Napthenic acid
HAZARDOUS SUBSTANCES	Dimethylamine	Nitrotoluene
	Dintrobenzene	Parathion
Acetaldehyde	Diquat	Phenolsulfonate
Allyl alcohol	Disulfoton	Phosgene
Allyl chloride	Diuron	Propargite
Amyl acetate	Epichlorohydrin	Propylene oxide
Aniline	Ethion	Pyrethrins
Benzonitrile	Ethylene diamine	Quinoline
Benzyl chloride	Ethylene dibromide	Resorcinol
Butyl acetate	Formaldehyde	Strontium
Butylamine	Furfural	Strychnine
Captan	Guthion	Styrene

TABLE B – (continued)

HAZARDOUS SUBSTANCES	HAZARDOUS SUBSTANCES	HAZARDOUS SUBSTANCES
Carbaryl	Isoprene	2, 4, 5-T (2,4,5-Trichloro- phenoxyacetic acid)
Carbofuran	Isopropanolamine	TDE (Tetrachlorodiphenyl ethane)
Carbon disulfide	Kelthane	2, 4, 5-TP (2-(2,4,5-Trichloro- phenoxy) propanoic acid)
Chlorpyrifos	Kepone	Trichlorofon
Coumaphos	Malathion	Triethanolamine
Cresol	Mercaptodimethur	Triethylamine
Crotonaldehyde	Methoxychlor	Uranium
2,4-D (2,4-Dichloro- Phenoxyacetic acid)	Methyl mercaptan	Vanadium
Diazinon	Methyl parathion	Vinyl acetate
Dicamba	Mevinphos	Xylene
Dichlobenil	Mexacarbate	Xylenol
2,2-Dichloropropionic acid	Monethyl amine	Zirconium
	Monomethyl amine	

3.10 Self-explanatory. Additional information may be requested by the Missouri Department of Natural Resources.

3.20 Self-explanatory.

3.30 The Clean Water Act provides for severe penalties for submitting false information on this application form.

Section 309(c)(2) of the Clean Water Act provides that "Any person who knowingly makes any false statement, representation, or certification in any application . . . shall upon conviction, be punished by a fine of no more \$10,000 or by imprisonment for not more than six months, or both.

All applications must be signed as follows and the signature must be original.

- A. For a corporation, by an officer having responsibility for the overall operation of the regulated facility or activity or for environmental matters.
- B. For a partnership or sole proprietorship, by a general partner or the proprietor.
- C. For a municipal, state, federal or other public facility, by either a principal executive officer or by an individual having overall responsibility for environmental matters at the facility.