

STATE OF MISSOURI  
**DEPARTMENT OF NATURAL RESOURCES**  
MISSOURI CLEAN WATER COMMISSION



## MISSOURI STATE OPERATING PERMIT

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

Permit No.	MO-0125849
Owner:	Wild Animal Safari
Address:	124 Jungle Drive, Strafford, MO 65057
Continuing Authority:	Same as Above
Address:	Same as Above
Facility Name:	Wild Animal Safari Inc. dba Animal Paradise
Facility Address:	124 Jungle Drive, Strafford MO 65757
Legal Description:	SW <sup>1</sup> / <sub>4</sub> , SW <sup>1</sup> / <sub>4</sub> , Sec. 32, T30N, R19W, Webster County
Lat / Long:	+3716160 / -09303261
Receiving Stream:	Unnamed Tributary to Davis Creek (U)
First Classified Stream and ID:	Tributary to Davis Creek (C) (02372)
USGS Basin & Sub-watershed No.:	(11010002-010004)

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

### FACILITY DESCRIPTION

#### Outfall #001

Single cell storage lagoon/wastewater irrigation/sludge is retained in lagoon.

Design organic population equivalent is 87.  
Design average daily flow is 3,400 gallons per day.  
Design sludge production is 1.3 dry tons/year.

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

February 21, 2008  
Effective Date

October 31, 2008  
Revised

  
Doyle Childers, Director, Department of Natural Resources  
Executive Secretary, Clean Water Commission

February 20, 2013  
Expiration Date  
MO 780-0041 (10-93)

Cynthia S. Davies, Regional Director, Southwest Regional Office

**FACILITY DESCRIPTION (continued)**

Outfall #001 – Irrigation System Design

**Receiving Stream Watershed:** a gaining stream setting / into a classified lake / within two (2) miles of a losing stream / 303(d) list >

**Facility Type:** No-discharge Storage & Irrigation System for year round flows into lagoon

**Design Basis:** **Average Annual**

Design dry weather flows: 3,400 gpd

Design with 1-in-10 year flows: 3,400 gpd

Design PE: 87

**Storm Water Flows: ( Webster County)**

Average Annual Rainfall:	41	inches
1-in-10 Year Annual Rainfall:	55	inches
25-year-24-hour storm:	6.50	inches

<u>1-in-10 Year Flows:</u>	<u>Annual</u>	
Runoff from concrete and roof areas:	3.60	ft
Runoff from earth areas: (lagoon berm, lots, etc.)	2.50	ft
Rainfall minus evaporation (R-E) on lagoon water surface:	1.80	ft

**Cell #001**

<u>Lagoon Dimensions:</u>	<u>(Length x Width)</u>	<u>Surface Area</u>	<u>Depth from Bottom</u>
Inside Top Berm:	137' x 202'	27,674 sq.ft.	by <u>6</u> feet depth
Emergency Spillway:	133' x 198'	26,334 sq.ft.	by <u>5</u> feet depth
Freeboard: (top berm to spillway):			<u>2</u> feet depth
Maximum operating level:			<u>5</u> feet depth
Minimum operating level:			<u>2</u> feet depth
Storage volume (minimum to maximum water levels)	<u>547,339.75</u> gallons		

**Storage Capacity:** **Average Annual**

Design for dry weather flows: 160.98 days

**Land Application:**

Irrigation volume per year:	1,275,000 gallons (including 1-in-10 year flows)
Irrigation areas:	2.00 acres at design loading
Application rates per acre:	0.2 inch / hour; 1.0 inch / day; 3.0 inches / week; 11 inches / year
Field slopes:	less than 6.0 percent
Equipment type:	sprinklers
Vegetation:	grass land
Application rate is based on:	hydraulic loading rate

<b>A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS</b>					PAGE NUMBER 3 of 10	
					PERMIT NUMBER MO-0125849	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #001</u> – Emergency discharge from lagoon or irrigation sites (Note 1)						
Flow	MGD	*		*	once/day**	24 hr. estimate
Biochemical Oxygen Demand <sub>5</sub>	mg/L		45	30	once/week**	grab
Total Suspended Solids	mg/L		45	30	once/week**	grab
pH – Units	SU	***		***	once/week**	grab
Fecal Coliform	#/100mL	****		****	once/week**	grab
Ammonia Nitrogen as N	mg/L	****		****	once/week**	grab
Temperature (degrees)	C°	****		****	once/week**	grab
Dissolved Oxygen	mg/L	*		*	once/week**	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <b>January 28, 2009</b> .						
<u>Outfall #001</u> – Land Application Operational Monitoring (Notes 2 & 3)						
Lagoon Freeboard	feet	*			once/month	measured
Irrigation Period	hours	*			daily	total
Volume Irrigated	gallons	*			daily	total
Application Area	acres	*			daily	total
Application Rate	inches / acre	*			daily	total
Rainfall	inches	*			daily	total
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <b>January 28, 2009</b> .						
<u>Outfall #001</u> – Irrigated Wastewater (Notes 4 & 5)						
pH – Units	SU	***			once/quarter	grab
Total Kjeldahl Nitrogen as N	mg/L	*			once/quarter	grab
Nitrate / Nitrite as N	mg/L	*			once/quarter	grab
Ammonia Nitrogen as N	mg/L	*			once/quarter	grab
Total Phosphorus as P	mg/L	*			once/quarter	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <b>January 28, 2009</b> . THERE SHALL BE NO DISCHARGE OF FLOATING OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
<b>B. STANDARD CONDITIONS</b>						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Parts I &amp; III</u> STANDARD CONDITIONS DATED <u>October 1, 1980 and August 15, 1994</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

- \* Monitoring requirement only.
- \*\* Monitor only when discharge occurs. Report as no-discharge when a discharge does not occur during the report period.
- \*\*\* pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.0 pH units.
- \*\*\*\* Comply with water quality standards per Special Conditions #5.

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

Note 2 Records shall be maintained and summarized into an annual operating report, which shall be submitted by **January 28<sup>th</sup>** of each year for the previous calendar year. The report shall include the following:

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

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

Note 4 – Wastewater that is irrigated shall be sampled at the irrigation pump or wet well.

Note 5 – Monitor once per quarter in the months of March, June, September, and December.

C. SPECIAL CONDITIONS

- 1. Report as no-discharge when a discharge does not occur during the reporting period.
- 2. Outfalls must be marked in the field and on the topographic site map submitted with the permit application.
- 3. Permittee will cease discharge by connection to area wide wastewater treatment system within 180 days of notice of its availability.
- 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;

C. SPECIAL CONDITIONS (continued)

(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. Water Quality Standards

(a) Discharges to waters of the state shall not cause a violation of water quality standards rule 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.

6. 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.

C. SPECIAL CONDITIONS (continued)

7. Sludge and Biosolids Use For Domestic Wastewater Treatment Facilities

- (a) Permittee shall comply with the pollutant limitations, monitoring, reporting, and other requirements in accordance with the attached permit Standard Conditions.
- (b) If sludge is not removed by a contract hauler, permittee is authorized to land apply biosolids that are removed from the domestic wastewater treatment lagoon during lagoon clean out and maintenance activities. Permit Standard Conditions, Part III shall apply to the land application of biosolids. Permittee shall notify the department at least 180 days prior to the planned removal of biosolids from the lagoon. The department may require submittal of a biosolids management plan for department review and approval as determined appropriate on a case-by-case basis.

8. Lagoons and earthen basins shall have a liner that is designed, constructed and maintained in accordance with 10 CSR 20-8.020(13)(A)4. If operating records indicate, excessive percolation, the department may require a water balance test in accordance with 10 CSR 20-8.020(16) or other investigations to evaluate adequacy of the lagoon seal. The department may require corrective action as necessary to eliminate excess leakage.

9. Wastewater Irrigation System

- (a) Discharge Reporting. Any unauthorized discharge from the lagoon or irrigation system shall be reported to the department as soon as possible but always within 24 hours. Discharge is allowed only as described in the Facility Description and Effluent Limitations sections of this permit.
- (b) Irrigation Design. Permittee shall operate the land application system in accordance with 10 CSR 20-8.020(15). Permittee shall operate the land application system in accordance with the design parameters listed in the Facility Description section of this permit:
  - (1) No-discharge System. When the Facility Description is “No-discharge”, wastewater must be stored and irrigated at appropriate times. There shall be no-discharge from the irrigation site or storage lagoon except due to precipitation exceeding either the 1-in-10 year rainfall event for the design storage period or the 25-year-24-hour rainfall event.
- (c) Lagoon Operating Levels – No-discharge Systems. The minimum and maximum operating water levels for the storage lagoon shall be clearly marked. Each lagoon shall be operated so that the maximum water elevation does not exceed one foot (1') below the overflow point except due to any exceedance of the 1-in-10 year or 25-year-24-hour rainfall events. Wastewater shall be land applied whenever feasible based on soil and weather conditions and permit requirements. Storage lagoon(s) shall be lowered to the minimum operating level prior to each winter by November 30<sup>th</sup>.
- (d) Emergency Spillway. Lagoons and earthen storage basins should have an emergency spillway to protect the structural integrity of earthen structures during operation at near full water levels and in the event of overflow conditions. The spillway shall be at least one foot (1') below the top of berm. The department may waive the requirement for overflow structures on small existing basins.
- (e) General Irrigation Requirements. The wastewater irrigation system shall be operated so as to provide uniform distribution of irrigated wastewater over the entire irrigation site. A complete ground cover of vegetation shall be maintained on the irrigation site unless the system is approved for row crop irrigation. Wastewater shall be land applied only during daylight hours. The wastewater irrigation system shall be capable of irrigating the annual design flow during an application period of less than 100 days or 800 hours per year.
- (f) Saturated / Frozen Conditions. There shall be no irrigation during frozen, snow covered, or saturated soil conditions. There shall be no irrigation on days when more than 0.2 inches of precipitation is received or when there is observation by operator of an imminent or impending rainfall event.
- (g) Buffer Zones. There shall be no irrigation within 300 feet of any down gradient pond, lake, sinkhole, losing stream or water supply withdrawal; 100 feet of gaining streams or tributaries; 150 feet of dwellings; or 50 feet of the property line.
- (h) Public Access Restrictions. Public access shall not be allowed to the irrigation site(s). Fencing and public access restrictions to land application sites shall be in accordance with requirements in 10 CSR 20-8.020(15)(B)(5).

**C. SPECIAL CONDITIONS** (continued)

- (i) **Equipment Checks During Irrigation.** The irrigation system and application site shall be visually inspected at least once per hour during wastewater irrigation to check for equipment malfunctions and runoff from the irrigation site.
- (j) **Operation and Maintenance Manual.** The permittee shall develop, maintain and implement an Operation and Maintenance (O&M) Manual that includes all necessary items to ensure the operation and integrity of the waste handling and land application systems. Copies of the O&M Manual and subsequent revisions shall be submitted to the departments' Water Pollution Control Program and the appropriate Regional Office for review and approval. The O&M Manual shall be reviewed and updated at least every five years.

**10. Nutrient Management**

- (a) **Nitrogen.** The permittee shall not exceed the plant available nitrogen management approach as listed in this permit.
- (b) **Phosphorus.** When soil test phosphorus (P) levels are above 120 pounds per acres using Bray P-1 test method, the sludge application rate shall not exceed the annual crop requirements for available phosphorus in accordance with state NRCS guidelines. When state NRCS standards and guidelines become available, the permit will be revised to include the Phosphorus Threshold and Phosphorus Index methods to be developed under the USDA, NRCS National Policy, General Manual, Part 402.06.
- (c) The actual application rates for a given year or growing season must be adjusted based on the approved management approach and the actual sludge and soil testing results and crop requirement. If crop yields are less than that predicted in the permit application, the application rates must be reduced or the yields increased through appropriate changes in management practice.
- (d) This permit will be modified to require a Nutrient Management Plan (NMP) after promulgation of applicable state, EPA and USDA rules and guidelines. The NMP will replace the current PAN and phosphorus methods.

**11. Plant Available Nitrogen (PAN) Procedure**

- (a) Wastewater, sludge and fertilizer nitrogen application shall not exceed the crop nitrogen requirements based on realistic crop yield goals and the Plant Available Nitrogen (PAN method). The wastewater application rate shall be calculated as follows:

$$\text{PAN} = \text{CNR} - \text{SRN} - \text{CFN}$$

WHERE: **CFN** = Commercial Fertilizer Nitrogen applied in pounds N/acre.  
**CNR** = Crop Nitrogen Requirement in pounds N/acre.  
**PAN** = Plant Available Nitrogen in wastewater and sludge expressed as annual pounds N/acres.  
**SRN** = Soil Residual Nitrogen in pounds N/acre.

- (b) Plant Available Nitrogen (PAN) is calculated as follows:

$$\begin{aligned} \text{PAN} = & [\text{Ammonia Nitrogen}] \quad \times \quad [\text{Availability Factor}] \\ & + [\text{Organic Nitrogen}] \quad \times \quad [\text{Availability Factor}] \\ & + [\text{Nitrate Nitrogen}] \quad \times \quad [\text{Availability Factor}] \end{aligned}$$

For anaerobic treated wastewater and sludge, the nitrate nitrogen amounts will be negligible and can be ignored.

- (c) Plant Available Nitrogen (PAN) Availability factors are as follows:

- (1) Average Availability factors for all fields:

<b><u>Types of Nitrogen</u></b>	<b><u>Surface Application</u></b>	<b><u>Immediate Incorporation or Subsurface Injection</u></b>
Organic	0.25 – 0.75*	0.25 – 0.75*
Ammonia	0.6**	0.9**
Nitrate	0.9**	0.9**

\* Organic Nitrogen = [Total Kjeldahl Nitrogen as N] – [Ammonia as N]. Availability Factors based on time after application and waste type are:

C. SPECIAL CONDITIONS (continued)

Type of Wastewater And Sludge Treatment Method	Organic Nitrogen Availability Factor by Time Period			
	Year	Year	Year	Cumulative
	1	2	3	Year 3+
Aerobic wastewater lagoon and sludge	0.20	0.10	0.05	0.35
Anaerobic wastewater lagoon and sludge	0.40	0.20	0.10	0.70
Aerobic sludge-only storage basin/lagoon	0.40	0.20	0.10	0.70
Extended aeration plant and sludge	0.40	0.20	0.10	0.70
Waste activated treatment plant (liquids, primary/secondary sludges)	0.40	0.20	0.10	0.70
Lime Stabilized Sludge	0.40	0.20	0.10	0.70
Aerobic Sludge Digestor	0.30	0.15	0.08	0.53
Anaerobic Sludge Digestor	0.20	0.10	0.05	0.35
Composted Sludge (Class A)	0.10	0.05	0.03	0.18

NOTES: Year 1 is the current year of waste application; year 2 is the previous year of waste application; and year 3 is waste application two years ago. Nitrogen availability for years 1, 2 and 3 must be added when waste is applied in consecutive years. The cumulative factor is used when waste is applied at about the same rate for 3 consecutive years or longer.

\*\* Average inorganic nitrogen availability based on the typical soil and climate conditions when considering additions due to precipitation, dry deposition, and foliar absorption versus losses due to volatilization and denitrification (10% denitrification loss is included). The permittee may choose to use this average value for all fields or may adjust the N availability based on site specific soil conditions using the following tables under 'field Specific Availability Factors for Inorganic Nitrogen'.

(2) Field Specific Availability Factors for Inorganic Nitrogen.

For ammonia and nitrate nitrogen factors, the permittee may choose to use the average value for all fields under paragraph C.1. above, or may use the alternate factors on a field specific basis using the tables below. The approved factors for each field will be included in the O&M Manual.

Table A. Alternate Field Specific Availability Factors for Surface Application					
% of inorganic N (manure., precip.) available					
Soil Organic Matter %	Excessively Well drained	Well Drained	Moderately Well drained	Somewhat Poorly Drained	Poorly Drained
< 2	71	66	62	56	45
2-5	66	60	56	49	30
> 5	63	56	49	38	19
Adapted from USDA – NRCS, national Engineering Handbook, Part 651, Animal Waste Management Field Handbook (AWMFH), April 1992, Tables 11-6 and 11-8.					



C. SPECIAL CONDITIONS (continued)

<b>Table B. Alternate Field Specific Availability Factors for Sub-Surface Injection or Immediate Incorporation.</b>					
% of inorganic N (manure., precip.) available					
Soil Organic Matter %	Excessively Well drained	Well Drained	Moderately Well drained	Somewhat Poorly Drained	Poorly Drained
< 2	89	84	78	70	57
2-5	84	76	70	62	38
> 5	80	70	62	48	24
Adapted from USDA – NRCS, national Engineering Handbook, Part 651, Animal Waste Management Field Handbook (AWMFH), April 1992, Tables 11-6 and 11-8.					

(d) Soil Residual Nitrogen (SRN).

- (1) For Annual Crops, the nitrogen availability from soil organic matter must be included based on soil CEC and crop season as follows:

SRN in pound N/acre\* = [percent organic matter] x Soil Availability Factor

<b>Soil Availability Factor By Soil CEC Ranges and Organic Matter</b>				
<u>Growing Season</u>	<u>Organic Matter</u>	<u>CEC &lt;10</u>	<u>CEC 10-18</u>	<u>CEC &gt;18</u>
<b>Summer</b>	<b>1%</b>	<b>40*</b>	<b>20</b>	<b>10</b>
<b>Winter</b>	<b>1%</b>	<b>20*</b>	<b>10</b>	<b>5</b>

**\*Note:** If CEC is less than 10 and organic matter is 1.5% or greater, the total SRN is constant at 60 pound nitrogen for summer and 30 pounds for winter.

- (2) For Perennial Crops the SRN is considered zero (0) for purposes of these calculations because the SRN has already been considered in the crop fertilization recommendations in the referenced publications.
- (e) Crop nitrogen requirements shall be based on University of Missouri publication, Soil Test Interpretations and Recommendations Handbook, as revised or one of the other reference publications listed in this permit. Alternate reference publications may be used only upon prior approval by the department and shall be listed in the approved Operation and Maintenance Manual.
- (f) If a crop is not harvested, the PAN rate shall not exceed 40 lbs/acre/year and grass vegetation must be maintained on the site.
- (g) PAN calculations, application amounts, crop yields and crop removal rates shall be listed in the annual report.
- (h) Conversion Factors for laboratory testing results:

[mg/L or mg/kg or ppm] x [conversion factor] = [pounds per Unit Volume]

<u>Unit Volume</u>	<u>Conversion Factors</u>
1 lbs/acre inch	0.226
1 lbs/1,000 gallons	0.0083
1 lbs/100 cubic feet	0.0062
1lbs/ton (wet wt)	0.002

- (i) Alternate nitrogen availability factors may be considered based upon site-specific conditions for each filed and submittal of scientific justification. Alternate factors will be reviewed and approved by the department as part of the Operation and Maintenance Manual.

C. SPECIAL CONDITIONS (continued)

- (j) Supplemental nitrogen may be added to row crops when determined necessary for proper plant growth based on testing of plant vegetation or soil nitrate testing during the growing season. Procedures will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
- (k) Primary reference publications used herein are:
  - (1) Livestock Waste Facilities Handbook, Midwest Plan Service, MWPS-18, April 1993.
  - (2) National Engineering Handbook, Part 651, Agricultural Waste Management Field Book, USDA, Natural Resources Conservation Service (NRCS), April 1992 and current supplements.
  - (3) Managing Nitrogen for Groundwater Quality and Farm Profitability, Soil Science Society of America, Inc. 1991
  - (4) Soil Test Interpretations and Recommendations Handbook, University of Missouri, Department of Agronomy, December 1992.
  - (5) Land Application of Sewage Sludge, EPA/831-B-002b, U.S. Environmental Protection Agency, December, 1994

**Missouri Department of Natural Resources**  
**Statement of Basis**  
**Animal Paradise WWTF**  
**NPDES #: MO-0125849**  
**(Webster) County**

A Statement of Basis (Statement) gives pertinent information regarding the applicable regulations and rational for the development of the NPDES Missouri State Operating Permit (operating permit). This Statement includes Wasteload Allocations, Water Quality Based Effluent Limitations, and Reasonable Potential Analysis calculations as well as any other calculations that effect the effluent limitations of this operating permit. This Statement does not pertain to operating permits that include sewage sludge land application plans and variance procedures, and does not include the public comment process for this operating permit.

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

**Facility Information**

Facility Type: Amusement Animal Park/ Sewerage Works  
Facility SIC Code(s): #7999/ 4952

Facility Description:  
No Discharge System  
Single cell storage lagoon/ wastewater irrigation/ sludge is retained in lagoon.

**OUTFALL(S) TABLE:**

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	0.005	Secondary	Domestic Waste	1.8

Water Quality History: Missing DMR's: 7/31/02, 8/31/02, 9/30/02, 10/31/02, 11/30/02, 11/30/03,12/31/03, 01/31/04, 2/28/04, 3/31/04, 4/30/04, 5/31/04, 6/30/04, 7/30/04, 8/30/04, 9/30/04, 10/31/04, 11/30/04, 12/31/04, 1/31/05, 2/30/05, 3/31/05, 5/31/05, 6/30/05, 7/31/05, 8/31/05, 9/30/05, 10/31/05, 11/30/05, 12/30/05, 10/31/06, 11/30/06, 1/31/07, 2/28/07, 3/31/07, 4/30/07, 5/31/07, 6/30/07, 7/31/07, 8/31/07.

Comments:

**Receiving Stream Information**

**APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:**

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

Please mark the correct designated waters of the state categories of the receiving stream.

Missouri or Mississippi River [10 CSR 20-7.015(2)]:	Yes <input type="checkbox"/> ; No <input checked="" type="checkbox"/>
Lake or Reservoir [10 CSR 20-7.015(3)]:	Yes <input type="checkbox"/> ; No <input checked="" type="checkbox"/>
Losing [10 CSR 20-7.015(4)]:	Yes <input type="checkbox"/> ; No <input checked="" type="checkbox"/>
Metropolitan No-Discharge [10 CSR 20-7.015(5)]:	Yes <input type="checkbox"/> ; No <input checked="" type="checkbox"/>
Special Stream [10 CSR 20-7.015(6)]:	Yes <input type="checkbox"/> ; No <input checked="" type="checkbox"/>
Subsurface Water [10 CSR 20-7.015(7)]:	Yes <input type="checkbox"/> ; No <input checked="" type="checkbox"/>
All Other Waters [10 CSR 20-7.015(8)]:	Yes <input checked="" type="checkbox"/> ; No <input type="checkbox"/>

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 1<sup>st</sup> classified receiving stream's beneficial water uses to be maintained are located in the Receiving Stream Table located below in accordance with [10 CSR 20-7.031(3)].

**RECEIVING STREAM(S) TABLE:**

WATERBODY NAME	CLASS	WBID	DESIGNATED USES*	8-DIGIT HUC	EDU**
Unnamed Tributary to Davis Creek	U		General Criteria	11010002	Ozarks/ White

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

\*\* - Ecological Drainage Unit

\*\*\* - UAA has not been conducted.

**RECEIVING STREAM(S) LOW-FLOW VALUES TABLE:**

RECEIVING STREAM (U, C, P)	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
Unnamed Tributary to Davis Creek	0	0	0

Mixing Zone: Not Allowed [10 CSR 20-7.031(4)(A)4.B.(I)(a)].

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

**Rationale and Derivation of Effluent Limitations & Permit Conditions****ALTERNATIVE EVALUATIONS FOR NEW FACILITIES:**

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

Not Applicable ☒;

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

**ANTI-BACKSLIDING:**

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

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

**ANTIDEGRADATION:**

Policies which ensure protection of water quality for a particular water body where the water quality exceeds levels necessary to protect fish and wildlife propagation and recreation on and in the water. This also includes special protection of waters designated as outstanding natural resource waters. Antidegradation requirements are consistent with 40 CFR 131.12 that outlines methods used to assess activities that may impact the integrity of a water and protect existing uses. This policy may compel the state to maintain a level of water quality above those mandated by criteria.

Not Applicable ☒;

Renewal of permit for existing facility.

**APPLICABLE PERMIT PARAMETERS:**

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

**COMPLIANCE AND ENFORCEMENT:**

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

Not Applicable ☒;

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

**PRETREATMENT PROGRAM:**

The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a Publicly Owned Treatment Works [40 CFR §403.3(q)].

Not Applicable ☒;

At this time, the permittee is not required to implement and enforce a Pretreatment Program.

**REASONABLE POTENTIAL ANALYSIS (RPA):**

Limitations must control all pollutants or pollutant parameters that are or may be discharged at a level which will cause, have reasonable potential to cause, or contribute to an excursion above the Missouri Water Quality Standards.

Not Applicable ☒;

A RPA was not conducted for this facility.

**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 (BOD<sub>5</sub>) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs). Please see the United States Environmental Protection Agency's (EPA) website for interpretation of percent removal requirements for National Pollutant Discharge Elimination System Permit Application Requirements for Publicly Owned Treatment Works and Other Treatment Works Treating Domestic Sewage @ [www.epa.gov/fedrgstr/EPA-WATER/1999/August/Day-04/w18866.htm](http://www.epa.gov/fedrgstr/EPA-WATER/1999/August/Day-04/w18866.htm)

Not Applicable ☒;

This wastewater treatment facility is not a POTW. Influent monitoring is not being required to determine percent removal.

**SANITARY SEWER OVERFLOWS (SSOs), AND INFLOW & INFILTRATION (I&I):**

Collection systems are a critical element in the successful performance of the wastewater treatment process. Under certain conditions, poorly designed, built, managed, operated, and/or maintained systems can pose risks to public health, the environment, or both. Causes of SSOs include, but are not limited to, the following: high levels of I&I during wet weather; blockages; structural, mechanical, or electrical failures; collapsed or broken sewer pipes; insufficient conveyance capacity; and vandalism. Effective and continuous management, operation, and maintenance, as well as ensuring adequate capacity and rehabilitation when necessary are critical to maintaining collection system capacity and performance while extending the life of the system.

Not Applicable ☒;

This facility is not required to develop or implement a program for maintenance and repair of the collection system; however, it is a violation of Missouri State Environmental Laws and Regulations to allow untreated wastewater to discharge to waters of the state.

**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.

Not Applicable ☒;

This permit does not contain a SOC.

**STORM WATER POLLUTION PREVENTION PLAN (SWPPP):**

A plan to schedule activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the state. The plan may include, but is not limited to, treatment requirements, operating procedures, and practices to control facility site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Not Applicable ☒;

At this time, the permittee is not required to develop and implement a SWPPP.

**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 to 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:

**Error! Objects cannot be created from editing field codes.** (EPA/505/2-90-001, Section 4.5.5)

Where C = downstream concentration

Cs = upstream concentration

Qs = upstream flow

Ce = effluent concentration

Qe = effluent flow

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).

**WLA MODELING:**

Not Applicable ☒;

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

**WHOLE EFFLUENT TOXICITY (WET) TEST:**

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

Not Applicable ☒;

At this time, the permittee is not required to conduct WET test for this facility.

**303(d) LIST & TOTAL MAXIMUM DAILY LOAD (TMDL):**

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

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

Not Applicable ☒;

This facility does not discharge to a 303(d) listed stream.

**Outfall #001** – Main Facility Outfall – Emergency Discharge only

**EFFLUENT LIMITATIONS TABLE:**

PARAMETER	UNIT	BASIS FOR LIMITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MODIFIED	PREVIOUS PERMIT LIMITATIONS
FLOW	GPD	1		*	*	NO	N/A
BOD <sub>5</sub> **	MG/L	1		45	30	NO	N/A
TSS **	MG/L	1		45	30	NO	N/A
PH (S.U.)	SU	1	***		***	NO	N/A
AMMONIA AS N	MG/L	5	****		****	NO	N/A
FECAL COLIFORM	****	1	****		****	NO	N/A
TEMPERATURE	°C	5	****		****	NO	N/A
DISSOLVED OXYGEN	MG/L	3	*		*	YES	NONE

**\* - Monitoring requirement only**

\*\*\* - # of colonies/100mL; the Monthly Average for Fecal Coliform is a geometric mean.

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

N/A – Not applicable

S – Same as previous operating permit

Basis for Limitations Codes:

- |  |                                   |
|--|-----------------------------------|
| 1. State or Federal Regulation/Law       | 6. Antidegradation Policy         |
| 2. Water Quality Standard (includes RPA) | 7. Water Quality Model            |
| 3. Water Quality Based Effluent Limits   | 8. Best Professional Judgement    |
| 4. Lagoon Policy                         | 9. TMDL or Permit in lieu of TMDL |
| 5. Ammonia Policy                        | 10. WET test Policy               |

**OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:**

**Biochemical Oxygen Demand (BOD<sub>5</sub>).**

- ☒ –45 mg/L as a Weekly Average and 30 mg/L as a Monthly Average. Please see the **APPLICABLE DESIGNATION OF WATERS OF THE STATE** sub-section of the **Receiving Stream Information.**

**Total Suspended Solids (TSS).**

- ☒ –45 mg/L as a Weekly Average and 30 mg/L as a Monthly Average. Please see the **APPLICABLE DESIGNATION OF WATERS OF THE STATE** sub-section of the **Receiving Stream Information.**

**pH.**

- ☒ – Effluent limitations have been retained from previous state operating permit, please see the **APPLICABLE DESIGNATION OF WATERS OF THE STATE** sub-section of the **Receiving Stream Information.**

**Temperature.** Monitoring requirement due to the toxicity of Ammonia varies by temperature.

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

**Total Ammonia Nitrogen**

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

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

**Dissolved Oxygen** Monitoring only to determine reasonable potential during the next renewal.

**Minimum Sampling and Reporting Frequency Requirements.**

PARAMETER	SAMPLING FREQUENCY	REPORTING FREQUENCY
FLOW	ONCE/DAY	QUARTERLY
BOD <sub>5</sub>	ONCE/WEEK	QUARTERLY
TSS	ONCE/WEEK	QUARTERLY
PH (S.U.)	ONCE/WEEK	QUARTERLY
TEMPERATURE (°C)	ONCE/WEEK	QUARTERLY
AMMONIA AS N	ONCE/WEEK	QUARTERLY
DISSOLVED OXYGEN (MG/L)	ONCE/WEEK	QUARTERLY
LAGOON FREEBOARD	ONCE/MONTH	QUARTERLY
IRRIGATION PERIOD	ONCE/DAILY	QUARTERLY
VOLUME IRRIGATED	ONCE/DAILY	QUARTERLY
APPLICATION AREA	ONCE/DAILY	QUARTERLY
APPLICATION RATE	ONCE/DAILY	QUARTERLY
RAINFALL	ONCE/DAILY	QUARTERLY

The land application Operational Monitoring and the Monitoring Tests for the Irrigated Wastewater are standard for all land application permits. The Irrigated Wastewater monitoring is necessary to determine Phosphorus and Nitrogen loading for the plants.

**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.

**Date of Factsheet:**

Tara Massey  
WP Permitting and Assistance Unit  
(417) 891-4300  
Tara.massey@dnr.mo.gov