KOCH

KOCH NITROGEN COMPANY LLC

July 30, 2014

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Chief of the Hazardous Waste Permits Section
Bureau of Waste Management
Kansas Department of Health and Environment
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Chief - RCRA Corrective Action & Permits Branch
Air, RCRA and Toxic Division
U.S. Environmental Protection Agency – Region VII
11201 Renner Boulevard
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Andrea R. Stone (CD Copy)
Environmental Scientist
RCRA Corrective Action & Permits Branch
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U.S. Environmental Protection Agency Region VII
11201 Renner Boulevard
Lenexa, Kansas 66219

RE **Response to KDHE July 1, 2014 Comments to the RCRA Post-Closure Permit Renewal Application**
Koch Nitrogen Company, LLC
Dodge City, Kansas
EPA RCRA ID No. KSD044625010

Dear Regulatory Officials:

This letter and associated attachments are provided to address comments on Koch Nitrogen Company, LLC's (KNC's) RCRA Post-Closure Permit Application, submitted October 2012,

620.227.8631 Tel
620.227.6016 Fax

11559 U.S. Highway 50
P.O. Box 1337
Dodge City, Kansas 67801-1337

which were provided by the Kansas Department of Health and Environment (KDHE) and the U.S. Environmental Protection Agency (EPA), in a letter dated July 1, 2014.

Comments from KDHE's July 1, 2014 submittal and KNC's responses to these comments are provided in Attachment A. Comments from EPA's June 11, 2013 submittal and KNC's responses to these comments are provided in Attachment B. Text revision replacement pages and an updated cost estimate are provided in Attachment C. Figure revisions are provided in Attachment D.

We trust that the information we have provided will address the corresponding comments. Please call Cory Zellers at (620) 371-7914 if you have any questions or would like to discuss any of these items further.

In accordance with Section I.F of the Part I Permit and Section B.22 of the Part II permit, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or other persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Very Truly Yours,

Rachel L. Moore
Plant Manager
Koch Nitrogen Company, LLC

ATTACHMENT A

KDHE 1 JULY 2014
COMMENTS AND KNC RESPONSES

KDHE Comment 1 – Section A, Part A: The contact person for the facility has changed since the permit application was submitted for review. Please update the contact information in applicable sections of the Part A and Part B Permit Application.

KNC Response: The contact information for the facility has been updated on Kansas Form 8700-23 included in Part A of the permit. In addition, the Part B Certification (Section L) has been updated. Replacement pages are provided in Attachment C.

KDHE Comment 2 – Section I, Appendix I-4: The Supplement to the Part B Permit Application specifies the addition of groundwater recovery wells and groundwater monitoring wells. Incorporation of these wells into the groundwater recovery and treatment system and the groundwater monitoring system will increase the operating costs for the groundwater corrective action program. Use the enclosed form to update the cost estimate to reflect these additional costs. Corresponding text in Section I-8 will also require revision.

KNC Response: The monitoring and recovery system costs have been updated in Appendix I-4. Replacement pages for Appendix I-4 and Section I-8 text are provided in Attachment C.

KDHE Comment 3 – Section J: The Solid Waste Management Units (SWMUs) at the facility are identified in this section. However, the information specified in 40 CFR 270.14(d) is not provided. Instead, reference is made to descriptions in other documents. Revise this section to include descriptions for each SWMU. Also, please provide descriptions for each Areas of Concern (AOC).

KNC Response: Section J has been revised to include descriptions for each SWMU and AOC. This information was provided to the KDHE in an email transmission dated 19 June 2014. The modified Section J is provided in Attachment C.

KDHE Comment 4 – Figure A-1 and Figure J-1: The location identified on these figures for SWMU 8, the Former Chromium Destruct Unit, is not accurate. The location depicted on the map is the cooling tower. Please correct this error. In addition, identify boundaries of each SWMU and AOC at the facility on these figures. If the boundary of each unit is uncertain, identify the anticipated boundary.

KNC Response: Figures A-1 and J-1 have been updated to include approximate boundaries of each SWMU and AOC. The location of SWMU 8 has been corrected. Revised Figures A-1 and J-1 are provided in Attachment D.

KDHE Comment 5 – Section G, Contingency Plan: This section is not necessary because the facility does not manage hazardous waste. Therefore, remove this section from the Permit B Application.

KNC Response: Comment noted. Section G has been removed, and the Table of Contents has been updated to reflect this change. Replacement pages for the Table of Contents and a modified Section G title page are provided in Attachment C.

KDHE Comment 6 – Supplement to the Part B Permit Application: During our December 2013 meeting, KNC presented a figure depicting proposed locations for new recovery wells and monitoring wells. Update Figure 18 to show the proposed locations of these new wells. In addition, add three new wells labeled as MW-33, MW-34, and MW-35 to monitor the limit of contamination southeast, southwest, and west of the facility. Once the wells are installed, the information in Table 1 of the SAP will need to be updated.

KNC Response: A revised Figure 18 is included in Attachment D depicting the target groundwater recovery and monitoring networks. New monitoring wells will be sampled, following installation and development, on a semiannual basis as part of routine groundwater sampling events. Please note that the installation of proposed monitoring well MW-34 is contingent on KNC obtaining permission from the Ford Count Economic Development Commission. Furthermore, the proposed monitoring well in the southeast (MW-35) is contingent on sufficient, and/or the presence of groundwater, at this location. Please note that wells TW-81A, MW-24, MW-25, and MW-26 have been dry recently, and in some cases have not had groundwater present for several years. Note that all proposed monitoring well locations off-site are subject to receipt of landowner approval.

Pursuant to KDHE's request on 22 July 2014, TW-47 and TW-36 will be added to the semi-annual groundwater monitoring program. Once the new wells have been installed, the information in the SAP text and in Table 1 of the SAP will be updated to reflect the updated recovery and monitoring network, including the conversion of TW-47 and TW-36 to monitoring wells.

KDHE Comment 7 – Environmental Restrictive Covenant: In accordance with K.A.R. 28-31-264(a)(c), KDHE will require KNC to submit an environmental restrictive covenant and easement. Please use the enclosed template as a guide to create an environmental restrictive covenant for the facility.

KNC Response: Comment noted. KNC is preparing an updated environmental restrictive covenant for the facility for submission to the KDHE upon completion of the new Permit. KNC will separately provide a suggested document to KDHE for review.

ATTACHMENT B

EPA 11 JUNE 2013
COMMENTS AND KNC RESPONSES

Geologist Comment 1 – Section E-5 Site Hydrogeologic Setting, Page E-12, Second Paragraph, and Page E-13, First Paragraph: The accuracy of the data resulting from a rising head slug test in which a submersible pump was used to "instantaneously" remove a volume of water over a 10-20 second period of time is very questionable. Additionally, in the discussion regarding the averaging of results from the wells tested there is no indication that consideration was given to the interval of the unconsolidated aquifer that was tested, since hydraulic conductivity can vary with depth. The screened interval of the well being tested should be matched up with its drilling log, and only wells that are screened across approximately the same zones should be averaged together. This process of ensuring that similarly screened wells are grouped together for averaging may be useful in locating zones of higher permeability, if present, in the unconsolidated aquifer.

KNC Response: This comment was addressed in KNC's 20 June 2013 and 9 July 2013 responses to EPA comments. The responses are provided as follows:
"The Hvorslev solution method was used to evaluate slug test results. The Hvorslev method does not require that the slug be introduced in a near-instantaneous manner relative to aquifer response. As a quasi-steady state representation of slug induced flow, there is no assumption about the relative speed of slug introduction in the underlying mathematical model. The only assumption in this regard is that the slug introduction has been completed prior to the collection of response data. Under the circumstances this was the most accurate method afforded to assess the hydraulic conductivity at the recovery well locations. To evaluate the results between testing methods employed at the monitoring and recovery wells the slug testing results of the monitoring well and recovery wells were compared. The geometric mean of hydraulic conductivity determined at the monitoring wells (excluding MW-19S) which were tested using conventional slug testing methods was 0.4 ft/day. The geometric mean of hydraulic conductivity determined at the recovery wells was 1.4 ft/day. The slightly elevated result from the recovery well is not surprising due to the constant pumping and development occurring at the recovery wells.

The horizontal hydraulic conductivity testing results were reviewed to determine if grouping of results was possible. In the original submittal, Table 2 [of the Supplement to the Permit Renewal Application] included the lithology of the entire screened interval. In order to refine the table and to perform additional analysis of the distribution of hydraulic conductivity, Table 2 was updated to only include the lithology of the saturated screened section.

The testing results from each well were compared to determine if hydraulic conductivity coincided with saturated lithology material and/or saturated screen interval elevation. The comparison did not suggest a trend in hydraulic conductivity results with either screen elevation or saturated screen lithologic material. Furthermore, the results between testing locations was consistent. The range of horizontal hydraulic conductivity results ranged from 0.1 and 19.5 ft/day (excluding MW-19S which had a result of 0.0012 feet per day [ft/day]) and a geometric mean of 1.0 ft/day. Previous slug testing and aquifer performance testing completed by Woodward Clyde Consultants (WCC) at the site in 1988 indicated a range of horizontal hydraulic conductivity between 0.9 and 13 ft/day. Furthermore, both

the 1988 and 2012 results are similar to the range of horizontal hydraulic conductivity reported by the Kansas Geologic Survey Open File Report 2010-18, as noted in the Permit Renewal Submission.

The majority of the recovery wells are screened over the entire saturated thickness and thus the estimate of horizontal hydraulic conductivity includes the entire saturated thickness of the unconsolidated aquifer. Due to the consistency of the 2012 and historical results and the small variability, as described above, grouping of K estimates based on lithology or screen interval does not appear warranted."

<u>EPA PM Specific Comment 1 – Section E-2 Groundwater Monitoring, First Paragraph, Page E-8 of E-15:</u> There is a sentence in this paragraph that states, "This schedule will be followed until the concentration of constituents of concern has to be at or below for a period of three (3) consecutive years and approved by KDHE and EPA.

In addition, there is no mention of where the compliance wells are located. In the Groundwater Sampling and Analysis Plan on Figure 2, it shows all of the compliance wells as proposed to being plugged and abandoned.

Based on the conversation with the EPA and KDHE June 5, 2013, the compliance point wells are not going to be replaced, because Koch will be required to maintain and operate the groundwater recovery system until the levels throughout the entire plume(s) of contamination (Chromium, Nitrate, Nitrate and VOCs) have been reduced to levels at or below the groundwater protection standards for a period of three (3) consecutive years for all of the constituents of concern. Please revise the third sentence in this section to read, "This schedule will be followed until the concentrations for all of the constituents of concern (Chromium, Nitrite, Nitrate, and VOCs) throughout the entire plume(s) have been reduced to levels at or below the groundwater protection standards for a period of three (3) consecutive years, and approval has been granted by KDHE and EPA. In the last sentence of the first paragraph in this section please delete out, "...at the compliance point..." so the sentence reads, "Since the timeframe for achieving this reduction cannot be predicted, the monitoring and recovery program will continue for such time as is necessary to achieve the groundwater protection standards throughout the plume(s) of contamination for all constituents of concern (Chromium, Nitrite, Nitrate, and VOCs) for a period of three (3) consecutive years, and approval from KDHE and EPA has been granted."

<u>Second paragraph of the same section:</u> The last section states, "The groundwater analyses results are provided to the KDHE in Corrective Action Reports on an annual basis." Add "and EPA" after "KDHE" in that sentence.

KNC Response: Comment noted. Replacement pages E-8 through E-15 are provided in Attachment C.

<u>EPA PM Specific Comment 2 – Table E-1:</u> Protection Standards for Groundwater Constituents of Concern, Page E-9 of E-15: Add Hexavalent Chromium to this table and its current Regional Screening Level.

Footnote #2 for Table E-1 states "Groundwater protection standards are from the EPA Regional Screening Level (RSL) Summary Table (April 2012). The RSL tables are periodically updated. The current RSLs are dated November 2012. Please change the Footnote #2 to read, "Groundwater protection standards are from the most recent EPA Regional Screening Level (RSL) Summary Table. The current update is November 2012; however when the RSLs are updated the most current version will be used."

KNC Response: Table E-1 has been updated. Per KDHE's July 1, 2014 letter, the table has been updated to include the Risk-Based Standards for Kansas (RSK) values where applicable and the EPA RSLs when RSK values have not been identified (hexavalent chromium, nitrate, nitrite). The table has also been footnoted to reference that the most current RSL or RSK values, as applicable, will be utilized.

ATTACHMENT C

SUPPLEMENTAL REPLACEMENT PAGES

MAIL COMPLETED 8700-12 FORM TO: KDHE-BWM 1000 SW Jackson, Suite 320, Topeka, KS 66612-1366	Kansas Department of Health and Environment **Notification of Regulated Waste Activity for Kansas Treatment, Storage, and Disposal Facilities** KANSAS FORM 8700-23 (RCRA SUBTITLE C SITE IDENTIFICATION FORM)	

1. Reason for Submittal (See page 4 of the instructions) MARK ALL BOX(ES) THAT APPLY	**Reason for Submittal:** • •To provide Initial Notification of Regulated Waste Activity (to obtain an EPA ID Number) • •To provide Subsequent Notification of Regulated Waste Activity (to update information) • •As a component of a FIRST–Kansas RCRA Hazardous Waste Part A Permit Application •X•As a component of a REVISED–Kansas RCRA Hazardous Waste Part A Permit Application • •As a component of the Hazardous Waste Report		
2. Site EPA ID Number (See page 5 of the instructions)	**EPA ID Number:** **KSD044625010**		
3. Site Name (See page 5 of the instructions)	**Name:** KOCH NITROGEN COMPANY, LLC		
4. Site Location Information (See page 5 of the instructions)	**Street Address:** 11559 U.S. Highway 50		
	City or Town: Dodge City	**State:** KS	
	County Name: Ford	**Zip Code:** 67801-1337	
5 Site Land Type (See page 5 of the instructions)	**Site Land Type:** •X Private • •County • •District • •Federal • •Indian • •Municipal • •State • •Other		
6. North American Industry Classification System (NAICS) Code(s) for the Site (See page 5 of the instructions)	**A.** 325311	**B.**	
	C.	**D.**	
7. Site Mailing Address (See page 6 of the instructions)	**Street or P. O. Box:** P.O. Box 1337		
	City or Town: Dodge City		
	State: Kansas		
	Country: USA	**Zip Code:** 67801-1337	
8. Site Contact Person (See page 6 of the instructions)	**First Name:** Cory	**MI:**	**Last Name:** Zellers
	Phone Number & Extension: 620-371-7914	**Email Address:** zellersc@kochind.com	
9. Legal Owner and Operator of the Site (See page 6 of the instructions)	**A. Name of Site's Legal Owner:** Koch Nitrogen Company, LLC	**Date Became Owner (mm/dd/yyyy):** 12/31/2008	
	Owner Type: •X Private • •County • •District • •Federal • •Indian • •Municipal • •State • •Other		

	B. Name of Site's Operator: Koch Nitrogen Company, LLC	**Date Became Operator (mm/dd/yyyy):** 12/31/2008
	Operator Type: • X Private • County • District • Federal • Indian • Municipal • State • Other	

10. Type of Regulated Waste Activity (Mark the appropriate boxes for activities that apply to your site. See pages 7-11 of the instructions)

A. Hazardous Waste Activities

1. **Generator of Hazardous Waste (Choose only one of the following three classifications)**

• a. EPA: 1,000 kg/mo (2,200 lbs in any single mo.) or more of non-acute hazardous waste, greater than 1 kg of acute hazardous waste;

or

• X b. KSG Sub-Class 1: 100 kg or more and less than 1,000 kg (220 - 2,200 lbs in any single mo.) of non-acute hazardous waste;

or

• b. KSG Sub-Class 2: 25 kg or more and less than 100 kg (55 - 220 lbs in any single mo.) of non- acute hazardous waste;

or

• c. SQG: Less than 25 kg/mo (55 lbs./mo.) of non-acute hazardous waste

In addition, indicate other generator activities. (Mark all that apply)

• d. United States Importer of Hazardous Waste

• e. Mixed Waste (hazardous and radioactive) Generator

For Items 2 through 6, mark all that apply.

• 2. **Transporter of Hazardous Waste**

• X 3. **Treater, Storer, or Disposer of Hazardous Waste (at your site)** Note: A hazardous waste permit is required for this activity.

• 4. **Recycler of Hazardous Waste (at your site)** Note: A hazardous waste permit may be required for this activity.

5. **Exempt Boiler and/or Industrial Furnace**

• a. Small Quantity On-site Burner Exemption

• b. Smelting, Melting, and Refining Furnace Exemption

• 6. **Underground Injection Control**

B. Universal Waste Activities

1. **Large Quantity Handler of Universal Waste (accumulate 5,000 kg or more) [refer to Kansas regulations to determine what is regulated]. Indicate types of universal waste generated and/or accumulated at your site. (Mark all boxes that apply):**

	Generate	Accumulate
a. Batteries	•	•
b. Pesticides	•	•
c. Thermostats	•	•
d. Lamps	•	•
e. Other (specify) ________	•	•
f. Other (specify) ________	•	•
g. Other (specify) ________	•	•

• 2. **Destination Facility for Universal Waste**

Note: A hazardous waste permit may be required for this activity.

C. Used Oil Activities (Mark all boxes that apply.)

1. **Used Oil Transporter - Indicate Type(s) of Activity(ies)**
   - • a. Transporter
   - • b. Transfer Facility
2. **Used Oil Processor and/or Re-refiner - Indicate Type(s) of Activity(ies)**
   - • a. Processor
   - • b. Re-refiner

• 3. **Off-Specification Used Oil Burner**

4. **Used Oil Fuel Marketer - Indicate Type(s) of Activity(ies)**
   - • a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
   - • b. Marketer Who First Claims the Used Oil Meets the Specifications

11. **Description of Hazardous Wastes (See page 11 of the instructions)**						
Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g., D001, D003, F007, U112). Use an additional page if more spaces are needed.						
D001	D007	F005				
D002	D009	U134				
D003	D011	U161				
D005	D035					
D006	F003					

12. Comments (See page 11 of the instructions)

The facility does not routinely generate hazardous waste. Equipment painting/tank cleaning waste (D001, D002, D005, D035, F003, F0005) may be generated once or twice annually. Other wastes generally are from chemical cleanups. There is the possibility of generating D007 waste as investigation derived waste (IDW) or from future remedial programs with soil contaminated by historical activities.

Underground Injection Control wells are permitted for nonhazardous wastewater injection only.

13. Certification. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. **(See page 11 of the instructions)**

Signature of owner, operator, or an authorized representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
Rachel Moore	Rachel Moore - Plant Manager	07/30/2014

MAIL TO:
KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
BUREAU OF WASTE MANAGEMENT
1000 SW JACKSON, SUITE 320
TOPEKA, KS 66612-1366

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT INFORMATION FORM (8700-23)

1. Facility Permit Contact (See instructions on page 16)	**First Name:** Cory	**MI:**	**Last Name:** Zellers
	Phone Number: 620-371-7914		**Phone Number Extension:**
2. Facility Permit Contact Mailing Address (See instructions on page 16)	**Street or P.O. Box:** 11559 U.S. Highway 50		
	City, Town, or Village: Dodge City		
	State: Kansas		
	Country: USA		**Zip Code:** 67801 -1337
3. Legal Owner Mailing Address and Telephone Number (See instructions on page 17)	**Street or P.O. Box:** 11559 U.S. Highway 50		
	City, Town, or Village: Dodge City		
	State: Kansas		
	Country: USA	**Zip Code:** 67801-1337	**Phone Number** 620-371-7910
4. Operator Mailing Address and Telephone Number (See instructions on page 17)	**Street or P.O. Box:** 11559 U.S. Highway 50		
	City, Town, or Village: Dodge City		
	State: Kansas		
	Country: USA	**Zip Code:** 67801-1337	**Phone Number** 620-371-7910
5. Facility Existence Date (See instructions on page 17)	**Facility Existence Date (mm/dd/yyyy):** 07/01/1968		

6. Other Environmental Permits (See instructions on page 17)

A. Permit Type ***(Enter code)***	**B. Permit Number**													**C. Description**
U	K	S	-	0	1	-	0	5	7	-	0	0	1	Class I Non-Hazardous Injection Well (UIC Well #2)
U	K	S	-	0	1	-	0	5	7	-	0	0	2	Class I Non-Hazardous Injection Well (UIC Well #3)
N	I	-	U	A	1	1	-	N	P	0	2			KS Water Pollution Control Non-Dicharge
E	3	7	5											Solid Waste (Non-Hazardous Only)
E	9	6	9	0	1	0	-	0	0					Remediation Wells
E	S	E	E	S	E	C	T	I	O	N	A	-	3	Above Ground Storage Tanks
E	0	5	7	0	0	0	3							Class I Air Emission Source Operating Permit

7. Nature of Business (Provide a brief description; see instructions on page 18)

See Section A-1.

8. Process Codes and Design Capacities (See instructions on page 18)

A. **PROCESS CODE** - Enter the code from the list of process codes below that best describes each process to be used at the facility. Thirteen lines are provided for entering codes. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space provided in Item 9.

B. **PROCESS DESIGN CAPACITY**- For each code entered in column A, enter the capacity of the process.

1. **AMOUNT** - Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.
2. **UNIT OF MEASURE** - For each amount entered in column B(1), enter the code in column B(2) from the list of unit of measure codes below that describes the unit of measure used. Select only from the units of measure in this list.

C. **PROCESS TOTAL NUMBER OF UNITS** - Enter the total number of units for each corresponding process code.

PROCESS CODE	PROCESS	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
	Disposal:	
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Landfill	Acre-feet; Hectare-meter; Acres; Cubic Meters; Hectares; Cubic Yards
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day or Liters Per Day
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards
D99	Other Disposal	Any Unit of Measure Listed Below
	Storage:	
S01	Container	Gallons; Liters; Cubic Meters; or Cubic Yards
S02	Tank Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S03	Waste Pile	Cubic Yards or Cubic Meters
S04	Surface Impoundment Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S05	Drip Pad	Gallons; Liters; Acres; Cubic Meters; Hectares; or Cubic Yards
S06	Containment Building Storage	Cubic Yards or Cubic Meters
S99	Other Storage	Any Unit of Measure Listed Below
	Treatment:	
T01	Tank Treatment	Gallons Per Day; Liters Per Day; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; or Metric Tons Per Hour
T02	Surface Impoundment Treatment	Gallons Per Day; Liters Per Day; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Pounds Per Hour; Short Tons per Day; Kilograms Per Hour; Metric Tons Per Day; or Metric Tons Per Hour
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; Btu Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Gallons Per Day; Liters Per Hour; or Million Btu Per Hour
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; Btu Per Hour; or Million Btu Per Hour

PROCESS CODE	PROCESS	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
T81	Cement Kiln	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Liters Per Hour; Kilograms Per Hour; or Million Btu Per Hour
T82	Lime Kiln	
T83	Aggregate Kiln	
T84	Phosphate Kiln	
T85	Coke Oven	
T86	Blast Furnace	
T87	Smelting, Melting, or Refining Furnace	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Gallons Per Hour; Liters Per Hour; or Million Btu Per Hour
T88	Titanium Dioxide Chloride Oxidation Reactor	
T89	Methane Reforming Furnace	
T90	Pulping Liquor Recovery Furnace	
T91	Combustion Device Used In The Recovery Of Sulfur Values From Spent Sulfuric Acid	
T92	Halogen Acid Furnaces	
T93	Other Industrial Furnaces Listed In 40 CFR §260.10	
T94	Containment Building - Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Btu Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
	Miscellaneous (Subpart X):	
X01	Open Burning/Open Detonation	Any Unit of Measure Listed Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour; Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; Kilograms Per Hour; Gallons Per Hour; Liters Per Hour; or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; or Million Btu Per Hour
X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

UNIT OF MEASURE	UNIT OF MEASURE CODE
Gallons	G
Gallons Per Hour	E
Gallons Per Day	U
Liters	L
Liters Per Hour	H
Liters Per Day	V

UNIT OF MEASURE	UNIT OF MEASURE CODE
Short Tons Per Hour	D
Metric Tons Per Hour	W
Short Tons Per Day	N
Metric Tons Per Day	S
Pounds Per Hour	J
Kilograms Per Hour	R
Million Btu Per Hour	X

UNIT OF MEASURE	UNIT OF MEASURE CODE
Cubic Yards	Y
Cubic Meters	C
Acres	B
Acre-feet	A
Hectares	Q
Hectare-meter	F
Btu Per Hour	I

8. Process Codes and Design Capacities (*Continued*)

EXAMPLE FOR COMPLETING Item 8 (shown in line number X-1 below): A facility has a storage tank, which can hold 533.788 gallons.

Line Number		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	(2) Unit of Measure (Enter code)	C. Process Total Number of Units	For Official Use Only
X	1	S	0	2	5 3 3 . 7 8 8	G	0 0 1	
	1	T	0	4	0 .		0 0 1	
	2				.			
	3				.			
	4				.			
	5				.			
	6				.			
	7				.			
	8				.			
	9				.			
1	0				.			
1	1				.			
1	2				.			
1	3				.			

NOTE: If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the lines sequentially, taking into account any lines that will be used for "other" processes (i.e., D99, S99, T04 and X99) in Item 9.

9. Other Processes (*See instructions on page 18 and follow instructions from Item 8 for D99, S99, T04 and X99 process codes*)

Line Number (Enter #s in sequence with Item 8)		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	(2) Unit of Measure (Enter code)	C. Process Total Number of Units	D. Description of Process
X	1	T	0	4	.			In-situ Vitrification
	1				.			
	2				.			
	3				.			
	4				.			

10. Description of Hazardous Wastes (See instructions on page 18)

A. **EPA HAZARDOUS WASTE NUMBER** - *Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR Part 261, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.*

B. **ESTIMATED ANNUAL QUANTITY** - *For each listed waste entered in column A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A, estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.*

C. **UNIT OF MEASURE** - *For each quantity entered in column B, enter the unit of measure code. Units of measure which must be used and the appropriate codes are:*

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure, taking into account the appropriate density or specific gravity of the waste.

D. **PROCESSES**

1. **PROCESS CODES:**

For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in Items 8A and 9A on page 3 to indicate the waste will be stored, treated, and/or disposed at the facility.

For non-listed hazardous waste: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in Items 8A and 9A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1. *Enter the first two as described above.*
2. *Enter "000" in the extreme right box of Item 10.D(1).*
3. *Use additional sheet, enter line number from previous sheet, and enter additional code(s) in Item 10.E.*

2. **PROCESS DESCRIPTION:** *If a code is not listed for a process that will be used, describe the process in Item 10.D(2) or in Item 10.E(2).*

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER - Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. *Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B, C and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.*
2. *In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.*
3. *Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.*

EXAMPLE FOR COMPLETING Item 10 (shown in line numbers X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operations. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									D. (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
X	1	K	0	5	4	900	P	T	0	3	D	8	0				
X	2	D	0	0	2	400	P	T	0	3	D	8	0				
X	3	D	0	0	1	100	P	T	0	3	D	8	0				
X	4	D	0	0	2												Included With Above

10. Description of Hazardous Wastes (*Continued; use additional sheets as necessary*)					
				D. PROCESSES	
Line Number	*A. EPA Hazardous Waste No. (Enter code)*	*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*(1) PROCESS CODES (Enter code)*	*(2) PROCESS DESCRIPTION (If a code is not entered in D(1))*
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					

10. Description of Hazardous Wastes (*Continued; Additional Sheet*)

Line Number	*A. EPA Hazardous Waste No. (Enter code)*	*B. Estimated Annual Quantity of Waste*	*C. Unit of Measure (Enter code)*	*E. PROCESSES* (1) PROCESS CODES (Enter code)	*E. PROCESSES* (2) PROCESS DESCRIPTION (If a code is not entered in E(1))

11. Map (See Instructions on page 19) Figure A-1	
Attach to this application a topographic map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in this map area. See instructions for precise requirements.	
12. Facility Drawing (See Instructions on page 20) Provided in attached	
All existing facilities must include a scale drawing of the facility (see instructions for more detail).	
13. Photographs (See Instructions on page 20) Section A	
All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).	
14. Comments (See Instructions on page 20)	

SECTION L

PART B CERTIFICATION
40 CFR 270.11

Part B Permit Application
Koch Nitrogen Company, LLC
Dodge City Nitrogen Plant
11559 U.S. Highway 50
Dodge City, Kansas

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

KOCH NITROGEN COMPANY, LLC

Rachel L. Moore
Plant Manager

07/30/2014
Date

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PERMIT SECTION

FIGURES

SECTION E

GROUNDWATER MONITORING
40 CFR 270.14 (c)

E-1 General

Historic records indicate that the former CDU was in operation from 1968 to 1991. It was initially used to treat cooling tower blowdown when hexavalent chromium was used as a corrosion inhibitor in cooling water systems. The CDU was later used to treat groundwater recovered through operation of a groundwater recovery system.

Site records indicate that a spill of a liquid corrosion inhibitor containing chromic acid occurred sometime in the 1970s, west of the ammonia plant cooling tower releasing approximately 1,200 gallons from a broken pipe connected to the chemical storage tank. The release to groundwater was confirmed in 1982. Since that time, additional monitoring and recovery wells have been installed to monitor the extent of chromium and nitrate in groundwater.

The groundwater recovery system was designed and is currently used to remove and contain groundwater containing chromium, nitrate, nitrite, and select volatile organic compounds (VOCs). Recovered groundwater is transferred via under-ground piping to a reverse osmosis (RO) treatment unit. The RO system is capable of treating all of the recovered groundwater for reuse in the industrial processes in the Plant prior to its disposal in the two existing Class I non-hazardous waste injection wells.

E-2 Groundwater Monitoring

Groundwater monitoring activities will continue as specified in the Sampling and Analysis Plan ("SAP"), provided in Appendix E-1. Well inspections, groundwater level measurements and samples will be collected and analyzed at the frequencies specified in the SAP. This schedule will be followed until the concentrations for the constituent(s) of concern (Chromium, Nitrate, Nitrite, and VOCs) in each plume(s) have been reduced to levels at or below the groundwater protection standards for a period of three (3) consecutive years, and approval has been granted by KDHE. The groundwater protection standards for on-site constituents of concern are summarized in Table E-1. Since the timeframe for achieving this reduction at the compliance point cannot be predicted, the monitoring program will continue for such time as is necessary to achieve the groundwater protection standards for the constituent(s) of concern (Chromium, Nitrate, Nitrite, and VOCs) in each plume(s) for a period of three (3) consecutive years, and approval from KDHE has been granted.

The locations of site monitoring and recovery wells are posted on the topographic map provided in Figure E-1. During the summer of 2012 monitoring and recovery well locations and elevations were resurveyed by a surveyor licensed by the State of Kansas. A summary of well construction details, recent survey data, boring logs and well construction logs for site wells are provided in

Appendix E-2. A Kansas certified laboratory will perform all groundwater sample analyses. The groundwater analyses results are provided to the KDHE in Corrective Action Reports on an annual basis.

Table E-1: Protection Standards for Groundwater Constituents of Concern		
Parameter[1]	**Groundwater Protection Standard[2]**	**Units**
Nitrate (as Nitrogen)	10	mg/L
Nitrite (as Nitrogen)	1	mg/L
Chromium (Total)	0.1	mg/L
[3]Chromium (Hexavalent)	0.035	mg/L
1,1,1-Trichloroethane	0.2	mg/L
1,1-Dichloroethene	0.007	mg/L
Tetrachloroethene	0.005	mg/L
Trichloroethene	0.005	mg/L
Vinyl Chloride	0.002	mg/L

Notes:

mg/L – milligrams per liter

[1]Only VOCs that have been previously detected in groundwater are listed. If other VOCs are detected they will be compared to the applicable KDHE or EPA groundwater protection standards

[2]Groundwater protection standards are from the KDHE Risk based Standards for Kansas RSK Manual, 5th Version (October, 2010). In the absence of KDHE standards (nitrate, nitrite, and hexavalent chromium) the most up to date EPA Regional Screening Level (RSL) will be utilized. The May 2014 RSL table was utilized for nitrate, nitrite, and hexavalent chromium.

[3] The tap water RSL for hexavalent chromium in the May 2014 RSL table was utilized in the absence of an MCL.

E-3 Regional Geology and Hydrogeology

A detailed description of the regional geology and hydrogeology was provided in the Remedial Facility Investigation (RFI) Work Plan (KNC, 2005). A summary of the RFI Work Plan description is provided below. The facility is underlain by geologic layers that, from oldest to youngest, include Cretaceous Age-Dakota Sandstone and Graneros Shale; Tertiary Age-deposits commonly referred to as the Ogallala formation; and undifferentiated Pleistocene and Recent unconsolidated soils. These deposits have been grouped into major units, from youngest to oldest, as follows:

- Unconsolidated Deposits – Tertiary, Pleistocene, and recent deposits near surface;

- Graneros Shale – Cretaceous age deposits that separate unconsolidated deposits from the Dakota Formations; and

- Dakota Formation – Cretaceous age deposits underlying the Graneros Shale

Ford County-wide, groundwater flow within the unconsolidated deposits is influenced by surface water features, primarily the Arkansas River (south of the Plant). County-wide flow paths developed using potentiometric surface data downloaded from the Kansas Geological Survey-Data Access and Support Center (KGS-DASC) clearly indicate an east southeast flow path (KNC, 2005). Generally, the county-wide flow path indicates discharge of groundwater toward the Arkansas River. These data support earlier observations reported by Waite (1942). Recharge to the unconsolidated deposits is derived mainly from precipitation. Because annual average precipitation in the Dodge City area is less than the evapotranspiration rate, significant recharge is not anticipated.

The unconsolidated deposits are underlain by the Graneros Shale at depths ranging from approximately 100 to 165 feet. The Graneros Shale consists of bluish to gray, noncalcareous claystone and shale. Waite (1942) estimated that Granerous Shale thickness ranges from 30 to 50 feet in Ford County.

The Dakota Formation underlies the Graneros Shale and is composed of white, gray, red, brown and tan claystone, siltstone, shale, and sandstone. The thickness of the Dakota Formation in Ford County is variable and appears to be 235 thick at a well in Spearville, approximately 12 miles to the northeast (Waite, 1942).

E-4 Site Geologic Setting

Woodward-Clyde Consultants performed a detailed evaluation of hydrogeological conditions at the Plant, as reported in a technical report dated May 10, 1988, which is included in Appendix E-3. Site geology is presented on pages 10-13 of this report. The Woodward-Clyde study was specifically undertaken to provide cross-sections, pumping tests, and slug tests to characterize groundwater flow characteristics at the Plant. Piezometer clusters were installed in three locations during the study.

Since the Woodward-Clyde Consultants study was completed, multiple soil and groundwater sampling programs have been performed to characterize the hydrogeologic conditions underlying the Plant and off-site areas. Revised cross-sections that depict the hydrogeology underlying and adjacent to the Plant from these borings are provided in Appendix E-4. Boring logs for the earliest monitoring wells frequently included highly generalized geologic material descriptions. More recent boring logs included geologic material descriptions that are much more detailed. To correlate geologic material layers in the cross sections, some interpretation was performed to aggregate geologic materials into five classes based primarily on their anticipated hydrogeologic (porosity and transmissivity) properties.

- Fine Grain - mostly clay, but may contain some silt and/or sand.
- Medium Grain - poorly sorted sediments consisting of grain sizes from clay to sand.
- Coarse Grain - mostly sand, but may contain some silt and/or clay.
- Caliche - mostly clay, but may contain a wide variety of grain sizes. The primary characteristic is significant caliche hardening.
- Graneros Formation - mostly shale, but may contain some sandstone and siltstone. The Graneros Formation is the uppermost bedrock unit underlying the site.

Once the geologic materials were aggregated, the classes form the basis for the updated cross-sections. For ease of comparison the vertical scale of all the cross sections was the same. Contacts between aggregated geologic layers were manually drawn using traditional cross-section techniques. The cross-sections also identify the total depth of boring and, where identified, the top of the Graneros at a particular location.

The site is underlain by Tertiary deposits commonly referred to as the Ogallala Formation. The deposits are primarily clay with lesser amounts of caliche, sand, silt and gravel. Generally, clay with some silt and sand are encountered in the top 50 feet of the unconsolidated deposits. At depths below approximately 50 feet, caliche layers are noted in many of the borings with thicknesses varying from a few feet to greater than 50 feet thick. The unconsolidated deposits generally coarsen below 50 feet below ground surface (bgs), if the caliche is absent, to more sandy or silty clay deposits that become predominantly sandy with depth. For many of the borings through the unconsolidated deposits, the sandy water-producing layer of the unconsolidated deposits (Ogallala) is underlain by a dry clay that rests on the contact with the underlying Graneros Shale (e.g., MW-26, SIT-RG-01, TW-26, and MW-26).

E-5 Site Hydrogeologic Setting

At the Facility and in the adjacent area, groundwater is present within the unconsolidated depths of the Ogallala Formation ranging from approximately 70 to 140 feet bgs. Figure E-2 provides the four quarterly potentiometric surface maps documented in the 2011 Annual Groundwater Corrective Action Report. On all dates, the predominant flow direction was to the southeast with groundwater extraction affecting flow and gradients in the area of recovery wells.

The saturated thickness of the Ogallala varies widely. Generally, the unconfined aquifer thickness is highest to the northeast, northwest and west of the Facility (Figure E-3). Note that the saturated thickness is partially affected by the pumping of groundwater. The thickness of the unconfined aquifer decreases substantially, over 30 feet, with many dry wells (e.g., MW-24, TW-81A, MW-25, and MW-26) to the southeast. The potentiometric surface maps generally mimic the unconfined aquifer thickness map with higher water table elevations to the northwest and northeast decreasing to the southeast along the predominant and regional groundwater flow vector. As noted in previous submittals, the historic water level data indicate that the water table elevation is declining approximately 2 feet per year. Slug testing completed by Woodward-Clyde (1998) and provided in Appendix E-3 yielded an average hydraulic conductivity estimate of approximately 14 feet per day (ft/day), which is noted in the RFI Work Plan (KNC, 2005) to compare favorably with the results of specific capacity testing results provided in the Kansas Geological Survey (KGS) database.

Additional hydraulic testing of the Ogallala was performed in 2012 through: i) single well permeability testing on 53 recovery and monitoring wells; and ii) single well aquifer performance tests on 5 recovery wells.

Single well permeability or slug tests were conducted on both recovery wells and monitoring wells to estimate the hydraulic conductivity of saturated aquifer materials adjacent to the screened section of the wells. Recovery wells were tested using a rising head method where a volume of water was instantaneously removed from the well and the recovery curve of the water level was measured until initial static conditions were reached. The submersible pump in each recovery well was initially shut down and the well was allowed to recover to static conditions prior to the initiation of the slug test. When the slug test was initiated, the well submersible pump was started and the water level within the well was recorded to determine the drawdown within the well. After 1 to 2 feet of drawdown occurred (usually 10 to 20 seconds of run time) the submersible pump was shut down and the well was allowed to return to 90% of initial static conditions. Each recovery well was tested two to three times using this methodology.

Monitoring wells were tested using pneumatic slug testing. Pneumatic slug testing was completed by: i) attaching an air tight testing head to the well; ii) pressurizing the airspace above the water column in the well with compressed nitrogen to depress the water table between 2 and 3 feet; and iii) instantaneously releasing pressure with the wellhead valve which resulted in the de-pressurization of the well and return of the water level to initial static conditions. The recovering water levels were then recorded by a pressure transducer. Each test was run until the water level recovered to at least 90% of the total static water level. On average, three tests were conducted on each well. The slug test data was analyzed using commercially available software designed to analyze slug and aquifer performance test data. The Hvorslev (1951) equation for unconfined aquifers was used to estimate hydraulic conductivity.

Constant rate aquifer performance tests (APTs) were conducted at 5 recovery wells to aid in determining the transmissivity of the saturated aquifer. Observation wells were not located close enough to the pumping wells to measure a hydraulic response, therefore, only the water levels in the pumping wells were monitored during each test. Each APT spanned approximately 2 hours including the background monitoring, pumping, and recovery phases. Initially, the submersible pump in each well was shut off and the water level in the well was allowed to return to initial static conditions. Once initial static conditions were reached, the submersible pump in the well was started and drawdown monitored. The constant flow rate was recorded with an in-line flow meter. Flow rates were recorded prior to the initial shutdown of the submersible pump, after the initial startup of the drawdown portion of the test, and after drawdown in the well stabilized. Water levels during all phases of the APT were monitored with a pressure transducer. Discharge rates varied by well and ranged from approximately 4 gallons per minute (gpm) to 9 gpm. The APT data were analyzed with commercially available software using methods appropriate for unconfined aquifers to estimate transmissivity. The analytical solutions utilized were Theis (1935), Cooper-Jacob (1946), and Neuman (1974) which each assume unconfined aquifer and fully penetrating well conditions.

The values of hydraulic conductivity calculated by the slug tests ranged from a minimum of 7.14 E^{-7} feet per day (ft/day) to 19.5 ft/day with a geometric mean of 0.958 ft/day. The geometric mean of the testing data was within the range of previously determined hydraulic conductivity. The transmissivities calculated by the single well APT's ranged from 11.61 feet squared per day (ft^2/day) to 37.31 ft^2/day with a geometric mean of 24.41 ft^2/day. The corresponding hydraulic conductivity ranges from 0.19 to 1.24 ft/day with a geometric mean of 0.67 ft/day. The results of this additional testing are summarized in Tables E-2 and E-3.

Table E-2: Slug Testing Summary

Parameter	**Hydraulic Conductivity (ft/day)**
Minimum	7.140E-07
Maximum	19.5
Geometric Mean	0.958

Table E-3: Single Well APT Summary

Parameter	**Transmissivity (ft^2/day)**	**Hydraulic Conductivity (ft/day)**
Minimum	11.614	0.194
Maximum	37.312	1.244
Geometric Mean	24.410	0.669

As documented in the RFI Work Plan (KNC, 2005), during a May 2005 pumping test at well cluster B-1 and B-2 (spaced approximately 10 ft apart) a head separation of approximately 60 feet was noted between the unconsolidated deposits and the Dakota formation. During the short term pumping test, the lower Dakota Formation monitoring well was stressed (i.e., pumped) and the position of the water-table was measured in both wells. Throughout the pumping and recovery phase, water level fluctuations were not noted within the unconsolidated deposits monitor well. These pumping test data as well as the period-of-record water level elevation indicated a separation between the over/underlying systems.

E-6 Constituents of Concern Groundwater Distribution

The distribution of chromium and nitrate in Ogallala groundwater monitoring wells over four quarters are documented in the 2011 Annual Groundwater Corrective Action Report (KNC, 2012). Appendix E-5 provides the Total Chromium, Hexavalent Chromium, and Nitrate plus Nitrite as N isoconcentration maps presented in the 2011 Annual Groundwater Corrective Action Report. Appendix E-6 provides a summary compilation of groundwater monitoring results from 2010 through 2011. The highest total chromium concentrations are generally present in the northeast corner of the plant (Appendix E-5 Figure 4-1) with a similar quarterly distribution and concentration. The highest concentrations of nitrate plus nitrite (as N) were consistently located near the central and south portions of the plant (Appendix E-5 Figure 5-1). The concentrations of nitrate as N decrease in all directions toward the periphery of the monitoring network.

In August 2012, KNC contractors collected groundwater samples from select monitoring and recovery wells to aid in groundwater delineation of VOCs and support identifying the optimum locations for VOC sampling and analysis for the revised GWSAP (Appendix E-1). Figure E-4 provides a summary of groundwater VOC results, where available, for monitoring and recovery wells during 2011 and 2012 groundwater sampling activities. These data were provided to the EPA and KDHE in the 3rd Quarter 2012 RCRA Progress Report. The wells identified for routine semiannual groundwater sampling and VOC analysis are included in Table 1 of the SAP (Appendix E-1). These locations were identified to: i) confirm delineation; ii) track VOC changes over time where detected; and iii) confirm the lateral extent of VOCs.

KNC currently monitors two wells (referred to as Dodge City Services and Feedmill) screened in the Dakota Formation. As noted in multiple Quarterly RCRA Progress reports, KNC has been unable to sample the Dodge City Services well since the 4th Quarter of 2010 as the current owner has closed the facility and KNC has not been able to obtain access to sample this well. The analytical results for the past 2 years (Appendix E-6) indicate that neither hexavalent nor total chromium has been detected in these wells. The maximum reported nitrate plus nitrite as N concentration in these wells was 1.9 mg/L.

E-7 Corrective Action Program

The current Corrective Action Program consists of: i) pumping over 60 wells at various locations within and outside the Plant; ii) transferring recovered groundwater to the RO unit for treatment, and iii) groundwater monitoring.

Well construction records (Appendix E-2) indicate the previous Plant owner installed the groundwater recovery system in stages with the majority of wells installed between 1982 and September 1984. Major expansions of the groundwater recovery network by the former Plant owner were as follows:

- Recovery wells TW-71, TW-72, TW-73, TW-74, and TW-75 were installed to the northeast of major Plant operations in May and September of 1985;

- The network was expanded to the southeast (TW-76, TW-77, TW-78, and TW-79) and southwest (TW-80) from 1989 to 1991;
- Additional recovery wells were added directly east and southeast of the Plant (TW-82, TW-83, TW-84, TW-85, and TW-86), west (TW-87 and TW-88), and southwest (TW-89, TW-90, and TW-91) in January and April 1993;
- The last major expansion took place in 1995 when recovery wells (TW-92, TW-93, and TW-94) were added south and southwest of the Plant.

The recovery wells remove approximately 100 to 200 million gallons of groundwater per year (KNC, 2012). KNC has reviewed the previous owner's records and has not identified groundwater modeling reports and/or any other technical rationale for the location, anticipated capture, and/or anticipated recovery from the original groundwater recovery system and/or subsequent expansion of the network. Little is known about the operation and maintenance of the groundwater recovery system by the former owner over the almost 20 years of operation prior to KNC purchasing the Site. The pumps currently utilized in recovery wells are predominantly 0.5 horsepower with maximum flow of between 5 and 10 gallons per minute.

The remedial objective for the Corrective Action System, as outlined in Section VI.C.2.a of the Permit, is as follows,

"The Permittee shall implement a corrective action program that contains contaminated groundwater and prevents further migration of hazardous constituents above the GWPS included in Permit Attachment C [40 CFR 264.100]"

To achieve this objective the permit requires pumping from a specific set of wells to create an inward hydraulic gradient toward the facility (IV.C.1.a, IV.C.1.b, and IV.C.2.b), with groundwater monitoring (IV.C.2.c). Section IV.C.3a and b reinforce that the specific set of wells identified for pumping must be utilized. KNC is in the process of evaluating groundwater and system performance data, and groundwater modeling information, and anticipates submitting an addendum to this permit renewal application providing a proposed update to the design and operation of the Corrective Action System that better meets project objectives. By prior agreement with the Agencies, KNC is preparing a proposal to amend the current corrective action program to incorporate newly obtained groundwater information and improvements to the groundwater recovery and treatment system, and this proposal will be submitted by no later than 28 February 2013.

SECTION G

Contingency Plan

Not Required

Treated water is either used within the plant or transferred via pipeline to the Wastewater Disposal Wells for injection. Prior to injection, wastewater is passed through a series of filters, which are monitored during each shift to ensure proper operation, and transferred to the injection tank. A pH meter monitors wastewater prior to discharge to insure the injection pH is within the range of 5 to 10 s.u. Sulfuric acid or caustic may be added, as required, to insure the pH of injected water is between 5 and 10 s.u. An antiscalent addition is also added to prevent formation of scale in the well. Antiscalent addition is generally determined from the wastewater flow rate to the well from the filter building. A signal from the flowmeter is sent to the metering pump to control the amount of antiscalent added to the injected wastewater.

I-8 Cost Estimate

Appendix I-4 provides the estimated costs for post-closure on the KDHE provided forms. These costs were developed based on previous and recent vendor quotes, invoices for similar work performed at the Plant, and previous KNC and contract labor and expense to perform the work components described.

Total post-closure cost for the CDU, with a 5% contingency, is estimated at $7,587,538.

I-9 Financial Assurance

A surety bond providing financial assurance for closure and post-closure activities is provided in Appendix I-5. The cost estimate for closure and post-closure will be adjusted annually for inflation and submitted to KDHE within 60 days of the anniversary date of the financial instrument, in accordance with 40 CFR 264.142(c) and 264.144(c), and KAR 28-31-264. Whenever a change in the closure, post-closure, or corrective action plan is required that will also require adjustment of the closure or post-closure cost estimate, a revised cost estimate will be submitted to KDHE no later than 30 days after agency approval of the change in the closure, post-closure, or corrective action plan, and a revised financial instrument (if required) will be submitted within 60 days of the approval of the revised cost estimate, in accordance with 40 CFR 264.143(b)(7) and 264.145(b)(7), and KAR 28-31-264. A copy of the financial instrument will be maintained at the Facility.

I-10 Liability Requirements

Liability insurance is provided in Appendix I-6.

Bureau of Waste Management
Curtis State Office Building
1000 SW Jackson, Suite 320
Topeka, KS 66612-1366
Robert Moser, MD, Secretary

Kansas
Department of Health & Environment

phone: 785-296-1600
fax: 785-296-1592
email: bwmweb@kdheks.gov
www.kdheks.gov/waste
Sam Brownback, Governor

RCRA Post Closure Cost Estimate Form for Hazardous Waste Facilities

Facility Information			
Facility Name:	Koch Nitrogen Company, LLC - Dodge City	EPA ID No.:	KSD044625010
Address:	11559 US Highway 50		
City:	Dodge City, KS	Zip Code:	67801
Contact Name:	Cory Zellers	Phone No.:	620-371-7914

PC_02 Post-Closure Care Removal of Leachate				
1	Volume of leachate to be removed per removal event		NA	gallons/event
2	Number of leachate removal events per year		NA	events/year
3	Volume of leachate to be removed per year		NA	gallons/year
4	Cost to treat leachate per gallon	$	NA	per gallon
5	Cost per year for removal of leachate	$	NA	per year
6	Number of years in post-closure (PC) care period		NA	years
7	TOTAL COST OF REMOVAL OF LEACHATE	$		

PC_03 Post-Closure Care Site Security				
	FENCING			
8	Length of fencing		NA	feet
9	Labor, materials, and equipment cost per foot	$	NA	per foot
10	Cost to fence site	$	NA	
	CORNER POSTS			
11	Number of corner posts required		NA	posts
12	Cost per corner post	$	NA	per post
13	Cost to erect corner posts	$	NA	
	GATES			
14	Number of gates required		NA	gates
15	Labor, materials, and equipment cost per gate	$	NA	per gate
16	Cost to install gates	$	NA	

PC_03 Post-Closure Care Site Security (cont.)				
REFLECTOR SIGNS				
17	Number of signs required		NA	signs
18	Labor, materials, and equipment cost per sign	$	NA	per sign
19	Cost to install signs	$	NA	
20	TOTAL COST OF SITE SECURITY	$		

PC_04 Post-Closure Care Maintenance of Vegetative Cover				
MOWING				
21	Area of cover to be mowed		NA	ft^2
22	Convert area in ft to area in MSF (thousand square feet)		NA	MSF
23	Labor and equipment cost per MSF		NA	per MSF
24	Cost of one mowing event (around select monitoring wells)	$	400	per event
25	Number of mowing events per year		2	events per yr
26	Number of years in PC care period		30	years
27	Number of mowing events during the PC care period		60	events
28	Cost to mow for PC care period	$	24000	
FERTILIZING				
29	Area of cover to be fertilized		NA	MSF
30	Labor, materials, and equipment cost per MSF	$	NA	per MSF
31	Cost of one fertilizing event	$	NA	per event
32	Number of fertilizing events per year		NA	events/yr
33	Number of years in the PC care period		NA	years
34	Number of fertilizing events during the PC care period		NA	events
35	Cost to fertilize for the PC care period	$	NA	
WATERING				
36	Area of cover to be watered		NA	MSF
37	Labor and material cost per MSF	$	NA	per MSF
38	Cost of one watering event	$	NA	per event
39	Number of watering events per year		NA	events/yr
40	Number of years in the PC care period		NA	years
41	Number of watering events during the PC care period		NA	events
42	Cost to water for the PC care period	$	NA	
43	TOTAL COST OF MAINTENANCE OF VEGETATIVE COVER	$	24000	

PC_05 Post-Closure Care Repair and Inspection of Final Cover				
MAINTENANCE AND REPAIR OF FINAL COVER				
44	Cost of installing undifferentiated fill	$	NA	
45	Cost of installing clay liner	$	NA	
46	Cost of installing geomembrane	$	NA	
47	Cost of installing drainage layer	$	NA	
48	Cost of installing earthen layer	$	NA	
49	Cost of installing topsoil	$	NA	
50	Cost of installing colloid clay layer	$	NA	
51	Total cost of installing final cover	$	NA	
52	Maintenance and repair factor	%	NA	
53	Cost to maintain and repair final cover	$	NA	
POST-CLOSURE CARE INSPECTION - Groundwater				
54	Cost of conducting one inspection	$	NA	per inspection
55	Number of inspections per year		NA	inspections
56	Cost of conducting post-closure care inspections per year	$	NA	per year
57	Number of years in PC care period		NA	years
58	Cost to conduct inspections over the PC care period	$	NA	
59	TOTAL COST OF REPAIR AND INSPECTION	$		

PC_06 Post-Closure Care Groundwater Monitoring

	COLLECTION OF GROUNDWATER SAMPLES - QUARTERLY RESIDENTIAL SAMPLING				
60a	Number of sampling locations		10		samples
61a	Choose the appropriate level of PPE		Level D ■	Level C ☐	Level B ☐
62a	Labor and equipment costs per work hour		$ 300		per work hr
63a	Work rate to collect samples from one sampling location		1		work hr per
64a	Number of hours required to collect all samples		10		work hours
65a	Cost to collect groundwater samples per event		$ 3000		per event
	ANALYSIS OF GROUNDWATER SAMPLES				
66a	DESCRIPTION/METHOD	LIQUID/SOLID	COST	[1]QTY	TOTAL
	Nitrate/Nitrite (Method 300/9056A)	Liquid	$ 26	11	286.00
	Total Chromium (Method 6010B)	Liquid	$ 14	11	154.00
	Hexavalent Chromium (Method 7196A Mod.)	Liquid	$ 20	11	220.00
67a	Cost to analyze groundwater samples per event (Quarterly)		$ 660		per event
	COLLECTION OF GROUNDWATER SAMPLES - SEMIANNUAL SAMPLING				
60b	[2]Number of sampling locations		95		samples
61b	Choose the appropriate level of PPE		Level D ■	Level C ☐	Level B ☐
62b	Labor and equipment costs per work hour		$ 300		per work hr
63b	[3]Work rate to collect samples from one sampling location		0.5		work hr per
64b	Number of hours required to collect all samples		48		work hours
65b	Cost to collect groundwater samples per event		$ 14250		per event
	ANALYSIS OF GROUNDWATER SAMPLES				
66b	DESCRIPTION/METHOD	LIQUID/SOLID	COST	QTY	TOTAL
	VOCs (Method 8260)	Liquid	$ 157	20	3,140.00
	Nitrate/Nitrite (Method 300/9056A)	Liquid	$ 26	112	2,912.00
	Total Chromium (Method 6010B)	Liquid	$ 14	112	1,568.00
	Hexavalent Chromium (Method 7196A Mod.)	Liquid	$ 20	112	2,240.00
			$		$
67b	Cost to analyze groundwater samples per event (Semiannual)		$ 9,860		per event
	TOTAL GROUNDWATER MONITORING FOR POST-CLOSURE CARE PERIOD				
68a	Quarterly cost of sampling and analysis of groundwater for post-closure		$ 3,660		per event
69a	Number of quarterly sampling events per year		4		events per yr
68b	Semiannual cost of sampling and analysis of groundwater for post-closure		$ 24,110		per event
69b	Number of semiannual sampling events per year		2		events per yr
70	Number of years of groundwater monitoring during PC care period		30		years
71	TOTAL COST OF GROUNDWATER MONITORING		$ 1,885,800		

PC_07 Post Closure Care Deed Notation			
72	Attorney fees	$ NA	
73	Clerical and deed filing fees	$ NA	
74	TOTAL COST OF DEED NOTATION	$	

PC_08 Maintenance and Inspection of Asphalt Cover			
	MAINTENANCE OF ASPHALT COVER		
75	Area of asphalt cover	NA	yd^2
76	Cost of seal coating asphalt per square yard	$ NA	per yd^2
77	Cost of one seal coating event	$ NA	per event
78	Number of seal coating events during PC period	NA	events
79	Cost to maintain asphalt cover	$ NA	
	POST-CLOSURE INSPECTION		
80	Cost of conducting one inspection	$ NA	per inspection
81	Number of inspections per year	NA	inspections
82	Cost of conducting PC care inspections per year	$ NA	per year
83	Number of years in PC care period	NA	years
84	Cost to conduct inspections over PC care period	$ NA	
85	TOTAL COST OF MAINTENANCE AND INSPECTION	$	

PC_09 Post-Closure Care Surface Emission			
	SURFACE EMISSION MONITORING		
86	Area of landfill requiring surface emission monitoring	NA	acres
87	Labor and equipment cost per work hour	$ NA	per work
88	Work rate required to monitor one acre	NA	work hrs per
89	Number of hours required to monitor entire area	NA	work hrs per
90	Cost of monitoring per event	$ NA	per event
	MONITORING EVENTS		
91	Number of monitoring events per year	NA	events per year
92	Number of years during the PC care period	NA	years
93	TOTAL COST OF SURFACE EMISSION MONITORING	$	

PC_10 Gas Extraction and Perimeter Probe Monitoring				
GAS EXTRACTION AND PERIMETER PROBE MONITORING				
94	Number of monitoring points		NA	points
95	Labor and equipment cost per work hour	$	NA	per work
96	Work rate required to monitor one point		NA	work hrs per
97	Number of hours required to monitor all points		NA	work hrs per
98	Cost of monitoring per event	$	NA	per event
99	Number of monitoring events per year		NA	events per year
100	Number of years during the PC care period		NA	years
101	TOTAL COST OF GAS EXT. AND PERIMETER PROBE MON.	$		

PC_11 Certification of Completion of Post-Closure				
102	Number of units requiring cert. of completion of PC care		1	units
103	Cost of certification of completion of PC care per unit	$	3500	per unit
104	TOTAL COST OF CERTIFICATION OF PC CARE	$	3500	

UD-01 User Defined Activity - Corrective Action				
SOIL VAPOR EXTRACTION				
105	Annual utility costs (e.g. electricity, natural gas, water)	$	NA	
106	Annual cost of scrubber chemicals	$	NA	
107	Annual testing and monitoring costs	$	NA	
108	Annual labor costs	$	NA	
109	Annual reporting costs	$	NA	
110	Number of years during the PC care period		NA	years
111	Annual cost of soil vapor extraction O&M	$	NA	
112	Decomissioning costs	$	NA	
113	TOTAL COST OF SOIL VAPOR EXTRACTION	$	NA	
AIR SPARGE				
114	Annual utility costs (e.g. electricity, natural gas, water)	$	NA	
115	Annual contaminant monitoring costs	$	NA	
116	Annual performance monitoring costs	$	NA	
117	Annual off-gas treatment costs	$	NA	
118	Annual equipment rental and maintenance costs	$	NA	
119	Number of years during the PC care period		NA	years
120	Annual cost of air sparge O&M	$	NA	
121	Decomissioning costs	$	NA	
122	TOTAL COST OF AIR SPARGE	$	NA	

	PUMP AND TREAT		
123	[4]Annual utility costs (e.g.electricity, natural gas, water)	$ 27000	
124	Annual contaminant monitoring costs	$	
125	Annual performance monitoring costs	$	
126a	[5]Annual equipment rental and maintenance costs (recovery wells)	$ 19200	
126b	[6]Annual equipment rental and maintenance costs (pre-disposal pipeline)	$ 9383	
126c	[7]Annual equipment rental and maintenance costs (disposal well operation)	$ 69243	
127	Number of years during the PC care period	$ 30	years
128	Annual cost of pump and treat	$ 124826	
129	[8]Decomissioning costs	$ 475000	
130	TOTAL COST OF PUMP AND TREAT	$ 4,219,780	
	MONITORED NATURAL ATTENUATION		
131	Annual MNA parmater monitoring costs	$	
132	Annual performance monitoring and reporting costs	$	
133	Number of years during the PC care period		years
134	Annual cost of monitored natural attenuation	$	
135	Decomissioning costs	$	
136	TOTAL COST OF MONITORED NATURAL ATTENUATION	$	
137	TOTAL COST OF CORRECTIVE ACTION	$ 4,219,780	

	UD-02 User Defined Activity - Reporting		
138	Annual cost of semi-annual/quarterly GW monitoring reports	$	
139	Annual cost of annual GW monitoring reports	$ 15000	
140	Annual reporting costs	$	
141	Number of years during the PC care period	30	years
142	TOTAL COST OF REPORTING	$ 450000	

	UD-03 User Defined Activity - Additional Maintenance Costs		
143	Annual costs for maintenance and inspection of monitoring wells	$ 2500	
144	Annual costs for maintenance of site security features	$	
145	Annual costs for inspection of recovery and monitoring wells.	$	
146	Annual costs for maintenance of recovery well telemetry	$ 8000	
147	Annual costs for maintenance of ______________________	$	
148	Total annual cost of additional maintenance and inspections	$ 10500	
149	Number of years during the PC care period	30	years
150	TOTAL COST OF ADDITIONAL MAINTENANCE	$ 315000	

Post-Closure Care Summary			
151	Removal of leachate (PC-02)	$	
152	Site security (PC-03)	$	
153	Maintenance of vegetative cover (PC-04)	$	24000
154	Maintenance and inspection (PC-05)	$	
155	Groundwater monitoring (PC-06)	$	1,885,800
156	Deed notation (PC-07)	$	
157	Maintenance and inspection of asphalt cover (PC-08)	$	
158	Surface emission monitoring (PC-09)	$	
159	Gas extraction system and perimeter probe monitoring (PC-10)	$	
160	User defined cost (UD-01) - Corrective Action	$	4,219,780
161	User defined cost (UD-02) - Reporting	$	450000
162	User defined cost (UD-03) - Additional Maintenance Costs	$	315000
163	Subtotal of post-closure costs	$	6894580
164	Percentage of engineering expenses	%	5
165	Engineering expenses	$	344729
166	Certification of post-closure (PC-11)	$	3500
167	Subtotal	$	7242809
168	Pecentage of contigency allowance	%	5
169	Contigency allowance	$	344729
170	TOTAL COST OF POST-CLOSURE CARE	$	7,587,538.00

Notes:

[1] Quantity of laboratory analysis provided in PC-06 includes quality assurance/quality control (QA/QC) samples.

[2] Number of wells identified in Table 1 of GWSAP (90) and an additional 12 monitoring wells associated with final remedy. Assumes that new monitoring wells co-located with recovery wells will be sampled instead of the adjacent recovery well.

[3] Sampling rate modified to account for more rapid sample collection resulting from the use of point samplers and recovery wells during semiannual monitoring.

[4] Electrical costs reduced 25% to account for the reduction in the number of recovery wells in operation, as outlined in the Groundwater Supplement.

[5] Cost includes recovery well maintenance, replacement, pipeline maintenace, storage tank maintenance and sludge disposal.

[6] Estimated costs for mainteance of the pre-disposal pipeline (pump and pH control systems) and final filter.

[7] Includes estimated cost for maintenance of the disposal wells and includes: i) annual fall-off testing; mechanical integrity tests (internal and external); operational labor cost; analytical costs associated with monitoring; reporting; routine maintenance repermitting; and an assumed workover every 10 years.

[8] Decomissioning costs include: monitoring and recovery well decommissioning, injection well plugging and abandonment; and recovery system piping decommissioning.

NA - not applicable

Costs have not been inflated over time and represent present day cost.

Estimated costs were derived from vendor invoices for the tasks summarized above and KNC's estimated time, labor, and expense to perform the tasks identified above during previous years of groundwater recovery system operation.

CHECKLIST FOR REVIEW OF FEDERAL RCRA PERMIT APPLICATIONS

SECTION J. SOLID WASTE MANAGEMENT UNITS

	Section and Requirement	Federal Regulation	Review Consideration[a]	Location in Application[b]	See Attached Comment Number[c]
J-1	Characterize the Solid Waste Management Unit (SWMU)	270.14(d)(1)	Describe methodology used to determine that no existing or former SWMUs exist at facility if applicable.	Section J-1 and Figure J-1	
J-2	Releases	270.14(d)(2)	Provide following information concerning releases: date of release; type, quantity, and nature of release; groundwater monitoring and other analytical data; physical evidence of stressed vegetation; historical evidence of releases; any state, local, or federal enforcement action that may address releases; any public citizen complaints that indicate a release; and any other information showing the migration of the release. Describe methodology used to determine that releases from SWMUs are not present.	Sections J-1 through J-3	

Notes:

[a] Considerations in addition to the requirements presented in the regulations.
[b] For each requirement, this column must indicate one of the following: NA for not applicable, IM for information missing, or the exact location of the information in the application.
[c] If application is deficient in an area, prepare a comment describing the deficiency, attach it to the checklist, and reference the comment in this column.

SECTION J

SOLID WASTE MANAGEMENT UNITS
40 CFR 270.14 (d)

J-1 General Description - 40 CFR 270.14(d)(1)

In July 2000, EPA issued a draft RCRA Facility Assessment (RFA) report that identified twenty-two potential SWMUs and six potential areas of concern (AOCs). Four wastewater treatment basins were added to the list of Solid Waste Management Units in 2002. The location of the SWMUs is shown in Figure J-1. The RFI Workplan submitted in October 2004, the Phase II RFI Workplan submitted by KNC in September 2008, and the Phase II: Tier II Soil Sampling Work Plan submitted by KNC in July 2012 present a comprehensive description of each SWMU and AOC; the findings of historical investigations conducted in these areas; and the proposed program for future investigation in those areas deemed to require additional investigation. The following is a comprehensive listing and descriptions of all of the identified SWMUs and AOCs at the Plant. The attached figure illustrates the locations for all of the identified SWMUs and AOCs.

SWMU 1: South Pond - The South Pond is an earthen lagoon with a surface area of approximately 35 acres, located to the southwest of the Facility's process area. Records reflect that the pond was constructed in 1968, near the time of the Facility construction. The SWMU was part of a non-discharging evaporation pond system used for the collection of Facility area runoff and for disposal of process wastewater. Wastewater discharge to the evaporation ponds was eliminated in 1998. Currently, the South Pond receives only occasional storm water runoff from upgradient areas. It is currently overgrown with weedy vegetation and has been dry for the past several years.

SWMU 2: North Pond - The North Pond is an earthen lagoon with a designed water surface area of approximately 15 acres, located to the west of the Facility's process area. When constructed in 1968, the North Pond was designed to operate in series with the South Pond, increasing wastewater storage capacity and available pond surface area. Historically, when water levels in the South Pond reached design capacity, an overflow pipe allowed excess water from the South Pond to drain into the North Pond. Although the pond system was not designed to discharge, the North Pond is equipped with an emergency spillway on its northern side. The North Pond is currently dry and overgrown with weedy vegetation.

SWMU 3: East Pond - The East Pond, which was constructed in 1976, was an earthen evaporation pond having an approximate surface area of 40 acres. The East Pond was constructed southeast of the Facility to increase water storage capacity and evaporation capacity of the evaporation pond system. The Facility sewer system was modified to allow discharge to either the South Pond or East Pond. Process wastewater discharges to the East Pond would likely have been from the same manufacturing sources as wastewater discharged into the South Pond. The East Pond reportedly operated from 1976 until 1984 when it was allowed to revert to crop land. The East Pond is now dry. The northern portion of the East Pond is now covered by Lime Landfills (SWMUs 10, 11, and 17) and the Wastewater Tank (Sunflower Tank – SWMU 16).

SWMU 4: Former Disposal Well No. 1 - Former Disposal Well No. 1 was located west of the product storage area. Based on Disposal Well No. 1 geologic and construction logs, the well was completed on 5 April 1968, with 8.625-inch outer casing to 1,654 feet below land surface (ft bls) and with a 5.5-inch carbon steel injection casing to 5,835 ft bls. The disposal well was uncased from 5,835 to 6,500 ft bls and the total depth was 6,507 ft bls in the Arbuckle Formation. A permit was issued for this disposal well on 28 January 1968. Wastewater was discharged directly into the disposal well through a sealed wellhead. Injection was by gravity-feed through piping. The wellhead consisted of a 5.5-inch casing head with 2-side openings, a flow control valve, and a pressure gauge to monitor annulus pressure. The permitted capacity of the well was 650,000 gallons per day (gpd). Former Disposal Well No. 1 was completed as an alternative disposal method to the evaporation ponds. Injection was used during periods when the North and South Ponds could not be used for wastewater disposal and during periods when the ammonia stripper tower was out of service. The disposal well was utilized as an alternative disposal system to the North and South Ponds until 1976.

SWMU 5: Land Farm - The Land Farm is located in the southwest property corner, west of the South Pond. Settleable matter consisting primarily of calcium and manganese carbonate from the water softening treatment system was stored in the Former Washout Area (SWMU 6) prior to disposal in this SWMU. Approximately 300 tons of settleable matter was disposed of in this manner from 1974 until 1983.

SWMU 6: Former Washout Area - The Former Washout Area is located in the southwest property corner, west of the South Pond. Settleable matter consisting primarily of calcium and manganese carbonate from the water softening treatment system was stored in this SWMU prior to disposal in the Land Farm (SWMU 5). Approximately 300 tons of settleable matter was disposed of in this manner from 1974 until 1983.

SWMU 7: Landfill for General Plant Trash - SWMU 7 was a general facility trash landfill that was operated from 1976 until 1979 under Bureau of Waste Management (BWM) Permit 242 and was located south of the Facility production area. Available records indicate that following closure of this landfill, it was covered with soil.

SWMU 8: Former Chrome Destruct Unit - The Former CDU is immediately east of the ammonia plant cooling tower along the eastern side of the process area. The Former CDU consisted of an influent box, two detention basins and an effluent structure. Historically, chromium-containing cooling tower blowdown was managed in this unit. During the period of operation of the Former CDU, the treatment process consisted of reducing the hexavalent chromium to trivalent chromium by adding sulfur dioxide and sulfuric acid to the cooling tower blowdown water in the influent box and mixing with a paddle wheel. The pH was maintained between about 2.7 and 3.5 standard units (SU) during the chromium reduction process. This initial treatment process reduced a portion of the chromium to the less mobile and less toxic trivalent form. The influent box, located on the north end of the Former CDU, is a reinforced concrete, epoxy-lined basin, which served as a mixing chamber for the cooling tower blowdown and the water treatment chemicals. The influent box is not in service although it is currently still in place as constructed. The influent box is approximately 10 ft by 20 ft, and 5 ft deep. Two formed asphalt detention basins received flow from the Former CDU influent box. The detention basins were designed as flow-through basins intended to provide additional reaction time for the conversion of hexavalent chromium to trivalent chromium to be completed before pH neutralization occurred in the former effluent structure. Each basin was approximately 130 ft long, 20 ft wide, and 3.75 ft deep. The cooling tower blowdown water was routed from the influent box by gravity through the asphalt-lined detention basins to complete the reduction process.

A cooling tower addition and the current neutralization basin (SWMU 25) were constructed over portions of the detention basins. Portions of the detention basins were removed for this new construction. According to facility records, approximately 880 square ft of the west detention basin was removed for construction of the cooling tower addition. Approximately 25 ft of the southern end of both detention basins were removed for construction of the current neutralization basin. There is approximately 3,655 square ft of the detention basins remaining. Historical records indicate the eastern basin was the last basin to be removed from service. Historical photos from June 1989, obtained from the Kansas Department of Health and the Environment (KDHE), show only the eastern detention basin was utilized for treatment. During some period of operation, the western basin had been reportedly used to store demineralizer regeneration wastewater containing sulfuric acid, which was fed into the influent structure for mixing with cooling tower blowdown water to reduce the influent wastewater pH. Available records do not indicate when the western basin was taken out of service.

The effluent structure, located on the south end of the Former CDU, was a reinforced concrete, epoxy-lined basin, which reportedly served as a neutralization basin for the treated cooling tower blowdown water. At this point in the treatment process, hexavalent chromium in the blowdown water had been reduced to a trivalent form. Precipitation of the trivalent chromium was completed by pH neutralization in this final treatment basin. Effluent from this structure was reportedly discharged to the chemical sewer for transport to either the injection well or evaporation ponds. By design, conversion of hexavalent chromium to trivalent chromium was to be completed in the influent box and detention basins. KNC is not aware of data that indicate that the flow from the detention basins to the former effluent structure exhibited any hazardous characteristics at the point where it flowed into the former effluent structure.

In the effluent structure, caustic regeneration wastewater from the demineralizer was added to increase the pH from 2.7 – 3.5 SU to about 8 SU. This alkaline condition caused the trivalent chromium to precipitate to the bottom of the effluent structure.

SWMU 9: Current Chrome Destruct Unit - The current Chrome Destruct Unit (also known as the ANDCO Unit) was used to treat recovered groundwater through electrochemical reduction of hexavalent chromium to trivalent chromium by precipitation. This unit was in operation from 1991 to 2007 when it was replaced by a reverse osmosis (RO) unit. The treatment unit consists of an electrochemical reaction unit housed inside a 40-ft by 50-ft pre-stressed concrete building.

SWMU 10: East Cell of the Lime Sludge Pond - The East Cell of the Lime Sludge Pond is the eastern portion of Trench No. 6 and consists of approximately 0.37 acres located near the northeast corner of the Facility. Aerial photographs show that construction and use of the East Cell of the Lime Sludge Pond did not occur until the 1990s. The approximate capacity of this cell is estimated at 6,000 cubic yards based on the areal extent (0.37 acres) and an estimated average thickness of 10 ft. The East Cell of the Lime Sludge Pond is full and currently inactive. The East and West Cells of the Lime Sludge Pond are regulated under BWM Permit No. 375 for the disposal of spent lime.

SWMU 11: West Cell of the Lime Sludge Pond - The West Cell of the Lime Sludge Pond is the western portion of Trench No. 6 and consists of approximately 1.14 acres located near the northeast corner of the Facility. Construction and operation of the West Cell of the Lime Sludge Pond occurred in the 1990s. The volume of settleable matter disposed in the West Cell of the Lime Sludge Pond is estimated at 18,000 cubic yards based on the areal extent (1.14 acres) and an estimated average thickness of 10 ft. The West Cell of the Lime Sludge Pond is currently active. The trench is authorized to receive spent lime under Permit No. 375.

SWMU 12: Disposal Area (North of the South Pond) - An area of stained soil on the northern bank of the South Pond was identified as a SWMU during the 2000 RCRA Facility Assessment. The area of stained soil was observed near demolition material, such as concrete and asphalt that were installed for erosion control on the bank of the South Pond.

SWMU 13: Disposal Well No. 2 - SWMU 13 is one of the Facility's two Class I nonhazardous wastewater disposal wells permitted under the Underground Injection Control (UIC) program. Disposal Well No. 2 is located in the southwest property corner. The construction of this disposal well was completed in 1993. The disposal well consists of approximately 5,800 ft of 4.5-inch carbon steel injection tubing inside a 9.5-inch casing and was installed to a depth of approximately 6,500 ft bls into the Arbuckle Formation. The well has been in operation under Permit No. KS-01-057-001 since it was installed. Disposal Well No. 2 is used for disposal of nonhazardous wastewater consisting of process wastewater, laboratory wastewater, and recovered groundwater from the remediation system.

SWMU 14: Settling Basin by Chromium Treatment Building - The Settling Basin by the chromium treatment building received ANDCO effluent from the electrochemical chromium reduction unit and collected trivalent chromium precipitate prior to replacement by the RO Unit in 2007. The treated effluent flowed from the Settling Basin to the Equalization Tank prior to reuse. The Settling Basin is located southeast of the ANDCO Unit and is an epoxy-coated, concrete basin that is 40-ft long, 20-ft wide, and 12-ft deep.

SWMU 15: Equalization Tank - The Equalization Tank receives water from the water supply wells, effluent from the ANDCO Unit, reverse osmosis reject water and, historically, carbon filter backwash. This tank is used to provide equalization of raw process water flow prior to lime softening treatment and is located east of the ANDCO Settling Basin (SWMU 14). The Equalization Tank is an aboveground, circular epoxy-coated metal tank with a capacity of 2.8 million gallons. This tank was installed in 1991 as part of the industrial water supply pretreatment process.

SWMU 16: Wastewater Tank - The Wastewater Tank (also termed the Sunflower Tank) receives treated wastewater from the neutralization basins. The chemical quality of water stored in this tank is identical to disposal well influent water. This tank was constructed in the 1990s and is a 65-ft diameter, 14-ft high, 350,000-gallon aboveground storage tank (AST) that provides wastewater storage and flow equalization prior to discharge to the disposal wells. This tank is located within a diked area south of SWMU 11.

SWMU 17: East Lime Sludge Landfill - The East Lime Sludge Landfill, regulated under BWM Permit No. 375, is located south of the wastewater tank (SWMU 16). The East Lime Sludge Landfill consists of Trenches No. 4 and 5, which cover about 0.49 and 0.38 acres, respectively. Records indicate the prior owner operated Trench No. 4 until 1994 and Trench No. 5 until 1999. Neither unit has been used by KNC. Records from the prior owner indicate that Trench No. 5 received only spent lime. Records from the prior owner indicate that monoethanolamine (MEA) charcoal and high temperature shift (HTS) catalyst, along with spent lime, were placed into Trench No. 4. These trenches were authorized to receive spent lime under Permit No. 375.

SWMU 18: Former Construction Landfill - During construction by the former owner, from 1967 to 1968, a Construction Landfill was operated at the Facility. The Construction Landfill was located east of the process area and received wood, trash, piping waste, and other similar construction debris. Industrial wastes are not suspected or known to have been placed in this landfill. Available information indicates disposal activity ceased prior to Facility operation.

SWMU 19: West Lime Sludge Industrial Landfill - The West Lime Sludge Industrial Landfill, regulated under BWM Permit No. 375, is located west of the South Pond (SWMU 1) on the western side of the Facility. This landfill was operated by the former owner for waste disposal and consists of three trenches. Records from the previous owner indicate that spent lime, spent resin, HTS catalyst, and MEA charcoal were placed into Trenches No. 1 and 2. These trenches were authorized to receive spent lime under Permit No. 375. Records from the prior owner indicate that spent lime, spent resin, sandblasting sand, MEA charcoal, tank sludge, wastewater sludge, HTS catalyst, and asphalt were placed into Trench No. 3. Trench No. 1 (about 0.28 acres) and Trench No. 2 (about 0.08 acres) were covered with soil in 1992. Trench No. 3 (about 0.3 acres) has not been covered, but is inactive.

SWMU 20: Disposal Well No. 3 - Disposal Well No. 3 is located in the northeast property corner. The construction of this disposal well was completed in 1995. As is the case for SWMU 13 (Disposal Well No. 2), this well was designed and constructed, and has been operated and monitored in accordance with Permit No. KS-01-057-002 for disposal of nonhazardous wastewater. This disposal well consists of approximately 5,800 ft of 4.5-inch carbon steel injection tubing inside a 9.5-inch casing, it was installed to a depth of approximately 6,550 ft bls. Disposal Well No. 3 is used for disposal of the same wastewater streams as Disposal Well No. 2.

SWMU 21: UIC Well #2 Cuttings - The drill cuttings from the installation of Disposal Well No. 2 (UIC Well #2) in November 1992 were placed in this SWMU, in accordance with directions and approval received from the KDHE on October 28, 1992. This SWMU is located near Disposal Well No. 2 in the southwest property corner. This SWMU was designed to contain solids with high and low chloride content. These solids were segregated within the disposal area based on their chloride content.

SWMU 22 – UIC Well #3 Cuttings - The drill cuttings from the installation of Disposal Well No. 3 (UIC Well #3) installed in November 1995 were reportedly placed in this SWMU, in accordance with directions and approval received from the KDHE on April 3, 1998, based on the prior owner's December 11, 1995 waste management plan. This SWMU is located near Disposal Well No. 3 in the northeast property corner. This SWMU was designed to contain solids with potentially elevated chlorides. These solids were segregated within the disposal area based on their chloride content.

SWMU 23: Neutralization Basin #1 - SWMU 23 is part of an operating neutralization basin system which historically operated as part of the Former CDU (SWMU 8). SWMU 23 is an epoxy-coated basin with approximate dimensions of 12.75 ft long by 10 ft wide and 10.5 ft deep. Records indicate that the basin was constructed in 1967 and began operation in 1968. SWMU 23 was historically used to collect decanted water from the Former CDU asphalt detention basins and served this function until 1991 when the Former CDU was taken out of operation. Currently, SWMU 23 receives ammonia plant cooling water blowdown containing orthophosphate-based water treatment chemicals. In the current process water treatment system, normal water treatment flow into SWMU 23 comes from Neutralization Basins #2 and #3 (SWMUs 24 and 25). Because the system is designed for complete recirculation if required by operational needs, other possible influent streams include any of the streams that are received in SWMU 26.

SWMU 24: Neutralization Basin #2 - SWMU 24 is part of an operating neutralization basin system which historically operated as part of the Former CDU (SWMU 8). SWMU 24 is a concrete basin with approximate dimensions of 13.2 ft long by 30 ft wide and 10.5 ft deep. Records indicate that the unit was constructed in 1967 and began operation in 1968. SWMU 24 was historically used to receive ammonia plant cooling tower blowdown containing hexavalent chromium prior to treatment, and to collect sediment, primarily dirt, filtered out by the ammonia cooling tower side stream filter. The influent received in SWMU 24 was later pumped to the Former CDU for processing. In 1993, the influent stream to this tank was reportedly modified to include the UAN Plant sewer, ammonia plant drainage, Praxair condensate, cooling tower blowdown containing orthophosphate-based water treatment chemicals, hydrogen recovery unit condensate, sulfuric acid truck drainage, utility drainage, and DURCO mechanical filter backwash from the wastewater treatment building. Currently, SWMU 24 is primarily used as a settling basin for sediment prior to two-step filtration and disposal into the injection wells. The system is designed for complete recirculation if required by operational needs; therefore, other possible influent streams include any of the streams that are received in SWMUs 23, 25, and 26.

SWMU 25: Neutralization Basin #3 - SWMU 25 is part of an operating neutralization basin system which historically operated as part of the Former CDU (SWMU 8). SWMU 25 is an HDPE-lined basin with approximate dimensions of 30 ft long by 40 ft wide and 12 ft deep. Records indicate that the unit was constructed on the southern portion of the Former CDU in approximately 1993, and it began operation shortly after completion. Construction of SWMU 25 required soil removal in an approximately 35-ft section of the southern portion of the Former CDU retention basins. SWMU 25 primarily receives the liquid regeneration stream from the ion exchange water treatment system, laboratory wastewater, Phase I building drainage, and drainage from the storage area where spent ammonia production catalyst is accumulated prior to offsite metals reclamation or disposal. The unit serves as a primary neutralization basin where acidic or basic streams and water are pumped out of the tank to achieve a near neutral pH for water destined for the disposal wells. Normal operation of the current wastewater system allows the contents of SWMU 24 to be directed to SWMU 25, but the system is designed for complete recirculation if required by operational needs; therefore, other possible influent streams include any of the streams that are received in SWMUs 23 and 26.

SWMU 26: West-Side Basin - The West-Side Basin (also referred to as the Wastewater Building Pit) is located south of the Former Chrome Destruct Unit. The basin is constructed of concrete and is 12-ft deep, 10-ft wide, and 10-ft in length. The floor is 1-ft 3-inches thick and the walls are 1-ft thick. Records indicate that this basin was constructed in 1991 and began operation in 1992. The Facility continues to use this structure as a settling basin. The waste streams it receives include groundwater from recovery wells; UAN plant sewer (process drainage nitric acid, urea ammonia nitrate, boiler blowdown containing orthophosphate-based treatment chemicals); liquid streams from Neutralization Basins No. 1, 2, and 3; Praxair condensate, hydrogen recovery unit condensate, sulfuric acid truck drainage, utility drainage (including washdown water from cleaning spills of acid/caustic or water treatment chemicals in the utility building); and DURCO mechanical filter backwash from the wastewater treatment building.

AOC 1: Chromate Spills - AOC 1 is defined as the chromate spill locations at the former storage tank feed line near the CDU and the north and south chromate tank location near the UAN Plant Cooling Tower.

AOC 2: Process Sewer Line to Former Ponds - The process sewer line transported process wastewater from the Facility to the South Pond, East Pond, or Former Disposal Well No. 1, and consisted of an 8-inch diameter, clay tile pipe. Records indicate that the process sewer lines carried process wastewater, consisting of treated cooling tower blowdown, regeneration waste streams from the demineralizer and boiler blowdown, steam condensate, and laboratory waste. Daily flow through the sewer line was estimated at approximately 600,000gpd.

AOC 3: Sanitary Sewage Pump Station - The sanitary sewage pump station has been in operation since 1993 and is used to isolate process wastewater from sanitary wastewater. Sanitary wastewater flows to the sanitary sewage pump station located west of the containment area which formerly contained the 30,000-ton UAN Tank. The sanitary sewage pump station consists of a 10-ft by 20-ft metal, below-ground tank equipped with submersible pumps that divert sanitary wastewater to the two-cell sanitary lagoon system. Sanitary wastewater consists of flow from the restrooms, kitchens, locker areas, and the sanitary wastewater from Praxair.

AOC 4: Former Gas Shed on the Old Farm – The Former Gas Shed reportedly was used for chemical storage before the Facility was built. Based on a review of historical and aerial photographs, this shed was located west of the utility building and east of the ammonia plant. This shed was a former farm storage structure located on the property prior to construction. This shed was reportedly removed prior to construction of the Facility.

AOC 5: UAN Tank Leak Area – The 30,000-ton UAN Storage Tank was located in the product storage area of the Facility and was used for the storage of UAN solution. In 1992, a leak was discovered in the tank. The leak was repaired in 1992, and the storage tank was placed back into operation until 1996. In 1996 this tank was removed from the Facility and replaced with a larger tank at a different location.

AOC 6: Dakota Formation – Based on the detection of nitrate and chromium in the production wells of United Protein's (Kansas By-Products) and Land O' Lakes (Feedmill) in the 1980s and 1990s, the Dakota Formation was identified by USEPA as an AOC during the 2000 RCRA Facility Assessment.

J-2 Release of Hazardous Wastes - 40 CFR 270.14 (d)(2)

Historical records indicate the most significant release of constituents of concern resulted from the release of approximately 1,200 gallons of corrosion inhibitor containing chromic acid to the soil. This historic release is believed to be the principal source of chromium in the groundwater at the Plant, rather than releases from identified solid waste management units.

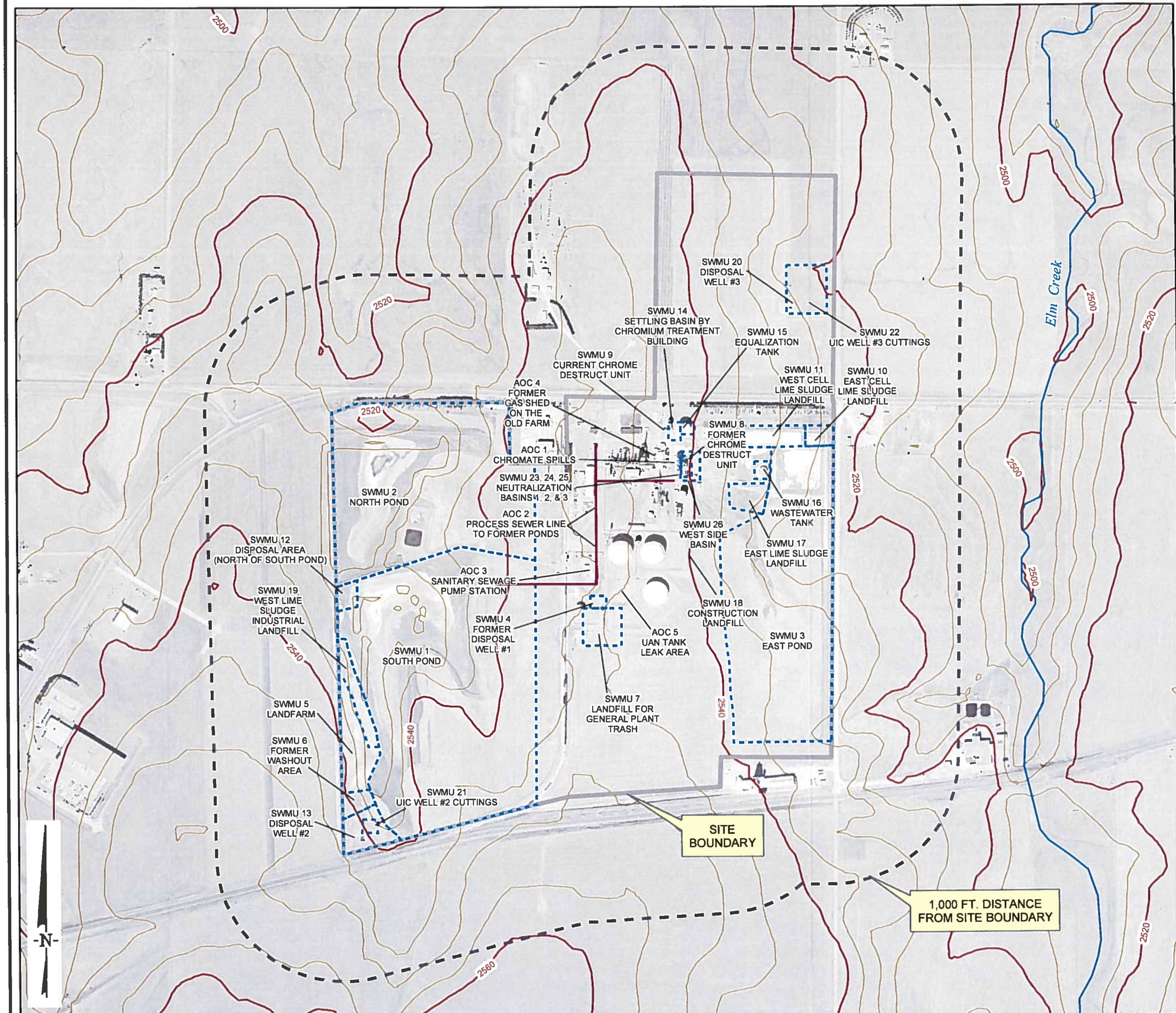
Soil investigations completed near former chromic acid chemical handling locations identified the presence of elevated chromium in the soil. Farmland initiated interim remedial action at the property to contain, recover, and treat groundwater at the Plant, and KNC is continuing these remedial actions by operating the existing groundwater recovery system.

J-3 Sampling and Analysis - 40 CFR 270.14 (d)(3)

The sampling and analysis plan for groundwater monitoring is discussed in Section E of this application. Reports of analysis of well samples have been submitted to the KDHE since 1982. A system of monitoring wells has been developed under the oversight of KDHE.

ATTACHMENT D

REVISED FIGURES



LEGEND

- STREAM
- INDEX TOPOGRAPHIC CONTOUR - 20 FT. INTERVAL
- INTERMEDIATE TOPOGRAPHIC CONTOUR - 5 FT. INTERVAL
- APPROXIMATE EXTENT OF SWMU

SWMU LIST

1. SOUTH POND
2. NORTH POND
3. EAST POND
4. FORMER DISPOSAL WELL #1
5. LAND FARM
6. FORMER WASHOUT AREA
7. LANDFILL FOR GENERAL PLANT TRASH
8. FORMER CHROME DESTRUCT UNIT
9. CURRENT CHROME DESTRUCT UNIT
10. EAST CELL OF LIME SLUDGE POND
11. WEST CELL OF LIME SLUDGE POND
12. DISPOSAL AREA (NORTH OF SOUTH POND)
13. DISPOSAL WELL #2
14. SETTLING BASIN BY CHROMIUM TREATMENT BUILDING
15. EQUALIZATION TANK
16. WASTEWATER TANK
17. EAST LIME SLUDGE LANDFILL
18. CONSTRUCTION LANDFILL
19. WEST LIME SLUDGE INDUSTRIAL LANDFILL
20. INJECTION WELL #3
21. UIC WELL #2 CUTTINGS
22. UIC WELL #3 CUTTINGS
23. NEUTRALIZATION BASIN #1
24. NEUTRALIZATION BASIN #2
25. NEUTRALIZATION BASIN #3
26. WEST SIDE BASIN

AOC LIST

1. CHROMATE SPILLS
2. PROCESS SEWER LINE TO FORMER PONDS
3. SANITARY SEWAGE PUMP STATION
4. FORMER GAS SHED ON THE OLD FARM
5. UAN STORAGE TANK LEAK
6. DAKOTA FORMATION (NOT SHOWN)

1,000 0 1,000
Feet

SWMU AND AOC LOCATIONS

PREPARED BY:
KOCH
KOCH NITROGEN COMPANY, LLC

PROJECT NO.	FIGURE NO. J-1
DATE. OCTOBER 2012	REVISION NO.