KOCH

KOCH NITROGEN COMPANY

REC'D
JUL 03 2006
RESP

CERTIFIED MAIL: RETURN RECIEPT REQUESTED:

June 29, 2006

Chief, Hazardous Waste Permits Section
Kansas Department of Health and Environment
Bureau of Waste Management
1000 SW Jackson St., Suite 320
Topeka, KS 66612-1366

7005 0390 0006 6702 1428

Chief of the RCRA, Corrective Action & Permits Branch
Air, RCRA and Toxic Division
U.S. Environmental Protection Agency – Region VII
901 North Fifth Street
Kansas City, Kansas 66101 (2 copies)

7005 0390 0006 6702 1411

RE: Koch Nitrogen Company – Dodge City Facility
Post Closure and Corrective Action Permit, EPA ID No. KSD 044625010
Groundwater Recovery and Treatment System Optimization

Ladies/Gentlemen

By this letter, Koch Nitrogen Company (KNC), as the owner and operator of the Dodge City Nitrogen Plant located near Dodge City, Kansas, hereby submits a request for a temporary authorization from the Kansas Department of Health and Environment ("KDHE") under Part I, Section I.B.1 of its RCRA Post Closure and Corrective Action Permit (the "Permit") and under 40 CFR 270.42(e) to conduct an Optimization Study on the Facility's groundwater recovery and treatment system, including the new reverse-osmosis components of the system whose installation was accepted by KDHE in its letter of May 18, 2006.

To the extent required, this letter is also a request for temporary authorization from the Environmental Protection Agency ("EPA") under Part II, Section B.3.c, as Part II of the Permit incorporates by reference the groundwater monitoring, recovery and treatment system requirements in Part 1 of the Permit. *See* Part II.C.5.e. For this purpose, two copies of this letter are being submitted to EPA pursuant to Part II.B.2.b. We would ask EPA to either grant the request for

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RCRA RECORDS

11559 U.S. Highway 50 ▪ P.O. Box 1337 ▪ Dodge City, Kansas 67801-1337
620/227-8631 ▪ FAX 620/227-6016

temporary authorization under its Part II authority, or determine that EPA is not required to issue an approval as the authorization addresses a Part I Permit requirement.

KNC is requesting approval to temporarily shutdown select wells within the recovery well network as shown on the two attached Groundwater Capture Zones Plans, for a period of 180 calendar days, commencing as soon as practical after the completion of the third quarter groundwater monitoring event. This will allow KNC to perform an Optimization Study, the primary objective of which is to demonstrate the benefits of applying hydraulic optimization to the existing pump and treat system using a traditional trial-and-error approach. A description of the proposed Optimization Study Plan is attached, along with responses to informal comments from KDHE..

Consistent with 40 CFR 270.42(e)(3)(ii), granting this request will facilitate timely implementation of closure and corrective action activities and will facilitate other changes to protect human health and the environment. If the Optimization Study indicates to KNC that changes to the well configuration should be made permanent, KNC will submit a request for a permit modification for agency consideration.

If you have any questions about this request, please do not hesitate to contact AnnieLaurie Burke at (620) 227-8631, ext. 350.

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. With the exception that certain information in the attachments may not reflect modifications to the Permit previously requested by KNC, as described above, 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.

Sincerely,

Gary J. LeRock

Gary J. LeRock
Plant Manager

Encs.: Optimization Study Plan, June 2006

Cc: RCRA Facility Mailing List (cover letter only)
Steve Ellingson, KMS, Wichita (electronic copy)
AnnieLaurie Burke, KNC Dodge City

Koch Nitrogen Company Dodge City Facility
Groundwater Recovery and Treatment System Optimization Plan

BACKGROUND

Koch Nitrogen Company (KNC) proposes to optimize the effectiveness of its groundwater recovery and treatment system, using field optimization procedures to determine the best combination of well locations and pumping rates to control and remediate the chromium and nitrate plus nitrite constituents in groundwater.

There are no specific permit regulations that mandate the use of optimization methods. However, the current state of knowledge of the existing system suggests that it is a prime candidate for an optimization program. The current groundwater recovery system consists of 66 wells. The recovery wells remove approximately 100 to 200 million gallons of groundwater per year. The pumping has created a steep and extensive inward hydraulic gradient throughout most of its extent. The inward water table gradients have been stable for several years. However, the gradients created by recovery wells that lie outside the plume boundary, or near the plume edges, may hamper optimum containment and treatment of the affected groundwater.

Previous projects sponsored by the United States Environmental Protection Agency (USEPA, 1999a and 1999b) have demonstrated potential savings of millions of dollars in operating and maintenance (O&M) costs and significant reductions in energy usage over the projected P&T lifetime at sites through the application of "hydraulic optimization." In addition to the potential monetary and energy savings, optimization could achieve substantial reductions in the volume of groundwater in an area where water is becoming a scarce resource. A fourth benefit would be more effective removal of the areas of highest concentration of contaminants of concern, thus improving chromium and nitrate capture efficiency.

KNC believes that hydraulic optimization of the P&T system at the Dodge City plant can contribute to long-term operating cost reduction and improved performance of the remedial systems with respect to the compliance objectives. Areas with elevated chromium and nitrate plus nitrite will be better controlled. Travel time from source areas to extraction points will be optimized. Areas currently pumping with no benefit or adverse benefit will be eliminated.

OBJECTIVES AND LIMITATIONS OF THE STUDY

The primary objective of this project is to demonstrate the benefits of applying hydraulic optimization to the existing system using a traditional trial-and-error approach. A secondary objective is to provide an alternate pumping strategy that would be feasible and cost-effective to implement.

KNC has considered optimization strategies to minimize the limitations inherent in the traditional trial and error approach. These limitations are:

(1) The limited number of pumping strategies that can be investigated; and
(2) The nonlinear relationship between pumping rates and groundwater concentrations (i.e., concentrations do not change proportionally with pumping rates).

These limitations can be overcome using KNC's experience and knowledge base from operating the system, the historical knowledge acquired by the former owner, and a more comprehensive understanding of the geology underlying the Facility based on recent phases of the RFI field investigation. The recent lithologic information will be incorporated into the optimization plan to account for geologic features and coupled hydrogeologic processes that affect the transport of site-related constituents. For example, historical P&T operations have lowered the groundwater table resulting in areas of unsaturated sand. Changes to the recovery system may result in saturation of these sands. Residual contamination in the sands may temporarily raise the chromium and nitrate plus nitrite concentrations. KNC proposes to monitor and evaluate these potential changes as part of the routine quarterly groundwater sampling.

Groundwater modeling is not proposed as part of this study. However, depending on the results of the study and the complexities encounter, KNC may opt to use groundwater modeling to further optimize the P&T system.

PROCESS DESCRIPTION AND PHYSICAL SET-UP

The most common decision variables affecting a groundwater optimization program are:

- Well locations;
- Operating status (on/off) of particular wells; and
- Groundwater extraction rates.

The optimization plan will be designed to identify the optimal combination of values for these decision variables. Constraints include limits on the extraction/ injection rates (aquifer limitations), the number of wells, well locations, hydraulic heads, and concentrations.

Several pumping scenarios will be evaluated with respect to locations of wells and the pumping rates. When the field optimization is completed, KNC will determine by observation/direct measurement if design constraints are satisfied. With this approach, a limited number of pumping scenarios (three are currently projected) will be tested. From these, the preferred pumping strategy will be selected.

The process of performing the hydraulic optimization generally includes the following steps:

- Install flow meters on individual recovery system wells to allow more accurate monitoring of extraction rates;

- Install transducers and data loggers in select wells to allow continuous groundwater monitoring;

- Shut down of the entire pumping network for a period of 3 to 5 days to evaluate the non-pumping groundwater flow directions; and

- Evaluation of three optimization configurations (details provided below).

Configuration No.	Description	Well Configuration	*Pumping Rate
1	Current configuration minus wells located upgradient and/or outside the suspected source areas that generally counteract development of inward gradients.	Current configuration with the following wells shutdown: TW-16, TW-17, TW-19, TW-23, TW-36, TW-37, TW-38, TW-52, TW-55, TW-56, TW-76, and TW-78	TBD
2	Interior network of wells focused in areas of elevated chromium and nitrate plus nitrite concentrations.	Operating Wells: TW-20, TW94, TW-92, TW-68, TW-65, TW-84, TW-83, TW-82, TW-09, TW-72, TW-64, TW-46, TW-21, TW-40 all other wells shutdown.	TBD
3	Configuration 2 with additional density of pumping wells in the areas of elevated chromium and nitrate plus nitrite concentrations.	Operating Wells: TW-20, TW-94, TW-92, TW-93, TW-68, TW-65, TW-84, TW-83, TW-82, TW-09, TW-72, TW-71, TW-64, TW-46, TW-88, TW-87, TW-21, TW-90, TW-40, TW-07, TW-39, TW-89 all other wells shutdown.	TBD

*Pumping rates will be determined by direct measurement during the Optimization Study. Figures 1 denotes the current and proposed well configurations.

The common goal of each configuration is to demonstrate that hydraulic containment can be maintained using the specified pumping well configuration. Configuration 1 is specially designed to determine the impacts of eliminating select wells thought to counteract development of inward gradients.

Configuration 2 represents what KNC believes is the minimum configuration needed to maintain hydraulic containment. The pumping wells in this configuration are centered in areas of elevated chromium and nitrate plus nitrite.

Configuration 3 is similar to configuration 2 with the addition of 8 pumping well. This configuration is designed to evaluate the benefit enhanced pumping in the areas of elevated chromium and nitrate plus nitrite.

KNC proposed to apply the following activities and conditions during the optimization study:

- Collect biweekly groundwater levels to monitor changes in the potentiometric surface.

- Take 13 extraction wells (TW-12, TW-16, TW-17, TW-19, TW-23, TW-36, TW-37, TW-38, TW-52, TW-55, TW-56, TW-76, and TW-78) out of service during the optimization study. These wells are located upgradient and/or outside the suspected source areas and generally counteract development of inward gradients.

- Submit biweekly status updates on progress and findings to EPA and KDHE.

- To ensure protection of human health and the environment, KNC will collect and analyze groundwater samples for chromium and nitrate plus nitrite from downgradient wells if groundwater elevations indicate loss of hydraulic containment at the plant.

- Ongoing groundwater monitoring activities as specified in the SAP will continue without interruption. Monitoring activities will continue even for those wells that are part of the monitoring system but temporarily out of service during the study.

PUMP TESTING

The RFI Field Sampling Plan (FSP) calls for slug tests and step drawdown tests. KNC is proposing to conduct six multiple well hydraulic tests (pumping tests) in place of the originally proposed slug and step drawdown testing.

It is anticipated that a minimum of three monitoring points will observed during the testing. Water levels will be measured using pressure transducers and an electronic data recorder, if feasible. Measurements will also be collected manually to correlate with data recorded by the logger and to act as back-up in case unforeseen problems arise with use of the data recorder.

SCHEDULE

The proposed schedule for completing the Pump Optimization Study is summarized below.

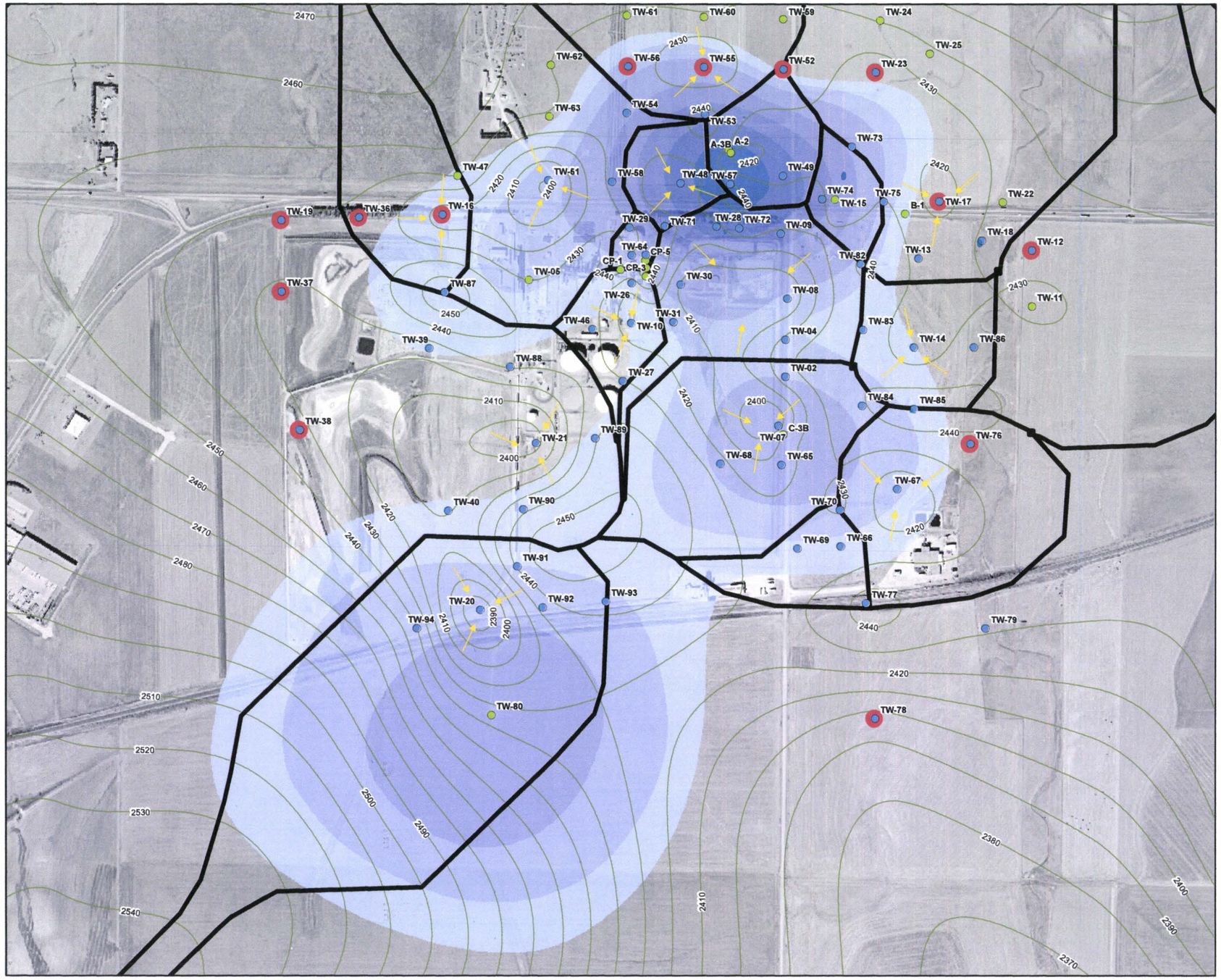
Project Activity	**Approximate Initiation from Date of Agency Approval (calendar days)**
Shutdown Evaluation	Day 1 through 5
Optimization Configuration 1 - Two Hydraulic Tests	Day 6 through 66
Optimization Configuration 2 - Two Hydraulic Tests	Day 67 through 120
Fourth Quarter (October 2006) Groundwater Monitoring	Day 121 through 129
Optimization Configuration 3 - Two Hydraulic Tests	Day 130 through 180

Field work will begin within two weeks of receipt of approval from the USEPA and KDHE. Each well configuration is expected to operate a minimum of 45 days.

REFERENCES

USEPA, 1999a. Hydraulic Optimization Demonstration for Groundwater P&T Systems, Volume I: Pre-Optimization Screening (Method and Demonstration). EPA/542/R-99/011A, December 1999.

USEPA, 1999b. Hydraulic Optimization Demonstration for Groundwater P&T Systems, Volume II: Application of Hydraulic Optimization. EPA/542/R-99/011B, December 1999.



LEGEND

- PUMPING WELL OPERATING DURING JANUARY 2006 MONITORING EVENT
- WELL NOT PUMPING DURING JANUARY 2006 MONITORING EVENT
- PUMPING WELL PROPOSED TO BE TEMPORARILY SHUT DOWN
- POTENTIOMETRIC SURFACE CONTOUR (FT AMSL) - JANUARY 2006
- GROUNDWATER CAPTURE ZONE BOUNDARY - JANUARY 2006

NOTES:

1. GENERAL GROUNDWATER FLOW DIRECTIONS ARE INDICATED BY YELLOW ARROWS.
2. CHROMIUM PLUME CONCENTRATIONS (mg/L) ARE GRADUATED IN COLOR INTENSITY IN THE FOLLOWING INCREMENTS: 0.01, 0.5, 0.1, 0.2, 0.3, 0.4 AND 0.5.
3. PLUME BOUNDARY IS POORLY DEFINED ALONG SOUTHWEST EDGE.

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Feet

GROUNDWATER CAPTURE ZONES - JANUARY 2006

PREPARED FOR:

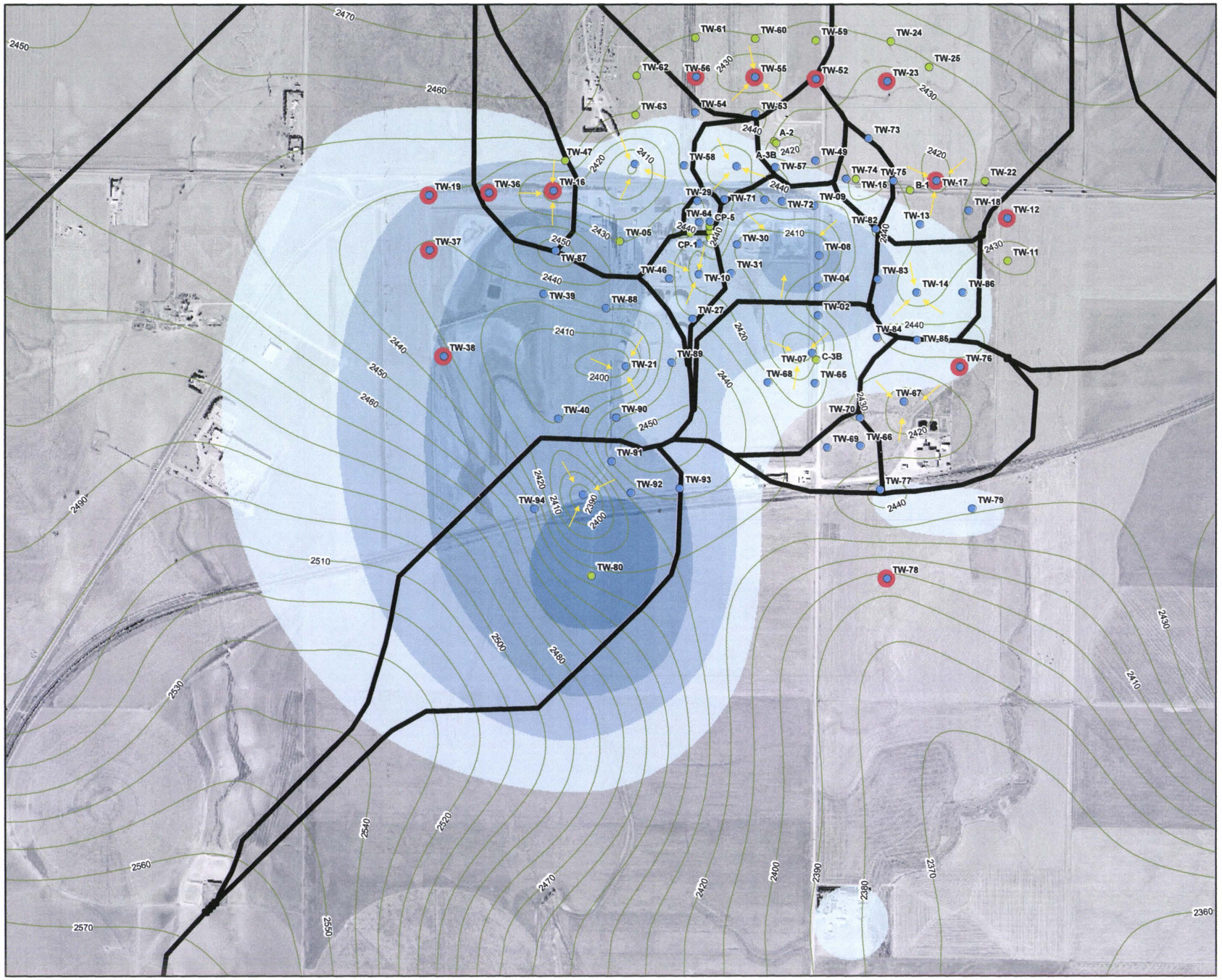
PREPARED BY:

KOCH

KOCH NITROGEN COMPANY

11558 US HIGHWAY 50 - P.O. BOX 1337
DODGE CITY, KS 67801

PROJECT NO.	FIGURE NO. X
DATE. APRIL 2006	FILE NO.



LEGEND

- PUMPING WELL OPERATING DURING JANUARY 2006 MONITORING EVENT
- WELL NOT PUMPING DURING JANUARY 2006 MONITORING EVENT
- PUMPING WELL PROPOSED TO BE TEMPORARILY SHUT DOWN
- POTENTIOMETRIC SURFACE CONTOUR (FT AMSL) - JANUARY 2006
- GROUNDWATER CAPTURE ZONE BOUNDARY - JANUARY 2006

NOTES:

1. GENERAL GROUNDWATER FLOW DIRECTIONS ARE INDICATED BY YELLOW ARROWS.
2. NITRATE PLUS NITRITE PLUME CONCENTRATIONS (mg/L) ARE GRADUATED IN COLOR INTENSITY IN THE FOLLOWING INCREMENTS: 10, 50, 100 AND 150.
3. PLUME BOUNDARY IS POORLY DEFINED ALONG SOUTHWEST EDGE.

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GROUNDWATER CAPTURE ZONES - JANUARY 2006

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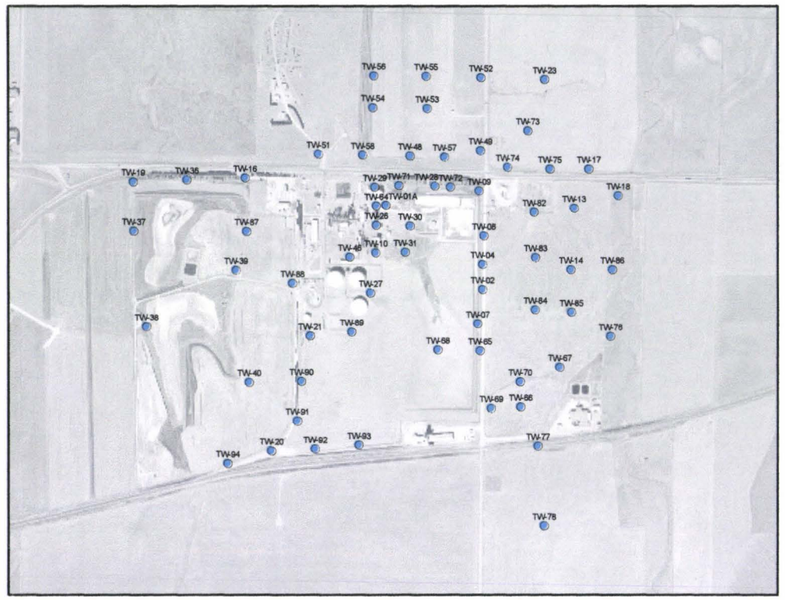
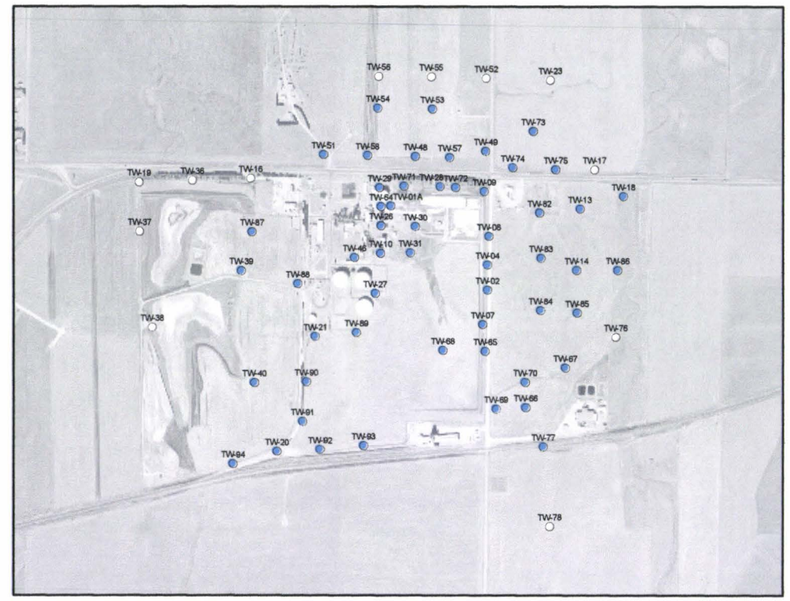
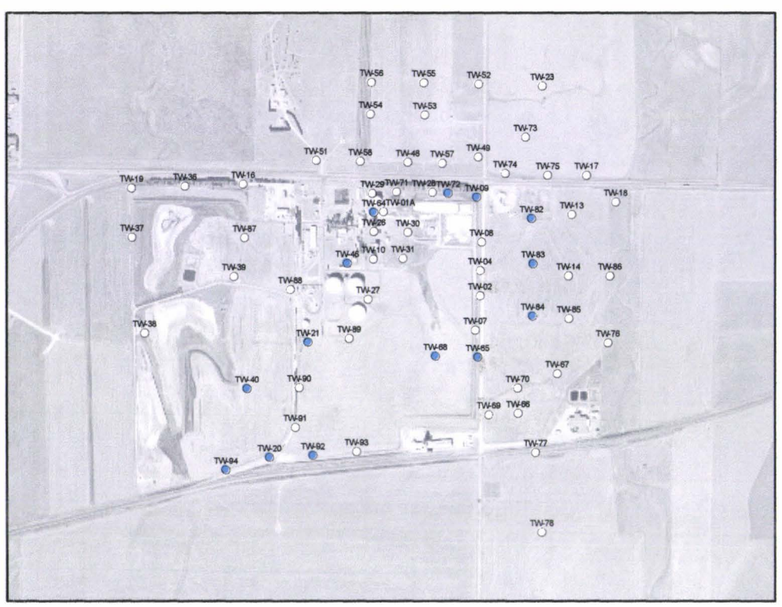
PROJECT NO.	FIGURE NO. X
DATE. APRIL 2006	FILE NO.



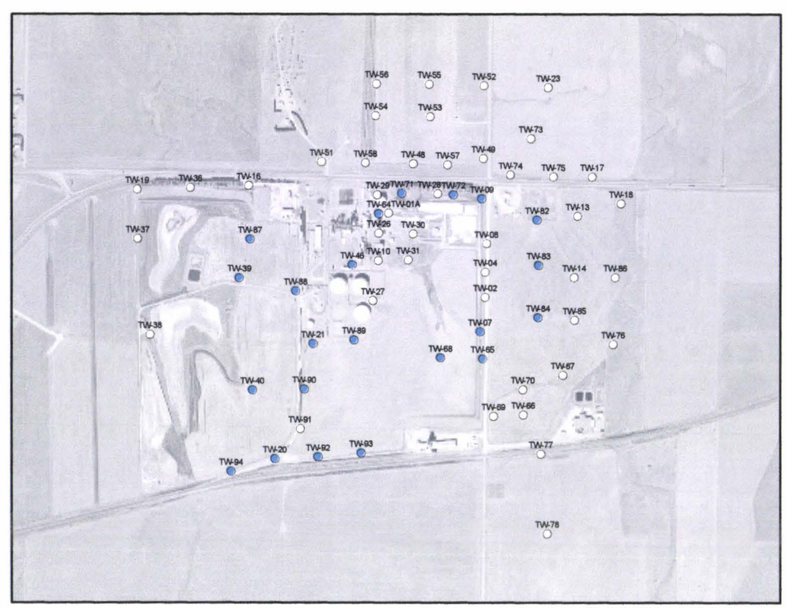
Current Pumping Configuration



Pumping Configuration 1



Pumping Configuration 2



Pumping Configuration 3

LEGEND

- PUMPING WELL
- NON-PUMPING WELL

-N-

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Miles

PUMPING CONFIGURATIONS

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KOCH NITROGEN COMPANY
11558 US HIGHWAY 50 - P.O. BOX 1337
DODGE CITY, KS 67801

PREPARED BY:

PROJECT NO.	FIGURE NO. 1
DATE. JUNE 2006	FILE NO.