Kansas Permit No. KS-05-079-001

KANSAS UNDERGROUND INJECTION
CONTROL AREA PERMIT
CLASS V INJECTION WELL

WORKING COPY

Pursuant to the provisions of Kansas Statutes Annotated (65-164, 65-165, 65-166, 65-170g and 65-171d) and Kansas Administrative Regulations (Chapter 28, Article 46),

Owner/Operator:	City of Wichita, Water Department
Owner/Operator's Address:	455 N. Main St. Wichita, Kansas 67202
Owner/Operator:	City of Wichita, Water Department
Owner/Operator's Telephone No.:	316-268-4578
Facility Name:	Equus Beds (ASR) Phase I Aquifer Storage Recovery
Facility Location:	Harvey County, Kansas
Injection Well Identifications:	RRW-1, RRW-2, RRW-3, RW-1, RB-1, RB-2

Well Locations:

RRW-1: SW SW SW 12-23-3W, Harvey Co. Kansas LAT 38° 03.478 LON 097°36.622	RRW-2: NE NE NE 23-23-3W, Harvey Co. Kansas, LAT 38°03.478 LON 097°36.662
RRW-3: SW SW SW 24-23-3W, Harvey Co. Kansas LAT 38°01.744 LON 097°37.606	RW-1: NW NW NW 36-23-3W, Harvey Co. Kansas LAT 38°00.835 LON 097°36.602
RB-I: NW NW NW 2-24-3W, Harvey Co. Kansas LAT 37°59.895 LON 097°36.687	RB-2: NW NW NW 11-24-3W, Harvey Co. Kansas LAT 37°59.056 LON 097°36.695
Receiving Formation:	Quaternary Alluvium

is authorized to inject groundwater in to the Equus Beds Aquifer for the purpose of storage and ~~later~~ recovery of the groundwater in accordance with the construction, operation, monitoring and reporting requirements as set forth herein. (Add language about being barrier wells to salt plume)

The permittee shall comply with all conditions in this permit, federal and state regulations governing Class V injection wells and the requirements of the Kansas Department of Health and Environment (KDHE).

This permit shall become effective _____, will supersede all previous permits and/or agreements relating to the underground injection control wells described above and will expire _____. (10 year effective date)

FACILITY DESCRIPTION: The recharge facilities consist of three recharge/recovery wells, one recharge well and two recharge basins located approximately 5 miles west of Halstead, Kansas, in Harvey County in a north-south line adjacent to Willow Lake Rd, from NW 12th St. to 48th. St.

_____
Secretary, Kansas Department
of Health and Environment

_____
Date

I. INJECTION LIMITATIONS, MONITORING, REPORTING, AND TESTING REQUIREMENTS

A. The permittee is authorized to inject groundwater recovered from the Little Arkansas River during periods above base flow as permitted by the Kansas Division of Water Resources. The purpose of injection is to form a hydraulic barrier to the Burton Oilfield brine plume and to recharge the Equus Beds Aquifer.

B. Such injection shall be controlled, limited and monitored by the permittee as specified in this permit. Injection shall not cause degradation of the ambient water use in the Equus Beds aquifer. Monitoring data required to be submitted to KDHE on a monthly basis shall be submitted to KDHE no later than twenty-eight (28) days after the last day of the month for which the monitoring data is being reported. Monitoring data required to be submitted to KDHE on a quarterly basis shall be submitted no later than twenty-eight days after the last day of the quarter for which the monitoring data are being reported. All Monitoring data shall be submitted on forms prescribed by KDHE. The monitoring reports shall be originally signed. Monitoring reports and other information required by this permit shall be directed to:

Bureau of Water
Kansas Dept. of Health and Environment
1000 SW Jackson St. Suite 420
Topeka, Kansas 66612-1367

A copy of the monitoring report shall also be submitted to:

Chief Engineer
Division of Water Resources
Kansas Department of Agriculture
109 SW 9th St., Second Floor
Topeka, Kansas 66612-1283

C.

Injection and Operational Parameters	Injection or Parameter Limitation	Measurement or Analysis Frequency	Reporting Requirement	Sample or Measurement Type
Maximum Daily Wellhead Injection Pressure for Project (pounds per square inch gauge)	5	*	Monthly	Gauge and Continuous Recording Device ***
Maximum Weekly Injection Volume for Project, (7 day week, gallons per week)	70,000,000	*	Monthly	Meter and Continuous Recording Device ***
pH (Standard units)	6.0 - 9.0	*	Monthly	Continuous Recording Device ***

Injection and Operational Parameters	Injection or Parameter Limitation	Measurement or Analysis Frequency	Reporting Requirement	Sample or Measurement Type
Specific Conductance (µS/cm)	Monitor	*	Monthly	Continuous Recording Device ***
Turbidity (NTU)	Monitor	*	Monthly	Continuous Recording Device ***
Temperature (degrees Fahrenheit)	Monitor	*	Quarterly	Continuous Recording Device ***
Chloride (mg/l)	**L.T. 250	Quarterly	Quarterly	Grab****
Atrazine (mg/l)	**L.T. ~~0.003~~	Quarterly	Quarterly	Grab*****
Arsenic (mg/l)	** L.T. ~~0.010~~	Quarterly	Quarterly	Grab****

Not determined yet

Grab appropriate

* See Attachment II for individual constituents for which the injectate shall be analyzed and reported for on a monthly basis beginning with the first month of injection, and Attachment III for individual constituents for which the injectate shall be analyzed and reported for on a yearly basis. annual? Can set a date and then annually thereafter.

** Conduct one weekly inspection reading for reporting purposes.

*** Denotes "less than".

**** The gauge, meter, or continuous recording device shall at all times be maintained operational and in a location to properly measure the activity being monitored. The permittee is allowed to measure the injection pressure and injection volume on a project basis. Authorized

***** Grab samples shall be collected at a location representative of the injection fluid distributed to all six injection wells.

D. Inspection readings of injection flow volume and injection pressure shall be made weekly and reported in the monthly monitoring report submitted to KDHE. The date and time these readings are taken and the initials of the person taking the readings shall be included in the monthly monitoring report. The total volume injected for the month shall also be reported in the monthly monitoring report.

E. The following shall also be reported to KDHE by the permittee:

1. Any injection well treatment procedures used, including those associated with normal maintenance and malfunction correction, and all injection well workovers shall be reported to KDHE within thirty (30) days of completion. An injection well treatment plan or workover plan shall be submitted to KDHE for review and approval prior to commencing a well treatment or workover. No injection well treatment or workover shall commence until the permittee has obtained approval for the well treatment or workover plan from KDHE.

2. Immediate notification of KDHE of all spills associated with the operation of the injection well.

3. Notification of KDHE of any injection well malfunction or failure within twenty-four (24) hours of becoming aware of the circumstances.

4. The results and interpretation of any tests or logs of the injection wells-+ or injection zone within thirty (30) days of completion.

5. A written description and explanation of any noncompliance with the operating limitations as specified by this permit for injection pressure, injection flow volume, or injection limits occurring during the month being reported and a detailed description of corrective action to prevent recurrence of the non-compliance shall be submitted with the monthly monitoring report.

6. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to KDHE, the permittee shall submit such facts or corrected information to KDHE within five (5) days of becoming aware of the circumstances.

F. All sample analyses required by this permit shall be conducted by a Kansas Certified Laboratory.

II. PLUGGING, ABANDONMENT

The well(s) shall be plugged and abandoned upon reaching the end of useful life or when determined necessary by KDHE to protect human health, or the fresh and/or usable water or the soils of the State. The permittee currently has a plugging and abandonment plan on file with KDHE. The permittee shall revise and update the plan when required by KDHE. The permittee shall notify KDHE at least sixty (60) days prior to plugging and abandonment of the well(s). With the notice, the permittee shall submit a revised and updated plugging and abandonment plan to KDHE for review and approval. The permittee shall conform to all plugging and abandonment requirements of state and federal regulations and KDHE. Plugging and abandonment work shall not commence until approval of the plugging and abandonment plan has been obtained from KDHE. The report of plugging and abandonment and related information shall be submitted to KDHE within thirty (30) days after completion of the plugging operation on the form provided by KDHE.

III. CONSTRUCTION REQUIREMENTS

A. Borehole casing, tubing and cement specifications for typical injection well for this project:

RRW-1

Borehole Size	Casing Size	Casing Material	Weight lbs/ft	Casing Seat Depth	Type of Grout	Amount of Grout	Grouted Interval From-To
32"	18"	Carbon Steel	NA	60'	?,	ft^3	?,

Screen or perforation material: Stainless Steel (Wire Wrapped)
Type of screen or perforation openings: Wire Wrapped slot size to be determined by pilot hole, set from 60' to 130' with intermittent blank casing at clay zones.

RRW-2

Borehole Size	Casing Size	Casing Material	Weight lbs/ft	Casing Seat Depth	Type of Grout	Amount of Grout	Grouted Interval From-To
32"	18"	Carbon Steel	NA	60'	?,	ft^3	?,

Screen or perforation material: Stainless Steel (Wire Wrapped)
Type of screen or perforation openings: Wire Wrapped slot size to be determined by pilot hole, set from 60' to 255' with intermittent blank casing at clay zones.

RRW-3

Borehole Size	Casing Size	Casing Material	Weight lbs/ft	Casing Seat Depth	Type of Grout	Amount of Grout	Grouted Interval From-To
13"	6"	Carbon Steel	NA	70'	?,	ft^3	?,

Screen or perforation material: Stainless Steel (Wire Wrapped)
Type of screen or perforation openings: Wire Wrapped slot size to be determined by pilot hole, set from 70' to 190' with intermittent blank casing at clay zones.

RW-1

Borehole Size	Casing Size	Casing Material	Weight lbs/ft	Casing Seat Depth	Type of Grout	Amount of Grout	Grouted Interval From-To
32"	18"	Carbon Steel	NA	70'	2	10.8 ft^3	5'-20'

Screen or perforation material: Stainless Steel (Wire Wrapped)
Type of screen or perforation openings: Wire Wrapped slot size to be determined by pilot hole, set from 70' to 260' with intermittent blank casing at clay zones.

RB-1

Borehole Size	Casing Size	Casing Material	Weight lbs/ft	Casing Seat Depth	Type of Grout	Amount of Grout	Grouted Interval From-To
16"	8"	Carbon Steel	NA	40'	2	ft^3	

Screen or perforation material: Stainless Steel (Wire Wrapped)
Type of screen or perforation openings: Wire Wrapped slot size to be determined by pilot hole, set from 40' to 275' with intermittent blank casing at clay zones.

RB-2

Borehole Size	Casing Size	Casing Material	Weight lbs/ft	Casing Seat Depth	Type of Grout	Amount of Grout	Grouted Interval From-To
16"	8"	Carbon Steel	NA	50'	2	ft^3	

Screen or perforation material: Stainless Steel (Wire Wrapped)
Type of screen or perforation openings: Wire Wrapped slot size to be determined by pilot hole, set from 50' to 260' with intermittent blank casing at clay zones.

B. Injection is into the Quaternary alluvial aquifer.

IV. CONVERSION

A notice of conversion of an injection well to a use other than authorized by this permit shall be submitted to KDHE at least sixty (60) days prior to conversion. A conversion plan shall be submitted with the notice to KDHE for review and approval. The injection gallery shall not

be converted until approval of the conversion plan has been obtained from KDHE.

V. SCHEDULE OF COMPLIANCE

None.

VI. STANDARD CONDITIONS - ATTACHMENT I

In addition to the specified conditions stated herein, the permittee shall comply with the provisions of Attachment I.

VII. OTHER CONDITIONS

To facilitate evaluation of the effects of the injection operation as the Equus Beds Aquifer recharge project progresses the following monitoring of the groundwater shall be conducted and reported to KDHE:

1. Monitoring wells number RR1MN, RR1ME, RR1MS, RR1MW, IW02, RR2MN, RR2ME, RR2MS, RR2MW, RR3MN1, RR3MN2, RR3ME1, RR3ME2, RR3MS1, RR3MS2, RR3MW1, RR3MW2, RW1MN, RW1ME, RW1MS, RW1MW, RB1MN, RB1MS, RB2MN, RB2MS, and all domestic wells within one-quarter mile of the recharge/recovery wells and recharge basins shall be sampled a minimum of once and preferably quarterly, prior to any injection into the aquifer for recharge purposes for the analytes in Tables 1 thru 7 listed in Attachment A thereafter. (during periods of injection?)

2. Monitoring wells number RR1MN, RR1ME, RR1MS, RR1MW, IW02, RR2MN, RR2ME, RR2MS, RR2MW, RR3MN1, RR3MN2, RR3ME1, RR3ME2, RR3MS1, RR3MS2, RR3MW1, RR3MW2, RW1MN, RW1ME, RW1MS, RW1MW, RB1MN, RB1MS, RB2MN, RB2MS shall be sampled on the following frequencies and for the following analytes:

   - Monthly during the injection project's operation for the analytes in Table 1.
   - At the end of the first and second years of the injection project's operation for the analytes in Tables 1 thru 7.

3. Monitoring wells number RR1MN (upgradient), RR1MS (downgradient), RR2MN (upgradient), RR2MS (downgradient), RR3MN1 (upgradient), RR3MS1 (downgradient), RW1MN (upgradient), RW1MS (downgradient), RB1MN (upgradient), RB1MS (downgradient), RB2MN (upgradient) and RB2MS (downgradient) shall be sampled annually for the analytes in tables 2 thru 7:

4. The fluid level in each of the active monitoring wells for this project shall be automated and measured on a frequency not to exceed six hours and the results used to generate an updated piezometric surface map. This piezometric surface map shall be submitted to KDHE no later than twenty-eight (28) days after the last day of the quarter for which the data are being reported.

5. At the conclusion of the injection project, monitoring wells number RR1MN, RR1ME, RR1MS, RR1MW, IW02, RR2MN, RR2ME, RR2MS, RR2MW, RR3MN1, RR3MN2,

RR3ME1, RR3ME2, RR3MS1, RR3MS2, RR3MW1, RR3MW2, RW1MN, RW1ME, RW1MS, RW1MW, RB1MN, RB1MS, RB2MN, RB2MS, and all domestic wells within one-quarter mile of the recharge/recovery wells and recharge basins shall be sampled for the analytes in Tables 1 thru 7.

in Attachment ____
and the results reported to
KDHE and. - -