KANSAS UNDERGROUND INJECTION
CONTROL PERMIT
CLASS V NON-HAZARDOUS WASTE INJECTION WELL

Pursuant to the provisions of Kansas Statues Annotated (65-164, 65-165, 65-166, 65-170g and 65-
171d) and Kansas Administrative Regulations (Chapter 28, Article 46), the undersigned is
authorized to inject brine in accordance with the construction operation, monitoring and reporting
requirements as set forth herein.

Owner/Operator: Northern Natural Gas Company
1111 S 103rd Street
Omaha, NE 68124-1000

Facility Name: Cunningham Storage Facility
20307 NE 150th Avenue
Cunningham, KS 67035

Well Identification: WIW #3

Well Location Lat: 37.76723, Long: -98.48393
Section 23, Township 26 South, Range 11 West
Pratt County, Kansas

Receiving Formation: Viola

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

This permit shall become effective July 20, 2022 and expires July 20, 2032.

Janet Stanek, Secretary
Kansas Department of Health and Environment

Date

7/12/2022
Facility Description

The permittee is authorized to inject brine produced from the Arbuckle Formation for the purpose of stabilizing the pressure in the Viola Formation to prevent the migration of stored gas. The injected fluid originates from Water Withdrawal Well #2 (WWW-2), located approximately 0.6 miles northwest of Water Injection Well #3 (WIW-3). Sulfate Scavenger (hscv30164A) and Corrosion Scale Inhibitor (SICI 10008A) are added to the Arbuckle water at the withdrawal well which is then pumped directly to WIW-3 for injection by gravity feed.

Facility Location Map

Figure 1 | Northern Natural Gas Storage Cunningham Facility

Injection and Source Water Wells

(Map Courtesy Google Earth)
SECTION I
CONSTRUCTION REQUIREMENTS

A. General Construction Requirements: The Permittee shall design, construct, maintain, and operate the permitted well to prevent the possibility of injected fluids being introduced into a useable aquifer or any underground source of drinking water ensuring that injection fluids or other formation fluids do not cause deterioration of the water quality of fresh and/or usable water zones. The well shall be cased and cemented such that it must prevent the loss of fresh and/or usable water due to downward migration and constructed as to prohibit the release of injection fluids into an unauthorized zone. Construction shall also include adherence to operating conditions and procedures, and emergency shutdown procedures specified in the permit application and in this Permit.

B. Injection Zone: Viola Formation through openhole from 4,289 feet to 4,296 feet.

C. Packer Type and Seating Depth: Nickle coated seal tite lined D&L ASII Packer. The packer is set at 4,197 feet.

D. Annulus Fluids: Champion CORR12264a & BIOC10031W are mixed and pumped behind the packer then the backside is topped off with Mobil EAL 224H.

E. Minimum Annulus Pressures: Annulus pressure shall be continually monitored and have an absolute minimum pressure of 60 psig. If the annulus pressure drops below 60 psig, the permittee shall contact KDHE as specified in Attachment I, paragraph O.

F. Spill prevention and containment: The underground pipeline is constructed using Polyethylene Pipe™ (noncorrosive piping) to prevent releases. Cement secondary containment has been constructed around the 100 bbl holding tank at the site capable of containing the fluids from the tank in the event of a spill.

Table 1: Borehole, casing, tubing, and cement specifications for permitted disposal well

<table>
<thead>
<tr>
<th>Borehole Size (in)</th>
<th>Casing or Tubing Size (in) &amp; Material</th>
<th>Weight (lbs/ft)</th>
<th>Casing Seat Depth (ft)</th>
<th>Type of Cement &amp; Additives</th>
<th>Number of Sacks of Cement</th>
</tr>
</thead>
<tbody>
<tr>
<td>17”</td>
<td>13 3/8” Steel</td>
<td>48#</td>
<td>212’</td>
<td>Class A None</td>
<td>240</td>
</tr>
<tr>
<td>12 ¼”</td>
<td>9 5/8” Steel</td>
<td>36#</td>
<td>1848’</td>
<td>Class A Cellflake, 2% Salt</td>
<td>565</td>
</tr>
<tr>
<td>8 ¾”</td>
<td>7” Steel</td>
<td>23#</td>
<td>4289’</td>
<td>Class A 10% Salt, 2% CCI</td>
<td>200</td>
</tr>
<tr>
<td>DV Tool</td>
<td>7” NA</td>
<td>NA</td>
<td>2707’</td>
<td>Class A 3% CCI, ¼ Cello Flake</td>
<td>275</td>
</tr>
</tbody>
</table>
SECTION II
INJECTION LIMITATIONS, MONITORING, REPORTING AND TESTING REQUIREMENTS

The permittee is authorized to inject brine produced from the Arbuckle Formation for the purpose of stabilizing the pressure in the Viola Formation to prevent the migration of stored gas.

A. Monitoring data: Monitoring data required to be submitted to KDHE via the KOLAR website monthly, shall be submitted no later than twenty-eight (28) days after the last day of the month for which the monitoring data are being reported. Monitoring data required to be submitted to KDHE via KOLAR on a quarterly basis shall be submitted no later than twenty-eight (28) days after the last day of the calendar quarter for which monitoring data are being reported. All monitoring data required for reports shall be submitted on-line to the KOLAR system hosted by the Kansas Geological Survey (KGS).

B. Permit Limits and Inspection Reporting: Inspection readings of injection flow rate and volume, wellhead annulus pressure, wellhead injection pressure and seal pot liquid level (Table 2) shall be made daily and reported in the monthly monitoring report submitted to KDHE via KOLAR. The inspection readings for wellhead annulus pressure and injection pressure shall include readings of both the gauge and the continuous recording device. 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.

<table>
<thead>
<tr>
<th>Injection and Operational Parameters</th>
<th>Injection or Parameter Limitation</th>
<th>Sample or Measurement Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Injection Pressure</strong> (inches Mg or psig)</td>
<td>Gravity flow, no wellhead pressure allowed during normal brine injection operations</td>
<td>Gauge and Continuous Recording Device **</td>
</tr>
<tr>
<td><strong>Maximum Daily Injection Volume</strong> (gallons per day)</td>
<td>4,000 barrels per day (168,000 gpd)</td>
<td>Meter or Continuous Recording Device **</td>
</tr>
<tr>
<td><strong>Injection Rate</strong> (gallons per day)</td>
<td>Monitor</td>
<td>Meter or Continuous Recording Device **</td>
</tr>
<tr>
<td><strong>Minimum Allowable Operating Annulus Pressure</strong></td>
<td>60 psig</td>
<td>Gauge and Continuous Recording Device **</td>
</tr>
<tr>
<td><strong>Seal Pot Liquid Level</strong> (in)</td>
<td>Liquid must be visible in sight glass</td>
<td>Sight Glass **</td>
</tr>
</tbody>
</table>

**The Gauge, meter, continuous recording device or sight glass shall at all times be maintained, operational and shall at all times be located to properly measure the activity being monitored.
C. Analytical data: The analytical results of representative injection fluid samples required by this permit shall be reported in the monitoring reports submitted to KDHE (Table 3). The samples shall be collected from the injection stream at the sample port located immediately upstream of the injection well during injection. The data reported shall include the date the sample was collected, the date the sample was analyzed, analytical results, the name of the laboratory conducting the analyses and the laboratory certification number. All analyses of injected brine required by this permit shall be conducted by a laboratory certified by a Kansas certified laboratory.

### Table 3: Permittee Sampling Schedule: Injectate sampling (grab) frequency and limitations

<table>
<thead>
<tr>
<th>Sample Quarterly, Report Quarterly</th>
<th>Monitor</th>
<th>Total Alkalinity as CaCO₃ (mg/l)</th>
<th>Monitor</th>
<th>Total Dissolved Solids (mg/l)</th>
<th>Monitor</th>
<th>Total Suspended Solids (mg/l)</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium (mg/l)</td>
<td>Monitor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chloride (mg/l)</td>
<td>Monitor</td>
<td></td>
<td></td>
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<tr>
<td>Conductivity (Mmhos)</td>
<td>Monitor</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Magnesium (mg/l)</td>
<td>Monitor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium (mg/l)</td>
<td>Monitor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfate (mg/l)</td>
<td>Monitor</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Weekly, Report Monthly</th>
<th>5.0-10.0</th>
<th>Temperature (°F)</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH (standard units)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Quarterly analysis frequency and reporting is based upon calendar quarters.

D. Viola Formation Pressure Monitoring Requirements: The Viola Formation pressure shall be measured in the observation wells depicted in Attachment III at least once annually and the results submitted to KDHE by January 31st of the year following the pressure measurement event. The pressure measurement results shall be presented in a format that provides a comparison of the most recent measurement with all previous pressure measurements obtained since the effective date of this permit.

E. Groundwater Monitoring Requirements: The groundwater shall be monitored for any impact of the injection operation on the Big Bend Aquifer. The groundwater in monitoring wells depicted in Attachment IV shall be sampled semi-annually and the results submitted to KDHE within 30 days of receipt of the analytical results from the laboratory. The samples shall be analyzed for nitrates, chloride, sulfate, sodium, pH and Total Dissolved Solids concentrations. The analyses shall be conducted by a KDHE laboratory certified for the required constituents. The analytical results shall be submitted to KDHE in a format that compares the most recent results with all previous results obtained since the effective date of this permit. This submittal shall include the name and certification number of the laboratory that conducted the analyses. If the results of the monitoring indicate potential endangerment or endangerment of the public health or the environment, KDHE may require the permittee to submit a corrective action plan and schedule of implementation to KDHE for review and consideration of approval. Corrective action may include the requirement by KDHE to cease the injection operation.
F. **Submittals:** Any and all other reporting and information required by this permit; including but not limited to those detailed below, shall be directed to the address below or as otherwise indicated by KDHE.

Kansas Department of Health and Environment  
Bureau of Water – Geology and Well Technology Unit  
1000 SW Jackson St., Suite 420  
Topeka, Kansas 66612-1367

G. **Other reporting:** The following shall also be reported to KDHE by the permittee:

1. Any well treatment procedures used, including those associated with normal maintenance and malfunction correction, and all well workovers shall not commence until the permittee has obtained approval for the well treatment or workover plan from KDHE. A well treatment plan or workover plan shall be submitted to KDHE for review and approval prior to commencing a well treatment or workover. A report of these activities shall be provided to KDHE within thirty (30) days of completion.

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

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

4. The results and interpretation of mechanical integrity tests and any other test or logs of the injection well 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 wellhead injection pressure, injection flow volume or injection limits occurring during the month being reported shall be submitted with the monthly monitoring report.

6. Any addition of liquid to the annulus seal pot shall be reported in the monthly monitoring report. The date the liquid was added, and the volume added, shall be included in the monthly monitoring report.

7. 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 other report to KDHE, the permittee shall submit such facts or corrected information to KDHE within five (5) days of becoming aware of the circumstances.

H. **Fall-off Testing:** Monitoring pressure buildup in the injection zone shall be conducted annually including, at a minimum, a shutdown of the injection well for a time sufficient to conduct a valid observation of the pressure fall-off curve. A plan for this test shall be submitted to KDHE for review and approval at a minimum of thirty (30) days prior to conducting the test. The test shall not commence until approval of the test plan has been...
obtained from KDHE. The test results and interpretation of this test shall be submitted to KDHE within thirty (30) days of test completion.

I. Static Fluid: The static fluid level of the injection interval shall be measured annually. The method used to measure the static fluid level shall have the prior approval of KDHE. A plan for this test shall be submitted to KDHE for review and approval at a minimum of thirty (30) days of completion of the measurement.

J. Mechanical Integrity Testing:

1. A two-part mechanical integrity test (MIT) to check for internal and external mechanical integrity shall be conducted at least once every five (5) years. The internal MIT is to check for significant leakage in the casing, tubing, and packer, and the external MIT is to check for significant fluid movement through vertical channels adjacent to the wellbore. Whenever KDHE believes that because of a downhole problem the continued use of the well constitutes a threat to human health, or the fresh and/or usable waters or the soils of the State, or the release of injected fluid into an unauthorized zone is occurring, the permittee shall be required to immediately cease injection and conduct a MIT. If determined necessary by KDHE, a MIT shall be conducted when there has been a well workover. A MIT plan shall be submitted to KDHE for review and approval prior to conducting any MIT. The MIT plan shall be submitted to KDHE for review and approval at a minimum of thirty (30) days prior to conducting the test. No MIT work shall commence until approval of the MIT has been obtained from KDHE. The internal MIT shall be witnessed by KDHE. If the well fails a MIT, the requirements of Section II.I.2 of this permit shall be implemented by the permittee. The results and interpretation of a MIT shall be submitted to KDHE within thirty (30) days of test completion.

K. Annulus Pressure Decline, Annulus Liquid Loss, Anomalous Operational Data, Loss of Mechanical Integrity:

1. If the annulus pressure declines below sixty (60) psig, or loss of annulus liquid indicating a loss of mechanical integrity occurs, or anomalous operational data indicating a loss of mechanical integrity occurs, the permittee shall 1) immediately investigate and identify the cause of the annulus pressure decline, annulus liquid loss or anomalous operational data and 2) notify KDHE within twenty-four (24) hours of becoming aware of the circumstances. The results of this investigation shall be reported to KDHE within twenty-four (24) hours of completion. If the well appears to be lacking mechanical integrity, the permittee shall:
   a. Immediately cease injection of fluids.
   b. Take all steps required by KDHE to determine the presence or absence of mechanical integrity. If a well is determined to have mechanical integrity, injection may resume after the permittee has obtained authorization from KDHE.
2. If a loss of mechanical integrity is determined pursuant to Section II.H.1. of this permit or as the result of a MIT, the permittee shall:

   a. Immediately cease injection of fluids.

   b. Notify KDHE within twenty-four (24) hours of the determination.

   c. Take all steps determined necessary by KDHE to determine whether there may have been a release of brine into any unauthorized zone. If there is evidence there may have been a release into an unauthorized zone, the permittee shall orally notify KDHE within twenty-four (24) hours of the determination. A written notice shall also be provided to KDHE within five (5) days of the determination including a description of the release.

   d. Comply with any immediate corrective or remedial action specified by KDHE. If determined necessary by KDHE, the permittee shall submit to KDHE a remediation and corrective action plan and implementation schedule for review and approval. Work shall not commence until approval of the remediation and corrective action plan has been obtained from KDHE.

   e. Restore and demonstrate mechanical integrity to the satisfaction of KDHE. A plan for any well workover or MIT shall be submitted to KDHE for review and approval. Work shall not commence until the permittee has obtained approval of the workover or MIT plan from KDHE. Injection shall resume only upon authorization from KDHE.

SECTION III
CONVERSION

A notice of conversion of the well to a use other than injection of brine for the purpose of stored gas containment 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 well shall not be converted until approval of the conversion plan has been obtained from KDHE.

SECTION IV
PLUGGING AND ABANDONMENT

The well shall be plugged and abandoned upon reaching the end of its useful life or when determined necessary by KDHE to protect human health or the fresh and/or usable waters 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 plugging and abandonment plan when required by KDHE. The permittee shall notify KDHE at least sixty (60) days prior to plugging and abandonment of the well. 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. The well shall be plugged in a manner which will not allow the movement of fluids into or between sources of fresh and/or usable water or allow the movement of injected fluids out of the injection zone. 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 forms provided by KDHE.

SECTION V
FINANCIAL ASSURANCE

The permittee shall maintain financial responsibility and financial resources to close, plug and abandon the underground injection well and appurtenances in a manner required by KDHE. The permittee shall show evidence of financial responsibility to KDHE by the submission of a surety bond or other adequate financial assurance such as financial statements or other materials acceptable to KDHE. Financial assurance documents and cost estimates shall be revised and updated when required by KDHE. The permittee must notify KDHE by certified mail of the commencement of voluntary or involuntary proceedings under Title 11 (Bankruptcy), U.S. Code, naming the owner or operator as debtor, within ten (10) business days after the commencement of the proceeding. A guarantor of a corporate guarantee must make such notification if named as debtor, as required under the terms of the guarantee.

SECTION VI
STANDARD CONDITIONS – ATTACHMENT I

In addition to the specified conditions stated herein, the permittee shall comply with the provisions of Attachment I.
## SECTION VII
### FACILITY SUBMISSION SUMMARY

A summary of the required facility submissions/reporting pursuant to this Permit:

<table>
<thead>
<tr>
<th>SUBMISSION REQUIREMENTS</th>
<th>DUE DATE</th>
<th>PERMIT CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Malfunction or Spills</td>
<td>Immediate contact; 24 hr written</td>
<td>II.G.2</td>
</tr>
<tr>
<td>Testing Malfunction or Other Emergency Reporting</td>
<td>Contact within 24 hrs, written contact within 5 days</td>
<td>II.G.3.</td>
</tr>
<tr>
<td>Monthly Monitoring</td>
<td>28th day of each month via KOLAR reporting system</td>
<td>II.A.</td>
</tr>
<tr>
<td>Viola Formation Pressure Monitoring Report</td>
<td>January 31st after completing the pressure measurement event</td>
<td>II.B.</td>
</tr>
<tr>
<td>Groundwater Monitoring Report</td>
<td>30 days of receipt of analytical results of semi-annual sampling</td>
<td>II.C.</td>
</tr>
<tr>
<td>Fall-Off Testing and Static Fluid Level Testing Plans</td>
<td>30 days minimum prior to proposed annual test date</td>
<td>II.D.</td>
</tr>
<tr>
<td>MIT Plan</td>
<td>30 days minimum prior to each 5-year test date</td>
<td>II.E.</td>
</tr>
<tr>
<td>Fall-Off Testing, Static Fluid Level Testing and MIT Reporting</td>
<td>30 days after the completion of each test</td>
<td>II.F.</td>
</tr>
<tr>
<td>Treatment or Work Over Reporting</td>
<td>30 days after completion</td>
<td>II.G.1.</td>
</tr>
<tr>
<td>Permit Renewal</td>
<td>180 days prior to permit expiration date</td>
<td>Attachment 1.B.</td>
</tr>
<tr>
<td>Permit Transfer Request</td>
<td>30 days prior to proposed transfer</td>
<td>Attachment 1.N.</td>
</tr>
<tr>
<td>Waste Stream Changes</td>
<td>180 days prior to proposed changes</td>
<td>Attachment 1.S.</td>
</tr>
<tr>
<td>Conversion Request</td>
<td>60 days minimum prior to proposed conversion</td>
<td>III.</td>
</tr>
<tr>
<td>Plugging and Abandonment Plan</td>
<td>60 days minimum prior to proposed plugging and abandonment</td>
<td>IV.</td>
</tr>
<tr>
<td>Plugging and Abandonment Report</td>
<td>30 days after completion of plugging operations.</td>
<td>IV.</td>
</tr>
<tr>
<td>Financial Assurance</td>
<td>As requested by KDHE</td>
<td>V.</td>
</tr>
<tr>
<td>Any Corrections to Submittals</td>
<td>Within 5 days of becoming aware of the circumstance</td>
<td>II.G.7.</td>
</tr>
</tbody>
</table>
Effective April 3, 2020
ATTACHMENT I

STANDARD CONDITIONS FOR
UNDERGROUND INJECTION CONTROL PERMITS

CLASS V
INJECTION WELLS

CONDITIONS APPLICABLE TO ALL PERMITS

A. **Duty to Comply:** The permittee shall comply with all conditions of the permit, Federal and State laws and regulations. Any permit noncompliance constitutes a violation of the appropriate act or regulations and is grounds for enforcement action, for permit termination, revocation and reissuance, modification or denial of a permit renewal application.

B. **Duty to Reapply:** If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee shall submit a complete application for a new permit at least one-hundred and eighty (180) days before this Permit expires, unless permission for a later submission date has been granted by the Secretary.

C. **Duty to Halt or Reduce Activity:** It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit.

D. **Duty to Mitigate:** In the event of noncompliance with the Permit, the Permittee shall take all reasonable steps to minimize releases to the environment and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment.

E. **Proper Operation and Maintenance:** The permittee shall at all times properly operate and maintain all facilities and systems of monitoring, treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the condition of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operating staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems when necessary to maintain compliance with the conditions of the permit.

F. **Permit Modifications and Termination:** After notice and opportunity for a hearing, this permit may be modified, suspended or revoked, or terminated in whole or in part during its term for cause as provided, but not limited to those set forth in K.A.R. 28-46-15 and K.A.R. 28-46-16 or if the KDHE or Environmental Protection Agency standards or regulations on which the permit was based have been changed by promulgation of new or amended codes, statutes, regulations or standards or by judicial decision after the permit was issued. The permittee shall furnish to KDHE, within a reasonable amount of time, any information which KDHE may request to determine whether cause exists for modifying, revoking and reissuing, or terminating
this permit or to determine compliance with this permit. The permittee shall also furnish, upon request, copies of all records required to be kept by this permit.

G. **Property Rights:** This permit does not convey any property rights of any sort, or any exclusive privilege.

H. **Duty to Provide Information:** The permittee shall furnish to KDHE within a time period specified by the Secretary, any information which KDHE may request to determine whether cause exists for modifying, revoking, reissuing or terminating the permit, or to determine compliance with this permit. The permittee shall also furnish to KDHE, upon request, copies of reports and information required to be kept by this permit.

I. **Inspection and Entry:** The permittee shall allow the Secretary, or any authorized representative, upon the presentation of credentials and other documents as may be required by law, to:
   1. Enter upon the permittee’s premises where a regulated facility or activity is located or conducted or where records are kept under the conditions of this permit;
   2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
   3. Inspect any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
   4. Sample or monitor for the purpose of assuring permit compliance or as otherwise authorized by the appropriate Act, any substances or parameters at any location.

J. **Samples, Measurements and Records:**

   1. Samples and measurements taken, to comply with this Permit, for the purpose of monitoring shall be representative of the monitored activity.

   2. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of sample, measurement, report or application. This period may be extended by request of KDHE at any time and is automatically extended during the course of any unresolved enforcement action regarding this Facility.

   3. The permittee shall retain records concerning the nature and composition of all injected fluids until three (3) years after the completion of any plugging and abandonment procedures. KDHE may require the owner or operator to deliver the records to KDHE at the conclusion of the retention period.
4. Records of monitoring information shall include:
   a. The date, exact place, and time of sampling or measurements;
   b. The individual(s) who performed the sampling or measurements;
   c. The date(s) analyses were performed;
   d. The individual(s) who performed the analyses;
   e. The analytical sampling, and sample preservation techniques or methods used; and
   f. The results of such analyses.

K. Signatory Requirements: All permit applications, reports required by this permit, or other information requested by KDHE shall be signed and certified in accordance with the requirements of K.A.R. 28-46-22.

L. Reporting Requirements:

1. Except for all new wells authorized by an area permit under K.A.R. 28-46-18, a new injection well may not commence injection until construction is complete, and:
   a. The permittee has submitted notice of completion of construction to KDHE; and
   b. 1) KDHE has inspected or otherwise reviewed the new injection well and finds it is in compliance with the conditions of the permit; or
      2) The permittee has not received notice from KDHE expressing the intent to inspect or otherwise review the new injection well within thirteen (13) days of the date of the receipt of the notice in paragraph a. of this section, in which case prior inspection or review is waived and the permittee may commence injection. KDHE shall allow for a reasonable time period in which the well shall be inspected.

M. Anticipated Noncompliance: If for any reason, the permittee will be unable to comply with permit requirements, the permittee shall give advance notice to KDHE. The notice shall include the reason for the anticipated noncompliance and a description of steps taken to reduce, eliminate and prevent recurrence of the noncompliance. Upon receiving proper notice from the permittee KDHE may grant for a specified time a temporary waiver to a permit requirement for the purpose of testing or treating the well or for conducting a well workover or to protect human health or the environment.

N. Transfer of Permit: This permit is not transferable to any person or entity except after notice and approval by KDHE. KDHE may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the appropriate regulations. The current owner shall notify KDHE at least thirty (30) days in advance of the proposed transfer date. The procedure for transferring ownership is available on the KDHE website. The new permittee shall submit to KDHE at least thirty (30 days prior to
the proposed transfer date a new permit application including the financial assurance documents guaranteeing resources are available to properly plug and abandon the well.

O. **Emergency Reporting:** The Permittee shall report to the Secretary any noncompliance with the Permit which may endanger health or the environment. Any such information shall be reported orally within twenty-four (24) hours from the time the Permittee becomes aware or reasonably should have become aware of the circumstances. A written submission shall also be provided within five (5) days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and time of the incident, corrective action taken, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The permittee shall comply with any corrective or remedial action required by KDHE.

P. **Permit Expiration:** This Permit shall be effective for a fixed term not to exceed ten (10) years. As long as KDHE is the permit-issuing authority, this Permit and all conditions herein will remain in effect beyond the Permit’s expiration date per state law K.S.A. 77-511 (d), which states: If a timely and sufficient application has been made for renewal of a license with reference to any activity of a continuing nature, the existing license does not expire until the state agency has taken final action upon the application for renewal or, if the state agency’s action is unfavorable, until the last day for seeking judicial review of the state agency’s action or a later date fixed by the reviewing court.

Q. **Severability:** The provisions of this permit are severable and if any provision of this permit and any circumstance is held invalid, the application of such provision to other circumstances and the remainder of the permit shall not be affected thereby.

R. **Operational Requirements:**

1. The permittee shall not allow the movement of fluid containing any contaminant into any formation or aquifer not permitted to receive fluid by this permit. The permittee shall have the burden of showing the requirements of this paragraph are met.

2. If any water quality monitoring of an aquifer indicates the movement of any contaminant into any formation or aquifer not permitted to receive fluids by this permit or into any uncontaminated part of the formation permitted to receive fluid by this permit, the permittee shall take such action as required by KDHE, including taking the well out of service, closure of the well or plugging and abandonment of the well.

S. **Change in Injection Stream:** Any facility changes or process modifications which may result in new, different or altered injection streams or an increase in injection volumes shall be reported to KDHE at least one hundred eighty (180) days prior to such changes at which point KDHE will consider approving a variance to the permitted injection volumes.

T. **Penalties:** Failure to comply with the terms of this Permit may subject the Permittee to an administrative and/or civil penalty, a criminal penalty and/or an action to suspend, revoke, or
terminate this Permit. Failure to minimize or mitigate any adverse impact on the environment resulting from noncompliance may serve to increase the severity of such penalties.

U. **Permit Actions:** The filing of a request by the permittee for a permit modification, a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

V. **Other Conditions:**

1. The permit holder shall maintain a copy of the permit and its modifications or revisions in the facility records. A copy of the permit shall also be located at the facility and accessible to those who operate the injection well.
# Water Injection Well #3 Wellbore Schematic

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>O.D.</th>
<th>I.D.</th>
<th>LENGTH</th>
<th>DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HANGER: 3 1/2&quot; EUE box X 3 1/2&quot; EUE box</td>
<td>2,995</td>
<td>0,64</td>
<td>11.40</td>
<td>11.40</td>
</tr>
<tr>
<td>2</td>
<td>X-over 3 1/2&quot; Rd pln X 2 7/8&quot; Rd pln (Coated)</td>
<td>3,600</td>
<td>2,650</td>
<td>12.61</td>
<td>12.61</td>
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<tr>
<td></td>
<td>Packer slack off -2.00</td>
<td></td>
<td></td>
<td>-2.00</td>
<td>10.51</td>
</tr>
<tr>
<td>3</td>
<td>Conductor Casing 13 3/8&quot; 48#</td>
<td>13,375</td>
<td>12,715</td>
<td>212.00</td>
<td>212.00</td>
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<tr>
<td>4</td>
<td>Surface Casing 9 5/8&quot; 36#</td>
<td>9,625</td>
<td>8,921</td>
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<td>184.00</td>
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<tr>
<td>5</td>
<td>Production Casing 7&quot; 23# J-55</td>
<td>7,000</td>
<td>6,386</td>
<td>4286.00</td>
<td>4286.00</td>
</tr>
</tbody>
</table>

Note: Gravely fed salt water injection well.
KDHE Permit: KS-05-145-003
Maximum Daily Permit: 168,600 gpd/day
Last Annular MIT: 3/9/2021
Last External MIT: 3/10/2021

**DV Tool @ 2707′**

**NAD 83**

**10.51**

**3 SUB: 2 7/8″ 3rd J55 EUE 6.5# (Lined)**

2.875 | 1.860 | 10.20 | 20.71

**4 Tubing: 2 7/8″ J55 3rd 6.5# Seal tite (129 Jts) (NEW)**

2.875 | 1.860 | 4173.19 | 4193.90

Tubing and suba tested to 2000 psig on 6/10/21

**TOP OF PACKER (Nickel Coated)**

5.860 | 2.359 | 3.50 | 4197.40

**BOTTOM OF PACKER**

Packer is 2 7/8″ Rd box X 2 7/8″ pln
Packer is lined with seal tite internally

5.860 | 2.359 | 3.50 | 4197.40

**6 Sub: 2 7/8″ EUE J55 6.5# (Unlined)**

2.875 | 2.441 | 8.00 | 2408.60

Set 7″ RBP at a depth of 4195′ to clean 7″ well bore up of BS. Pumped ACPC2078A, solvent with surfactant-EMBER10209A, emulsion breaker, PARA20209A, water miscible solvent, PARA11237, water dispersible solvent with EB dispersant and surfactant, on 6/28/21

**Squeeze perforations @ 4262′ to 4265′**

**The MFL log was run on 3/4/2021 from surface to a depth of 4260′ and repass from 4260′ to surface**

**MIT was conducted on 7″ casing on 6/29/21-MIT Passed**

**6 1/4″ OPEN HOLE FROM 4289′-4298′**

**4297.00**

**Total depth**

4297.00
Cunningham Gas Storage Field
Class V Injection Well and Facility Map

Attachment III
Containment Plan Observation Wells With Facilities

Injection Well Pad With ¼ Mile Radius
1/4 Mile – 1320 Feet
Radius Around Well

Well Location

200 ft x 200 ft Permanent Water Injection Well Pad
(Red Square)

Existing Wells Converted To Observation Wells
Geesling 1

Northern Drilled Observation Wells
NNG 1-31

Water Injection Pipeline

NORTHERN NATURAL GAS COMPANY

CONTOUR INTERVAL: 10 FEET
Elevation is Mean Sea Level

Prepared by TW Cook & Associates, Tulsa, OK