



DRAFT PERMIT

**STATE OF ARIZONA
AQUIFER PROTECTION PERMIT NO. P-511308
PLACE ID 144301, LTF 57695**

1.0 AUTHORIZATION

AUTHORIZATION TO CLOSE A DISCHARGING FACILITY IN A MANNER SUCH THAT CURRENT AND REASONABLY FORESEEABLE FUTURE USES OF THE AQUIFER ARE PROTECTED.

In compliance with the provisions of Arizona Revised Statutes (A.R.S.) Title 49, Chapter 2, Articles 1, 2, and 3, Arizona Administrative Code (A.A.C.) Title 18, Chapter 9, Articles 1 and 2, A.A.C. Title 18, Chapter 11, Article 4 and amendments thereto, and the conditions set forth in this permit, Kinder Morgan CO₂ Company, L.P. is hereby authorized to close the St. Johns Gas Unit, encompassing approximately 260 square miles southeast of the City of St. Johns, in Apache County. The Unit is located over groundwater of the Little Colorado River Plateau Basin, in Townships 9, 10, 11, and 12 North, Range 29, 30, and 31 East, Sections 3, 6, 21, 22, 23, 24, and 30, Gila and Salt River Base Line and Meridian.

This permit becomes effective on the date of the Water Quality Division Director’s signature and shall be valid for closure of the facility, unless suspended or revoked pursuant to A.A.C. R18-9-A213. The permittee has closed the facility:

1. Following all the conditions of this permit, including the design and operational information documented or referenced below, and
2. Such that Aquifer Water Quality Standards (AWQS) are not violated at the applicable point(s) of compliance (POC) set forth below, or if an AWQS for a pollutant has been exceeded in an aquifer at the time of permit issuance that no additional degradation of the aquifer relative to that pollutant, and as determined at the applicable POC occurs as a result of the discharge from the facility.

1.1 PERMITTEE INFORMATION

Facility Name: St. Johns Gas Unit (Stimulated Carbon Dioxide Wells)
Facility Address: 830 East Main Street, Suite 220
 Springerville, Arizona, 85938
County: Apache County

Permittee: Kinder Morgan CO₂ Company, L.P.
Permittee Address: 1001 Louisiana, Suite 1000
 Houston, Texas 77002

Facility Contact: Ken Havens, Jr. – Vice President Engineering/Operations CO₂
Emergency Phone No.: (713) 369-9113

Latitude/Longitude: See well table in Section 2.1
Legal Description: See well table Section 2.1

1.2 AUTHORIZING SIGNATURE

Trevor Baggio, Director
 Water Quality Division
 Arizona Department of Environmental Quality

Signed this _____ day of _____, 2016

2.0 SPECIFIC CONDITIONS [A.R.S. §§ 49-203(4), 49-241(A)]

2.1 Facility / Site Description [A.R.S. § 49-243(K)(8)]

The St. Johns Field was originally discovered in 1994 by the Ridgeway Petroleum Corporation following the identification of carbon dioxide (CO₂) while drilling the Plateau Land and Cattle #1 well. The Ridgeway Petroleum Corp drilled approximately 52 wells following the discovery of the CO₂ field and conducted stimulation operations on seven (7) of these wells (09-21-31, 10-22-30, 11-18-30, 11-21-30, 11-23-30, 11-24-29x, and 12-22-29x). The St. Johns Unit was established by the Ridgeway Arizona Oil Corporation in 2009. The St. Johns Unit encompasses approximately 260 square miles or 170,323 acres of mostly State land. Some of the land is privately held, with the largest private land owned by Tucson Electric Power (TEP) Generating Station. Kinder Morgan obtained oil and gas leases for the majority of the State and private areas within the Unit, as well as a sublease on the Prize leasehold. The entire CO₂ field extends into New Mexico; however, this application focuses only on the project area within Arizona.

January of 2012, Kinder Morgan acquired the St. Johns Unit from the Ridgeway Arizona Oil Corporation. Since acquiring the St. Johns Unit, Kinder Morgan installed one (1) CO₂ well (11-03-30) and stimulated a total of four (4) wells (11-03-29x, 11-06-30, 11-03-30, and 11-23-30), including one (1) well previously stimulated by the Ridgeway Petroleum Corporation (11-23-30). This brings the total number of previously stimulated wells covered by this permit to ten (10).

Kinder Morgan submitted an Individual APP application on October 28, 2014 to clean close the ten previously stimulated CO₂ wells and permit a lined impoundment and two brine disposal wells. Kinder Morgan withdrew the operational portion of the application (two brine disposal wells and a lined impoundment). This APP shall be for the clean closure of the ten previously stimulated CO₂ wells.

The site includes the following closed facilities:

| Stimulated Well | Township/Range/Section (T/R/Section #) | Latitude | Longitude |
|-------------------|---|----------------------|----------------------|
| 11-03-29x | T11N/R29E/3 | 34° 22' 43" North | 109° 15' 6" West |
| 11-06-30 | T11N/R30E/6 | 34° 22' 45.20" North | 109° 12' 32.17" West |
| 11-03-30 | T11N/R30E/3 | 34° 22' 45.35" North | 109° 9' 6.49" West |
| 11-23-30 | T11N/R30E/23 | 34° 20' 27" North | 109° 8' 3" West |
| 09-21-31 | T9N/R31E/21 | 34° 9' 50" North | 109° 4' 2" West |
| 22-1x (12-22-29x) | T12N/R29E/22 | 34° 25' 53.76" North | 109° 15' 58" West |
| 10-22-30 | T10N/R30E/22 | 34° 14' 36" North | 109° 9' 42" West |
| 11-21-30 | T11N/R30E/21 | 34° 20' 6" North | 109° 10' 30" West |
| 11-24-29x | T11N/R29E/24 | 34° 20' 20" North | 109° 13' 19" West |
| 11-18-30 | T11N/R30E/30 | 34° 20' 54" North | 109° 12' 38" West |

Annual Registration Fee [A.R.S. § 49-242 and A.A.C. R18-14-104]

No Annual Registration Fee is required for this permit. There is no design flow. All post closure requirements have been met. This facility is closed.

Financial Capability [A.R.S. § 49-243(N) and A.A.C. R18-9-A203]

No financial capability is required. All post closure requirements have been met. This facility is closed.

2.2 Best Available Demonstrated Control Technology (BADCT) [A.R.S. § 49-243(B) and A.A.C. R18-9-A202(A)(5)]

2.2.1 Closure Design

Kinder Morgan abandoned the ten previously stimulated CO₂ wells from May 20 to June 18, 2015 per the Arizona Oil and Gas Commission (AOGC) protocols. In general, each of the previously stimulated wells was abandoned by first setting a Cast Iron Bridge Plug (CIBP) approximately 50 feet above the shallowest perforation interval. A cement plug with a minimum of 50 linear feet was placed on top of the CIBP and once the cement set, a pressure test to 500 pounds per square inch (psi) was conducted for 30 minutes. The top 100 feet of the casing was perforated with deep penetration charges. A surface cement plug was installed in the top 100 feet of the casing where the casing was perforated. Cement was also circulated to the surface through the annulus, with the top of the cement inside the casing at the surface. The casing strings were cut and the wellhead recovered. Lastly a well marker was installed to mark the location of the abandoned well.

Kinder Morgan evaluated geophysical Cement Bond Logs (CBLs) that were conducted on nine of the ten previously stimulated wells and indicated that the CBLs show good cement seals between the casing and formation. Kinder Morgan also used drilling reports for each well and cited how cement was circulated to the surface as additional evidence of good cement bonds. This line of evidence was used to indicate that the one previously stimulated well without a CBL also had a good cement seal between the casing and formation

2.2.2 Site-specific Characteristics

Kinder Morgan used CBLs from the nine previously stimulated wells to determine the minimum thickness of good quality cement bond between the top of the shallowest stimulated zone and the base of the Coconino Aquifer to show that stimulation fluids would not impact the Coconino Aquifer. The following table indicates the evaluated minimum cement bond thickness:

| Stimulated Wells | Minimum Thickness of Good Quality Cement Bond between the Top of the Shallowest Stimulated Zone and the Base of the Coconino Aquifer (feet) |
|-------------------|---|
| 11-03-29x | 562 |
| 11-06-30 | 512 |
| 11-03-30 | 260 |
| 11-23-30 | 676 |
| 09-21-31 | 615 |
| 22-1x (12-22-29x) | 810 |
| 10-22-30 | 1,314 |
| 11-21-30 | 721 |
| 11-18-30 | 196 |

2.3 Point of Compliance [A.R.S. § 49-244]

Ten conceptual POC locations were proposed to be located on the northwestern edge of the PMAs of each previously stimulated well. The locations are as follows:

| POC Well Related to Stimulated Well | Latitude | Longitude |
|-------------------------------------|------------------------|------------------------|
| 11-03-29x | 34° 22' 47.9712" North | 109° 15' 6.2892" West |
| 11-06-30 | 34° 22' 47.9496" North | 109° 12' 32.6196" West |
| 11-03-30 | 34° 22' 45.6404" North | 109° 9' 5.67" West |
| 11-23-30 | 34° 20' 23.4096" North | 109° 8' 7.7604" West |
| 09-21-31 | 34° 9' 44.0496" North | 109° 4' 3.8784" West |
| 22-1x (12-22-29x) | 34° 25' 49.4688" North | 109° 15' 45.2988" West |
| 10-22-30 | 34° 14' 35.5596" North | 109° 9' 44.8488" West |
| 11-21-30 | 34° 20' 11.8716" North | 109° 10' 25.2516" West |
| 11-24-29x | 34° 20' 22.5708" North | 109° 13' 19.0488" West |
| 11-18-30 | 34° 24' 54.4812" North | 109° 12' 38.4696" West |

Monitoring of the POC wells is not required by this permit.

2.5 Monitoring Requirements [A.R.S. § 49-243(B) and (K)(1), A.A.C. R18-9-A206(A)]

Not required by this permit.

2.5.1 Post-closure Groundwater Monitoring

Not required by this permit.

2.5.1.1 POC Well Replacement

Not required by this permit.

2.5.2 Analytical Methodology

Not required by this permit.

2.5.3 Installation and Maintenance of Monitoring Equipment

Not required by this permit.

2.6 Contingency Plan Requirements

[A.R.S. § 49-243(K)(3), (K)(7) and A.A.C. R18-9-A204 and R18-9-A205]

2.6.1 General Contingency Plan Requirements

Not required by this permit.

2.6.2 Exceeding of Alert Levels

Not required by this permit.

2.6.3 Aquifer Quality Limit Violation

Not required by this permit.

2.6.4 Emergency Response and Contingency Requirements for Unauthorized Discharges pursuant to A.R.S. §49-201(12) and pursuant to A.R.S. § 49-241

2.6.4.1 Duty to Respond

Not required by this permit.

2.6.4.2 Emergency Response

Not required by this permit.

2.6.5 Corrective Actions

Not required by this permit.

2.7 Reporting and Recordkeeping Requirements [A.R.S. § 49-243(K)(2) and A.A.C. R18-9-A206(B) and R18-9-A207]

2.7.1 Self-monitoring Report Form

Not required by this permit.

2.7.2 Operation Inspection / Log Book Recordkeeping

Not required by this permit.

2.7.3 Permit Violation and Alert Level Status Reporting

Not required by this permit.

2.7.4 Operational, Other or Miscellaneous Reporting

2.7.4.1 Closure Report Submittal

Not required by this permit.

2.7.4.2 Post-closure Monitoring Report Submittal

Not required by this permit.

2.7.4.2 Closure Activity Status Reporting

Not required by this permit.

2.7.5 Reporting Location

Not required by this permit.

2.7.6 Reporting Deadline

Not required by this permit.

2.7.7 Changes to Facility Information in Section 1.0
Not required by this permit.

2.8 Temporary Cessation [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A209(A)]
Not required by this permit.

2.9 Closure [A.R.S. §§ 49-243(K)(6), 49-252 and A.A.C. R18-9-A209(B)]
Not required by this permit.

2.10 Post-closure [A.R.S. §§ 49-243(K)(6), 49-252 and A.A.C. R18-9-A209(C)]
Not required by this permit.

3.0 COMPLIANCE SCHEDULE [A.R.S. § 49-243(K)(5) and A.A.C. R18-9-A208]
Not required by this permit.

4.0 TABLES OF MONITORING REQUIREMENTS
Not required by this permit.

5.0 REFERENCES AND PERTINENT INFORMATION

The terms and conditions set forth in this permit have been developed based upon the information contained in the following, which are on file with the Department:

1. APP Application dated October 24, 2014
2. Public Notice dated June 24, 2016
3. Responsiveness Summary dated

6.0 NOTIFICATION PROVISIONS

6.1 Annual Registration Fees [A.R.S. § 49-242(D)]

Not applicable

6.2 Duty to Comply [A.R.S. §§ 49-221 through 49-263]

The permittee is notified of the obligation to comply with all conditions of this permit and all applicable provisions of Title 49, Chapter 2, Articles 1, 2 and 3 of the Arizona Revised Statutes, Title 18, Chapter 9, Articles 1 through 4, and Title 18, Chapter 11, Article 4 of the Arizona Administrative Code. Any permit non-compliance constitutes a violation and is grounds for an enforcement action pursuant to Title 49, Chapter 2, Article 4 or permit amendment, suspension, or revocation.

6.3 Duty to Provide Information [A.R.S. §§ 49-243(K)(2) and 49-243(K)(8)]

The permittee shall furnish to the Director, or an authorized representative, within a time specified, any information which the Director may request to determine whether cause exists for amending or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

6.4 Compliance with Aquifer Water Quality Standards [A.R.S. §§ 49-243(B)(2) and 49-243(B)(3)]

The permittee shall not cause or contribute to a violation of an aquifer water quality standard at the applicable point of compliance for the facility. Where, at the time of issuance of the permit, an aquifer already exceeds an aquifer water quality standard for a pollutant, the permittee shall not discharge that pollutant so as to further degrade, at the applicable point of compliance for the facility, the water quality of any aquifer for that pollutant.

6.5 Technical and Financial Capability

[A.R.S. §§49-243(K)(8) and 49-243(N) and A.A.C. R18-9-A202(B) and R18-9-A203(E)(F)]

The permittee shall have and maintain the technical and financial capability necessary to fully carry out the terms and conditions of this permit. Any bond, insurance policy, trust fund, or other financial assurance mechanism provided as a demonstration of financial capability in the permit application, pursuant to A.A.C. R18-9-A203(D), shall be in effect prior to any discharge authorized by this permit and shall remain in effect for the duration of the permit.

6.6 Reporting of Bankruptcy or Environmental Enforcement [A.A.C. R18-9-A207(C)]

The permittee shall notify the Director within five days after the occurrence of any one of the following:

1. The filing of bankruptcy by the permittee.
2. The entry of any order or judgment not issued by the Director against the permittee for the enforcement of any environmental protection statute or rule.

6.7 Monitoring and Records [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A206]

The permittee shall conduct any monitoring activity necessary to assure compliance with this permit, with the applicable water quality standards established pursuant to A.R.S. §§ 49-221 and 49-223 and §§ 49-241 through 49-252.

6.8 Inspection and Entry [A.R.S. §§ 41-1009, 49-203(B) and 49-243(K)(8)]

In accordance with A.R.S. §§ 41-1009 and 49-203(B), the permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to enter and inspect the facility as reasonably necessary to ensure compliance with Title 49, Chapter 2, Article 3 of the Arizona Revised Statutes, and Title 18, Chapter 9, Articles 1 through 4 of the Arizona Administrative Code and the terms and conditions of this permit.

6.9 Duty to Modify [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A211]

The permittee shall apply for and receive a written amendment before deviating from any of the designs or operational practices specified by this permit.

6.10 Permit Action: Amendment, Transfer, Suspension & Revocation

[A.R.S. §§ 49-201, 49-241 through 251, A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213]

This permit may be amended, transferred, renewed, or revoked for cause, under the rules of the Department.

The permittee shall notify the Water Permits Section in writing within 15 days after any change in the owner or operator of the facility. The notification shall state the permit number, the name of the facility, the date of property transfer, and the name,

address, and phone number where the new owner or operator can be reached. The operator shall advise the new owner or operators of the terms of this permit and the need for permit transfer in accordance with the rules

7.0 ADDITIONAL PERMIT CONDITIONS

7.1 Other Information [A.R.S. § 49-243(K)(8)]

Where 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 the Director, the permittee shall promptly submit the correct facts or information.

7.2 Severability

[A.R.S. §§ 49-201, 49-241 through 251, A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213]

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby. The filing of a request by the permittee for a permit action does not stay or suspend the effectiveness of any existing permit condition.

7.3 Permit Transfer

This permit may not be transferred to any other person except after notice to and approval of the transfer by the Department. No transfer shall be approved until the applicant complies with all transfer requirements as specified in A.A.C. R18-9-A212(B) and (C).