



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8**

1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
<http://www.epa.gov/region08>

UNDERGROUND INJECTION CONTROL (UIC)

FINAL PERMIT

Date Prepared: June 2012

**CLASS I
NON-HAZARDOUS INDUSTRIAL WASTE DISPOSAL WELL**

Permit No. CO12182-08833

DWD-1

County & State: Dolores County, Colorado

Issued To:

**KINDER MORGAN CO₂ COMPANY LP
17801 Hwy 491
Cortez, CO 81321**

TABLE OF CONTENTS

TITLE SHEET	1
PART I. AUTHORIZATION TO INJECT	4
PART II. SPECIFIC PERMIT CONDITIONS	6
A. WELL CONSTRUCTION REQUIREMENTS	6
1. Casing and Cementing.	6
2. Tubing and Packer Specifications.	6
3. Sampling and Monitoring Devices.	6
4. Well Logging and Testing.	7
5. Postponement of Construction or Conversion.	7
6. Proposed Changes and Workovers.	7
B. CORRECTIVE ACTION	8
C. MECHANICAL INTEGRITY	8
1. Types of Mechanical Integrity.	8
2. Demonstration of MI.	8
3. Mechanical Integrity Test Methods and Criteria.	9
4. Notification Prior to Testing.	9
5. Loss of Mechanical Integrity.	9
D. WELL OPERATION	10
1. Requirements Prior to Commencing Injection.	10
2. Injection Interval.	10
3. Injection Pressure Limitation.	10
4. Injection Volume-Rate Limitation.	11
5. Injection Fluid Limitation.	11
6. Tubing-Casing Annulus (TCA).	12
E. MONITORING, RECORDKEEPING, AND REPORTING OF RESULTS	12
1. Injection Well Monitoring Program.	12
2. Monitoring Information.	13
3. Recordkeeping.	13
4. Reporting of Results.	14
F. PLUGGING AND ABANDONMENT	14
1. Notice of Plugging and Abandonment (P&A).	14
2. Plugging and Abandonment Plan.	14

3.	Cessation of Injection Activity.	14
4.	Plugging and Abandonment Report.	15
G.	FINANCIAL RESPONSIBILITY	15
1.	Financial Responsibility.	15
2.	Insolvency of Financial Institution.	15
PART III.	GENERAL PERMIT CONDITIONS	17
A.	EFFECT OF PERMIT	17
B.	PERMIT ACTIONS	17
1.	Modification, Reissuance, or Termination.	17
2.	Transfers.	17
3.	Transition From Expiring Permit to Permit Reauthorization.	17
4.	Waiver of Permit Requirements.	18
5.	Conversions	18
6.	Permittee Change of Address	18
C.	SEVERABILITY	19
D.	CONFIDENTIALITY	19
E.	GENERAL DUTIES AND REQUIREMENTS	19
1.	Duty to Comply.	19
2.	Penalties for Violations of Permit Conditions.	19
3.	Continuation of Expiring Permits.	19
4.	Need to Halt or Reduce Activity not a Defense.	20
5.	Duty to Mitigate.	21
6.	Proper Operation and Maintenance.	21
7.	Duty to Provide Information.	21
8.	Inspection and Entry.	21
9.	Records of the Permit /Issuance Application.	22
10.	Signatory Requirements.	22
11.	Reporting of Noncompliance.	22
APPENDIX A	CONSTRUCTION PROCEDURE	24
APPENDIX B	MONITORING AND REPORTING	27
APPENDIX C	PLUGGING & ABANDONMENT PLAN	28
APPENDIX D	LOGGING & TESTING REQUIREMENTS	30
APPENDIX E	OPERATING REQUIREMENTS	33
APPENDIX F	CORRECTIVE ACTION	34
APPENDIX G	ANALYTICAL PARAMETERS	35

PART I. AUTHORIZATION TO INJECT

Pursuant to the Underground Injection Control (UIC) Regulations of the U.S. Environmental Protection Agency codified at Title 40 of the Code of Federal Regulations, Parts 124, 144, 146, and 147

Kinder Morgan CO₂ Company, LP
17801 Hwy 491
Cortez, CO 81321

hereby referred to as the “Permittee”, is authorized to operate a Class I injection well, **DWD-1** located in the NE ¼ NE ¼ at 240 feet (ft) from the north line and 240 ft from the east line of Section 19, Township 40 North, Range 17 West, Dolores County, Colorado. Injection shall be for the purpose of industrial waste fluid disposal into the gross intervals of the Leadville – Ouray Formation, 8,090 ft – 8,371 ft; Undifferentiated Devonian, 8,371 ft – 8,681 ft; and Undifferentiated Cambrian, 8,681 ft to 9,180 ft, in accordance with conditions set forth herein.

The Environmental Protection Agency (EPA) Underground Injection Control (UIC) program regulates the injection of fluids into injection wells so that injection does not endanger underground sources of drinking water (USDWs). EPA UIC Permit conditions are based on authorities set forth at 40 CFR Parts 144 and 146, and address potential impacts to USDWs.

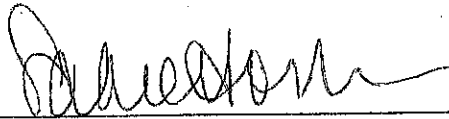
Under 40 CFR Part 144, Subpart D, certain conditions apply to all UIC Permits and may be incorporated either expressly or by reference. General permit conditions for which the content is mandatory and not subject to site specific differences are not discussed in this document. Issuance of this Permit does not convey any property rights of any sort or any exclusive privilege, nor does it authorize injury to persons or property or invasion of other private rights, or any infringement of other Federal, State, or local laws or regulations (40 CFR 144.35).

All conditions set forth herein refer to Title 40 Parts 124, 144, 146, and 147 of the Code of Federal Regulations and are regulations that are in effect on the date that this permit becomes effective.

This permit is issued for **ten (10) years**, unless terminated. It is the Permittee's responsibility to read and understand all provisions of this permit. The permit will **expire at midnight ten (10) years after the effective date of this permit**, or upon delegation of primary enforcement responsibility for the UIC 1422 Program to the State of Colorado, unless that State has adequate authority and chooses to adopt and enforce this permit as a State permit.

Issue Date: JUN 22 2012

Effective Date: JUN 22 2012



Callie A. Videtich
Acting Assistant Regional Administrator
Office of Partnerships and Regulatory Assistance

PART II. SPECIFIC PERMIT CONDITIONS

A. WELL CONSTRUCTION REQUIREMENTS

1. Casing and Cementing.

The well shall be cased and cemented to prevent the movement of fluids into or between underground sources of drinking water. The well casing and cement shall be designed for the life expectancy of the well and of the grade and size shown in APPENDIX A. The well construction shall be maintained throughout the operating life of the well. Remedial cementing may be required if shown to be inadequate by cement bond log or other attempted demonstration of Part II (External) mechanical integrity. The construction procedure submitted with the application is hereby incorporated into this permit as APPENDIX A, and shall be binding on the Permittee. APPENDIX A includes a discussion of allowable alteration to the final construction of the well due to unknown field geology and circumstances.

2. Tubing and Packer Specifications.

Injection tubing is required, and shall be run and set with a packer at or below the depth indicated in APPENDIX A. The packer setting depth may be changed provided it remains below the depth indicated in APPENDIX A and the permittee provides notice and obtains the Director's approval for the change. The applicant submitted details on the tubing and packer in the application; these are incorporated into the permit as APPENDIX A, and shall be binding on the Permittee.

Injection between the outermost casing protecting an underground source of drinking water (e.g. surface casing, production casing, and liner) and the wellbore is prohibited. Injection directly through the casing (i.e. without tubing) is also prohibited.

3. Sampling and Monitoring Devices.

The Permittee shall install and maintain in good operating condition:

- a) a "tap" at a conveniently accessible location on the injection flow line between the pump house or storage tanks and the injection well, isolated by shut-off valves, for collection of representative samples of the injected fluid; and
- b) one-half (1/2) inch female iron pipe fitting, isolated by shut-off valves and located at the wellhead at a conveniently accessible location, for the attachment of a pressure gauge capable of monitoring pressures ranging from normal operating pressures up to the Maximum Allowable Injection Pressure (MAIP) specified in APPENDIX E:
 - (i) on the injection tubing; and

- (ii) on the tubing-casing annulus (TCA); and
 - c) a pressure actuated shut-off device attached to the injection flow line set to shut-off the injection pump when or before the Maximum Allowable Injection Pressure specified in APPENDIX E is reached at the wellhead;
 - d) a non-resettable cumulative volume recorder attached to the injection line; and
 - e) a continuous recording device(s) to monitor injection pressure, flow rate, volume, and the pressure on the annulus between the tubing and the long string of casing.
- 4. Well Logging and Testing.

Well logging and testing requirements are found in APPENDIX D. The Permittee shall ensure the log and test requirements are performed within the time frames specified in APPENDIX D. Well logs and tests shall be performed according to current EPA-approved procedures. Well log and test results shall be submitted to the Director **within sixty (60) days** of completion of the logging or testing activity, and shall include a report describing the methods used during logging or testing and an interpretation of the test or log results.

At a minimum well logs shall include a description of deviation checks performed on all holes constructed by first drilling a pilot hole, and then enlarging the pilot hole by reaming or another method. Such checks shall be at sufficiently frequent intervals to assure that vertical avenues for fluid migration in the form of diverging holes are not created during drilling. Deviation checks are not required for existing wells which are being altered, recompleted, and/or converted.
- 5. Postponement of Construction or Conversion.

The Permittee shall complete (or recomplete) well construction within one year of the Effective Date of the Permit. Authorization to construct and operate shall expire if the well has not been constructed **within one (1) year** of the Effective Date of the Permit or Authorization and the Permit may be terminated under 40 CFR Section 144.40, unless the Permittee has notified the Director and requested an extension prior to expiration. Notification shall be in writing, and shall state the reasons for the delay and provide an estimated completion date. Once Authorization has expired under this part, the complete permit process including opportunity for public comment may be required before Authorization to construct and operate may be reissued.
- 6. Proposed Changes and Workovers.

Workovers and alterations shall meet all conditions of the Permit. Prior to beginning any addition or physical alteration to an injection well that may significantly affect

the tubing, packer or casing, the Permittee shall give advance notice to the Director and obtain the Director's approval. The Permittee shall record all changes to well construction on a Well Rework Record (EPA Form 7520-12), and shall provide this and any other record of well work over, logging, or test data to EPA **within sixty (60) days** of completion of the activity.

B. CORRECTIVE ACTION

No permitted water wells were identified in the Area of Review. In addition, no surface bodies of water are located within the one quarter mile radius of the proposed injection well.

Therefore, the operator is not required to take any corrective action for this permit as specified in Appendix F.

C. MECHANICAL INTEGRITY

1. Types of Mechanical Integrity.

The Permittee is required to ensure that each injection well maintains mechanical integrity at all times. Pursuant to 40 CFR Section 146.8, an injection well has mechanical integrity if it has:

Internal (or Part I) Mechanical Integrity (MI):

There is no significant leak in the casing, tubing, or packer. Internal MI generally is demonstrated by pressure testing the well's annulus to identify leaks; and

External (or Part II) MI:

There is no significant fluid movement into an underground source of drinking water (USDW) through vertical channels adjacent to the injection well bore. External MI involves evaluating the integrity of the cement behind the casing to find fluid channels or leaks, which is done using a noise log or temperature logs.

Other UIC regulations which may apply include: 40 CFR Section 146.13.

2. Demonstration of MI.

The operator shall demonstrate Internal and External MI initially and periodically thereafter, as described in APPENDIX D. The operator shall demonstrate Internal MI after any workover which affects the tubing, packer, or casing. The Director may stipulate specific test methods and criteria best suited for the specific well construction and injection operation. Well-specific conditions present at this well site that dictate the specific method(s) and frequency required for demonstrating MI, are discussed in the

Statement of Basis. The method(s) and frequency required, designed to demonstrate both Internal (Part I) and External (Part II) MI, are listed in APPENDIX D of this Permit.

The Director, by written notice, may require the Permittee to comply with a schedule describing when MI demonstrations shall be made. The Director may require additional or alternative tests if the results presented by the operator are not satisfactory to the Director.

3. Mechanical Integrity Test Methods and Criteria.

EPA-approved methods shall be used to demonstrate MI. The following EPA Region 8 guidance and guidelines may be accessed online at http://www.epa.gov/region8/water/uic/deep_injection.html, or will be provided to you upon request.

- ☐ “Pressure Testing Injection Wells for Part I (Internal) Mechanical Integrity”, *Ground Water Section Guidance No. 39*
- ☐ “Cement Bond Logging Techniques and Interpretation” *Groundwater Section Guidance No. 34*
- ☐ “Temperature Logging for Mechanical Integrity,” January 12, 1999
- ☐ “Radioactive Tracer Surveys for Evaluating Fluid Channeling Behind Casing near Injection Perforations,” September 8, 2009

4. Notification Prior to Testing.

The Permittee shall notify the Director **at least thirty (30) days** prior to any scheduled MI test. The Director may allow a shorter notification period if it would be sufficient to enable EPA to witness the test. Notification may be in the form of a yearly or quarterly scheduled mechanical integrity test(s), or it may be on an individual basis.

5. Loss of Mechanical Integrity.

If the well fails to demonstrate MI during a test, or a loss of MI becomes evident during operation (such as presence of pressure in the tubing-casing annulus (TCA), water flowing at the surface, etc), the Permittee shall notify the Director **within twenty-four (24) hours** (see Part III, Section E.11.(c) of this permit) and the well shall be shut-in **within forty-eight (48) hours** unless the Director requires immediate shut-in.

Within five (5) days of a loss of MI, the Permittee shall submit a follow-up written report that documents test results, repairs undertaken or a proposed remedial action plan. Injection operations shall not be resumed until after the well has successfully been repaired and demonstrated MI, and the Director has provided written approval to resume injection.

D. WELL OPERATION

1. Requirements Prior to Commencing Injection.

Well injection may commence only after all well construction or well recompletion and pre-injection requirements herein have been met and approved. The Permittee may not receive a final authorization to commence injection until

- a) construction is complete, a successful Part I (Internal) and Part II (External) Mechanical Integrity Test (MIT), pore pressure measurement of the proposed injection zone, a completed Well Work Record Form 7520-12 and schematic, and applicable logging test data, identified in Appendix D, is received;

and

- b) The Director has inspected or otherwise reviewed the new injection well and finds it is in compliance with the conditions of the Permit; or
- c) The Permittee has not received notice from the Director of his or her intent to inspect or otherwise review the new injection well **within thirteen (13) days** of the date of the Director's receipt of the documentation specified in Part II, Section D.1.a, in which case prior inspection or review is waived and the Permittee may commence injection.

2. Injection Interval.

Injection is permitted only within the approved injection interval listed in APPENDIX E. Additional individual injection perforations may be added provided that they remain within the approved injection interval and the Permittee provides notice to the Director in accordance with Part II, Section A.6.

3. Injection Pressure Limitation.

- a) The permitted Maximum Allowable Injection Pressure (MAIP), measured at the wellhead, is found in APPENDIX E. Injection pressure shall not exceed the amount the Director determines is appropriate to ensure that injection does not initiate new fractures or propagate existing fractures in the injection zone. In no case shall injection pressure cause the movement of injected or formation fluids into a USDW.
- b) The pressure limit in paragraph (a) may be increased by the Director if the fracture pressure of the injection formation will not be exceeded, and the Permittee demonstrates that the proposed increase in surface pressure is necessary: (1) to overcome friction losses in the injection system, or (2) to inject the volume rate of fluid set by Part II, Section D.4., below. Either demonstration shall be made by performing a step rate test, using fluid normally injected, to determine both the

instantaneous shut-in pressure (ISIP) and the formation breakdown pressure. The Director will determine any allowable increase based on the test results and other parameters reflecting actual injection operations.

- c) The Permittee shall give **thirty (30) days** advanced notice to the Director if an increase of injection pressure will be sought. Details of the proposed tests shall be submitted **at least seven (7) days** prior to the tests. Results of all tests shall be submitted to the Director **within ten (10) days** of the test. Injection at the increased pressure shall be approved by the Director, in writing, before the Permittee may begin continuous operations at the pressure.
- d) Any approval by the Director for the increased pressure limitations as stated in paragraph (b) shall be made a part of this permit by minor modification without further opportunity for public comment.

4. Injection Volume-Rate Limitation.

Injection volume is limited to the volume specified in APPENDIX E.

5. Injection Fluid Limitation.

The Permittee is authorized to inject field and gas plant waste streams and other associated waste streams generated at the Permittee's McElmo Dome and Doe Canyon facilities. These waste streams shall be nonhazardous prior to injection. This means that they shall not exhibit any hazardous characteristics of ignitability, corrosivity, reactivity, and/or toxicity. The present list of waste stream items is limited to:

- a) spent sulfamic acid (2-8%) neutralized to a pH of 5 to 9 with soda ash or baking soda. This solution will also include a surfactant, a corrosion inhibitor and ammonium bifluoride;
- b) acetic acid;
- c) diethanolamine (DEA);
- d) coolant drain-off (50% water, 50% diethylene glycol);
- e) associated treatment chemicals, (e.g., antifreeze, corrosion inhibitor, and bacteria inhibitor);
- f) potassium permanganate in potable water;
- g) diethylene glycol;
- h) produced/processed fluids; and

- i) any non-hazardous fluids associated with field and plant development, operation and maintenance:

The above waste stream items generated at McElmo Dome and Doe Canyon are approved for injection. Prior to the injection of any additional waste streams, the Permittee shall notify the EPA and receive approval from the Director. The Permittee shall demonstrate that the character of the waste stream is not being significantly modified. At a minimum, this shall include the permittee measuring the parameters pH, total dissolved solids, and specific gravity.

6. Tubing-Casing Annulus (TCA).

The tubing-casing annulus (TCA) shall be filled with water treated with corrosion inhibitor and oxygen scavenger, or other fluid approved by the Director. The permittee shall attempt to maintain zero (0) to twenty-five (25) pounds per square inch gauge (psig) pressure on the TCA.

If TCA pressure exceeds twenty-five (25) psi, the Permittee shall follow the procedures in *Ground Water Section Guidance No. 35* "Procedures to follow when excessive annular pressure is observed on a well."

E. MONITORING, RECORDKEEPING, AND REPORTING OF RESULTS

1. Injection Well Monitoring Program.

The Permittee submitted with the application a monitoring program, parts of which are incorporated into this permit as specified below. Monitoring shall consist of:

- a) analysis of the injection fluids, performed:

- (i) **quarterly** for: pH, Total Dissolved Solids (TDS), and specific gravity;

- (ii) The permittee shall submit a comprehensive water analysis and brief summary to the Director **within thirty (30) days** of observing any significant change(s) in the parameters measured under Part II, Section E.1.(a).(i) of this permit: pH, TDS, and specific gravity. The permittee shall identify the potential of any observed significant change(s) to cause fractures and/or of the potential of the injected fluid to exhibit a hazardous characteristic in the brief summary. A significant change observed for the parameters measured for the injection fluid are:

- ☐ pH - Analysis of the fluid's pH value shows it to be less than 2 and/or greater than 12.5;
 - ☐ TDS - Measured TDS values are 10% greater than the parameter's baseline value; and/or

- Specific Gravity - Specific gravity data is 10% greater than the parameter's baseline value.

The applicant shall use the baseline data previously established for the Woods No. 3 (MWD-1) well or a new baseline obtained for the DWD-1 well. Samples and measurements shall be representative of the monitored activity. The Permittee shall utilize the applicable analytical methods described in Table I of 40 CFR Section 136.3, or in Appendix III of 40 CFR Part 261, or in certain circumstances, other methods that have been approved by the EPA Administrator.

- b) **weekly** observations and recordings of the injection pressure flow rate and volume. The monthly average, maximum, and minimum injection pressure, flow rate, and volume values shall be reported **quarterly** to the Denver EPA office, as per Part II, Section E.4.; and
 - c) **weekly** observations and recordings of the annulus pressure and annulus fluid level. The monthly average, maximum, and minimum annulus pressure values, as well as the annulus fluid level, shall be reported **quarterly** to the Denver EPA office, as per Part II, Section E.4.
2. Monitoring Information.
Records of any monitored activity required under this permit shall include:
- a) the date, exact place, and time of sampling or field measurements;
 - b) the name of the individual(s) who performed the sampling or measurements;
 - c) the date(s) laboratory analyses were performed;
 - d) the name of the individual(s) who performed the analysis;
 - e) the analytical techniques or methods used by laboratory personnel; and
 - f) the results of such analyses.
3. Recordkeeping.
The Permittee shall retain records concerning: all monitoring information and copies of all reports required by this permit for a period of **at least three (3) years** from the date of the sample, measurement, or report, during the operating life of the well. Monitoring data will be kept in the local office of the Permittee. This period may be extended anytime prior to its expiration by request of the Director.

4. Reporting of Results.

The Permittee shall submit **Quarterly** Reports to the Director summarizing the results of the monitoring information required by Part II, Section E.1. of this permit. The Permittee shall also submit results of any mechanical integrity tests (MIT), any well workovers, logging, or testing that reveal conditions of the well or injection zone. These reports are due **within sixty (60) days** of the completion activity or at the time of the next quarterly report, whichever is sooner.

The first Quarterly Report shall cover the period from the effective date of the permit through the end of the quarter period. Subsequent **Quarterly** Reports shall cover the periods of: January 1 through March 31, April 1 through June 30, July 1 through September 30, and October 1 through December 31. Each **Quarterly** Report shall be submitted to the Denver Office by the last day of the following month.

F. PLUGGING AND ABANDONMENT

1. Notice of Plugging and Abandonment (P&A).

The Permittee shall notify the Director in writing **at least forty-five (45) days** prior to plugging and abandoning an injection well and converting to a non-injection well.

2. Plugging and Abandonment Plan.

The Permittee shall plug and abandon the well as provided in the approved Plugging and Abandonment Plan. EPA reserves the right to change the manner in which the well will be plugged if the well is modified during its permitted life or if the well is not made consistent with EPA requirements for construction and mechanical integrity. The Director may ask the Permittee to update the estimated plugging cost periodically. Such estimates shall be based upon costs which a third party (such as EPA) would incur to plug the well according to the plan. See the approved Plugging and Abandonment Plan in APPENDIX C of this permit. The Permittee shall submit a revised Plugging and Abandonment Plan which has been corrected to include correct depths once the well has been recompleted. The Permittee may provide three revised cost estimates if the Plugging and Abandonment Plan changes significantly, as well.

3. Cessation of Injection Activity.

After a cessation of injection for **two (2) years**, the Permittee shall plug and abandon the well in accordance with the Plugging and Abandonment Plan unless the Permittee:

- a) provides notice to the Director; and
- b) demonstrates that the well will be used in the future; and
- c) describes actions or procedures, satisfactory to the Director, that will be taken to

ensure that the well will not endanger underground sources of drinking water during the period of temporary abandonment.

4. Plugging and Abandonment Report.

Within sixty (60) days after plugging the well, the Permittee shall submit a report on Form 7520-13 to the Director. The report shall be certified as accurate by the person who performed the plugging operation and the report shall consist of either: (1) a statement that the well was plugged in accordance with the plan, or (2) where actual plugging differed from the plan, a statement that specifies the different procedures followed.

G. FINANCIAL RESPONSIBILITY

1. Financial Responsibility.

The Permittee shall maintain continuous compliance with the requirement to maintain financial responsibility and resources to close, plug, and abandon the underground injection well(s). No substitution of a demonstration of financial responsibility shall become effective until the Permittee receives written notification from the Director that the alternative demonstration of financial responsibility is acceptable. The Director may, on a periodic basis, require the holder of a permit to revise the estimate of the resources needed to plug and abandon the well to reflect changes in such costs and may require the Permittee to provide a revised demonstration of financial responsibility.

2. Insolvency of Financial Institution.

In the event of:

- a) the bankruptcy of the trustee or issuing institution of the financial mechanism;
- b) suspension or revocation of the authority of the trustee institution to act as trustee;
or
- c) the institution issuing the financial mechanism losing its authority to issue an instrument.

The Permittee shall notify the Director in writing, **within ten (10) business days**, and the Permittee shall establish other financial assurance or liability coverage acceptable to the Director **within sixty (60) days** after any event specified in (a), (b), or (c) above.

The Permittee shall also notify the Director 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, if named as debtor of a corporate guarantee, shall make such a notification as required under the terms of the guarantee.

PART III. GENERAL PERMIT CONDITIONS

A. EFFECT OF PERMIT

The Permittee is allowed to engage in underground injection in accordance with the conditions of this permit. The Permittee, as authorized by this permit, shall not construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water (USDW), if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR Part 142 or otherwise adversely affect the health of persons. Any underground injection activity not authorized in this permit or otherwise authorized by permit or rule is prohibited. Issuance of this permit does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of any other Federal, State or local law or regulations. Compliance with the terms of this permit does not constitute a defense to any enforcement action brought under the provisions of Section 1431 of the Safe Drinking Water Act (SDWA) or any other law governing protection of public health or the environment for any imminent and substantial endangerment to human health or the environment, nor does it serve as a shield to the Permittee's independent obligation to comply with all UIC regulations.

B. PERMIT ACTIONS

1. Modification, Reissuance, or Termination.

The Director may, for cause or upon request from the Permittee, modify, revoke and reissue, or terminate this permit in accordance with 40 CFR Sections 124.5, 144.12, 144.39, and 144.40. Also, the permit is subject to minor modifications for cause as specified in 40 CFR Section 144.41. The filing of a request for a permit modification, revocation and reissuance, or termination or the notification of planned changes or anticipated noncompliance on the part of the Permittee does not stay the applicability or enforceability of any permit condition.

2. Transfers.

This permit is not transferrable to any person except after notice is provided to the Director and the requirements of 40 CFR Section 144.38 is complied with. The Director 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 SDWA.

3. Transition From Expiring Permit to Permit Reauthorization.

Adherence to all requirements under 40 CFR Part 144, 146, and 147, including construction, has been verified for this well. An Internal (Part I) Mechanical Integrity

(MI) and External (Part II) MI **is required for reauthorization** of injection activities for this well.

4. Waiver of Permit Requirements.

The conditions in this permit may be altered in accordance with the provisions under 40 CFR Section 144.16 (b). This regulation applies to wells which inject through or above an underground source of drinking water. Under this provision, the Director may authorize a well or project with less stringent requirements for operation, monitoring, and reporting than required in 40 CFR Section 144.52 or Part 146 to the extent that the reduction in requirements will not result in an increased risk of movement of fluids into an underground source of drinking water. The radius of endangering influence (or cone of influence) when computed must be smaller or equal to the radius of the well. **A waiver may be requested no sooner than one (1) year after the well has begun operating. The Permittee may submit multiple applications due to changing site conditions.**

The Permittee shall discuss with the Director how they will obtain the following: the Radius of Endangering Influence (or cone of influence), Injection calibration data, Pressure Fall Off data, and viscosity of injection fluid measurements. Once the Permittee and the Director form a mutual agreement, the Permittee shall provide a work plan to the EPA for approval describing the Radius of Endangering Influence calculation, Injection Test, and Pressure Fall Off Test results, **thirty (30) days** prior to performing the test. All test results and calculations shall be provided to the Director **within sixty (60) days** of completion of the activity. If the Director determines that the requirements of 40 CFR Section 144.16(b) have been achieved, the conditions of this permit may be modified in accordance with the procedure identified in Part III, Section B.1.

5. Conversions

The Director may, for cause or upon a written request from the Permittee, allow conversion of the well from a Class I injection well to a non-Class I well. Conversion may not proceed until the Permittee receives written approval from the Director. Conditions of such conversion may include but are not limited to, approval of the proposed well rework, follow up demonstration of mechanical integrity, well-specific monitoring and reporting following the conversion, and demonstration of practical use of the converted configuration.

6. Permittee Change of Address

Upon the Permittee's change of address, or whenever the operator changes the address where monitoring records are kept, the Permittee must provide written notice to the Director within 30 days.

C. SEVERABILITY

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.

D. CONFIDENTIALITY

In accordance with 40 CFR Part 2 and 40 CFR Section 144.5, any information submitted to EPA pursuant to this permit may be claimed as confidential by the applicant. Any such claim shall be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the validity of the claim will be assessed in accordance with the procedures in 40 CFR Part 2 (Public Information). Claims of confidentiality for the following information will be denied:

- The name and address of the Permittee, and
- Information which deals with the existence, absence, or level of contaminants in drinking water.

E. GENERAL DUTIES AND REQUIREMENTS

1. Duty to Comply.

The Permittee shall comply with all conditions of this permit, except to the extent and for the duration such noncompliance is authorized by an emergency permit. Any permit noncompliance constitutes a violation of the SDWA and is grounds for enforcement action, permit termination, revocation and re-issuance, or modification. Such noncompliance may also be grounds for enforcement action under the Resource Conservation and Recovery Act (RCRA).

2. Penalties for Violations of Permit Conditions.

Any person who violates a permit requirement is subject to civil penalties, fines, and other enforcement action under the SDWA and may be subject to such actions pursuant to the RCRA. Any person who willfully violates permit conditions may be subject to criminal prosecution.

3. Continuation of Expiring Permits.

- a) 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 eighty (180) days before this permit expires.

- b) Permit Extensions. The conditions of an expired permit may continue in force in accordance with 5 U.S.C. 558(c) until the effective date of a new permit, if:
 - (i) The Permittee has submitted a timely application which is a complete application for a new permit; and
 - (ii) The Director, through no fault of the Permittee, does not issue a new permit with an effective date on or before the expiration date of the previous permit.
 - c) Enforcement. When the Permittee is not in compliance with the conditions of the expiring or expired permit the Director may choose to do any or all of the following:
 - (i) Initiate enforcement action based upon the permit which has been continued;
 - (ii) Issue a notice of intent to deny the new permit. If the permit is denied, the owner or operator would then be required to cease the activities authorized by the continued permit or be subject to enforcement action for operating without a permit;
 - (iii) Issue a new permit under Part 124 with appropriate conditions; or
 - (iv) Take other actions authorized by these regulations.
 - d) State Continuation. An EPA issued permit does not continue in force beyond its expiration date under Federal law if at that time a State has primary enforcement authority. A State authorized to administer the UIC program may continue either EPA or State-issued permits until the effective date of the new permits, if State law allows. Otherwise, the facility or activity is operating without a permit from the time of expiration of the old permit to the effective date of the State-issued new permit.
4. Need to Halt or Reduce Activity not a Defense.
It shall not be a defense for a 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.

5. Duty to Mitigate.

The Permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.

6. Proper Operation and Maintenance.

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator 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 only when necessary to achieve compliance with the conditions of this permit.

7. Duty to Provide Information.

The Permittee shall furnish the Director, within a time specified, any information which the Director 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 to the Director, upon request, copies of records required to be kept by this permit.

8. Inspection and Entry.

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:

- a) 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;
- b) Have access to and copy, at reasonable times, any records that shall be kept under the conditions of this permit;
- c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- d) Sample or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the SDWA any substances or parameters at any location.

9. Records of the Permit /Issuance Application.

The Permittee shall maintain records of all data required to complete the permit application and any supplemental information submitted for a period of **five (5) years** from the effective date of this permit. This period may be extended by request of the Director at any time.

10. Signatory Requirements.

All reports or other information requested by the Director shall be signed and certified according to 40 CFR Section 144.32.

11. Reporting of Noncompliance.

a) Anticipated Noncompliance. The Permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

b) Compliance Schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted **no later than thirty (30) days** following each schedule date.

c) Twenty-four Hour Reporting.

(i) The Permittee shall report to the Director any noncompliance which may endanger health or the environment. Any information shall be provided orally within twenty-four (24) hours from the time the Permittee becomes aware of the circumstances by telephoning EPA at **(303) 312-6211 (during normal business hours)** or at **(303) 293-1788 (for reporting at all other times)**. The following information shall be included as information, which shall be reported orally **within twenty-four (24) hours**:

(A) Any monitoring or other information which indicates that any contaminant may cause endangerment to an underground source of drinking water; and/or

(B) Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.

(ii) 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 times, 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.

- d) Oil Spill and Chemical Release Reporting. The Permittee shall comply with all reporting requirements related to the occurrence of oil spills and chemical releases by contacting the National Response Center (NRC) at (800) 424-8802, (202) 267-2675, or through the NRC website <http://www.nrc.uscg.mil/index.htm>.
- e) Other Noncompliance. The Permittee shall report all other instances of noncompliance not otherwise reported at the time monitoring reports are submitted. The reports shall contain the information listed in Part III, Section E.11.(c)(ii) of this permit.
- f) Other Information. Where the Permittee becomes aware that he failed to submit any relevant facts in the permit application, or submitted incorrect information in a permit application or in any report to the Director, the Permittee shall submit such facts or information within two (2) weeks of the time such information became known to him.

APPENDIX A CONSTRUCTION PROCEDURE

The construction procedures for the DWD-1, are presented below.

- Elevation = 7,264 ft
- Conductor Casing
30 inch conductor pipe or similar type piping: 0 – 59 ft (36 inch hole). Cemented 0 – 59 ft
- Surface Casing
10 ¾ inch surface casing or similar type casing: 0 - 3,807 ft (14 ¾ inch hole).
Cemented 0 – 3,807 ft
- Production Casing
7 5/8 inch casing: 0 - 8,479 ft (9 ½ inch hole). Cemented 550 ft – 8,479 ft
- Optional downhole completion
Liner: 5 ½ inch liner and cemented interval, 7,725 ft – 9,180 ft. or
Open Hole: 8,479 ft – 9,180 ft
- Tubing
4 ½ inch plastic coated tubing or similar size and type injection tubing
5 ½ inch x 4 ½ inch. Tubing shall be set within 100 ft. of the top open perforation
- Packer
Packer shall be set at 7,875 ft or within 100 ft of the top open perforation
- Perforations
Squeezed off:
7,924 ft - 7,925 ft
8,064 ft – 8,065 ft

Open Perforations:

8,100 ft – 8,134 ft	136 holes	8,176 ft – 8,188 ft	48 holes
8,143 ft – 8,146 ft	20 holes	8,212 ft – 8,218 ft	24 holes
8,158 ft – 8,162 ft	32 holes	8,278 ft - 8,286 ft	32 holes
- TD = 9,180 ft
- TOC = 550 ft in 7 5/8 inch casing (based on the application and Well Completion Report)

All of the depths provided above are approximate measurements. Following the receipt of approval on the Final Permit and the completion of construction activities the operator shall submit a Well Completion Form and revised well rework construction diagram which shall be subject to EPA's approval.



<u>PROPOSED WELL SCHEMATIC</u>			
Well Name	Doe Canyon 1 (DWD-1)	Original Well Name :	DCU 19-40-17 #1
Pilot API #	05-033-06078	Spud Date :	11/1/1983
S/T API #	N/A	Pilot Completion Date :	5/16/1984
Section :	19	Township :	40N
		Range :	17W
Surface Hole:	240' FNL, 240' FEL	Re-entry Start Date :	
Elevation (GR) :	7264'	Re-entry Completion Date :	
KB :	27.5'		
NOT TO SCALE			

<p>Conductor Casing</p> <p>Size: 30 in</p> <p>Set at: 59 ft</p> <p>Conductor @ 59 ft</p> <p>Surface Casing</p> <p>Size: 10-3/4 in</p> <p>Set at: 3907 ft</p> <p>WT: 45.5 ppg Grade K-55 surface to 3907 ft</p> <p>Hole Size: 14-3/4 in</p> <p>Est. T.O.C.: surface ft</p> <p>Csg Shoe @ 3907 ft</p> <p>Production Casing</p> <p>Size: 7-5/8 in</p> <p>WT: 26.4 ppg Grade K-55 surface to 4168 ft</p> <p>WT: 26.4 ppg Grade L-80 4168 to 5487 ft</p> <p>WT: 29.7 ppg Grade L-80 5487 to 5968 ft</p> <p>WT: 39 ppg Grade SS-05 5968 to 8051 ft</p> <p>WT: 33 ppg Grade 13 CR 8051 to 8479 ft</p> <p>Hole Size: 9-1/2 in</p> <p>Liner</p> <p>Size: 5-1/2 in</p> <p>WT: 17 ppg Grade 13 CR 7725 to 9180 ft</p> <p>Injection Tubing</p> <p>4 1/2" Plastic Coated Tubing</p> <p>5 1/2" x 4 1/2" packer</p> <p>10' 4 1/2" 13Cr</p> <p>Formation Tops</p> <table style="width: 100%;"> <tr><td>Chinle</td><td>1532 ft</td></tr> <tr><td>Cutter</td><td>2426 ft</td></tr> <tr><td>Upper Hermosa</td><td>4311 ft</td></tr> <tr><td>Desert Creek</td><td>6027 ft</td></tr> <tr><td>Paradox</td><td>6075 ft</td></tr> <tr><td>Lower Hermosa</td><td>7720 ft</td></tr> <tr><td>Molas</td><td>7973 ft</td></tr> <tr><td>Leadville</td><td>8090 ft</td></tr> <tr><td>Curry</td><td>8322 ft</td></tr> <tr><td>Elbert</td><td>8371 ft</td></tr> <tr><td>Cambrian</td><td>8681 ft</td></tr> </table> <p>Packer @ 7875 ft</p> <p>Csg Shoe @ 8479 ft</p> <p style="text-align: center;">Proposed TD @ 9180 ft</p>	Chinle	1532 ft	Cutter	2426 ft	Upper Hermosa	4311 ft	Desert Creek	6027 ft	Paradox	6075 ft	Lower Hermosa	7720 ft	Molas	7973 ft	Leadville	8090 ft	Curry	8322 ft	Elbert	8371 ft	Cambrian	8681 ft	<p>Conductor Cement</p> <p>cement with ready-mix to surface</p> <p>Surface Cement</p> <p>Date Cemented: 11/13/1983</p> <p>Lead: 2680 sx Lito, 2% CaCl₂, 1/4#/sk floccle</p> <p>Tail: 300 sx Class B, 32% CaCl₂, 1/4#/sk floccle, 1% Hsld-9</p> <p>Note: circ 40 bbls dehydrated cmt</p> <p>Prod Cement</p> <p>Date Cemented: 12/5/1983</p> <p>Lead: 1215 sx Lito, 1/4#/sk floccle, 12.5% Salt</p> <p>Tail: 150 sx Class H, 0.6% HF4</p> <p>disp w/ 388 bbl H₂O w/ Tretolite K700 & K490</p> <p>Note: No cmt to pits, ran lamp survey. TOC @ 550'.</p> <p>9074 Perforations (Cement squeeze prior to deepening)</p> <table style="width: 100%;"> <tr><td>7924-7925</td><td></td></tr> <tr><td>8064-8065</td><td></td></tr> <tr><td>8100-8134</td><td>136 shots</td></tr> <tr><td>8143-8146</td><td>20 shots</td></tr> <tr><td>8158-8162</td><td>32 shots</td></tr> <tr><td>8176-8188</td><td>48 shots</td></tr> <tr><td>8212-8218</td><td>24 shots</td></tr> <tr><td>8278-8286</td><td>32 shots</td></tr> </table>	7924-7925		8064-8065		8100-8134	136 shots	8143-8146	20 shots	8158-8162	32 shots	8176-8188	48 shots	8212-8218	24 shots	8278-8286	32 shots
Chinle	1532 ft																																						
Cutter	2426 ft																																						
Upper Hermosa	4311 ft																																						
Desert Creek	6027 ft																																						
Paradox	6075 ft																																						
Lower Hermosa	7720 ft																																						
Molas	7973 ft																																						
Leadville	8090 ft																																						
Curry	8322 ft																																						
Elbert	8371 ft																																						
Cambrian	8681 ft																																						
7924-7925																																							
8064-8065																																							
8100-8134	136 shots																																						
8143-8146	20 shots																																						
8158-8162	32 shots																																						
8176-8188	48 shots																																						
8212-8218	24 shots																																						
8278-8286	32 shots																																						

APPENDIX B MONITORING AND REPORTING

This is a listing of the parameters required to be observed, recorded, and reported. Refer to the permit Part II, Section E, for detailed requirements for observing, recording and reporting these parameters.

OBSERVE CONTINUOUSLY AND RECORD AT LEAST ONCE EVERY THIRTY DAYS	
OBSERVE AND RECORD	Injection pressure (psig)
	Annulus pressure(s) (psig)
	Injection rate (bbl/day)
	Fluid volume injected since the well began injecting (bbls)
QUARTERLY	
ANALYZE	Injected fluid total dissolved solids (mg/l)
	Injected fluid specific gravity
	Injected fluid pH
QUARTERLY	
REPORT	Each month's minimum, maximum and average injection pressure (psig)
	Each month's minimum, maximum and average annulus pressure (psig)
	Each month's injected volume (bbl)
	Fluid volume injected since the well began injecting (bbl)
	Each month's Annulus Fluid Level
	Written results of annulus injected fluid analysis
	Sources of all fluids injected during the year

In addition to these items, additional Logging and Testing results may be required periodically. For a list of those items and their due dates, please refer to Appendix D – LOGGING AND TESTING REQUIREMENTS.

APPENDIX C PLUGGING & ABANDONMENT PLAN

The PLUGGING AND ABANDONMENT PLAN incorporated into this Permit and is binding on the Permittee. After receiving approval from the Colorado Oil and Gas Conservation Commission, and notifying the appropriate Regional EPA office, the permitted injection well will be plugged and abandoned in accordance with the following PLUGGING AND ABANDONMENT PLAN.

PLUG NO. 1: (Injection zones: Leadville-Ouray, Undifferentiated Devonian, and Cambrian injection intervals (8,329 ft. – 9,180 ft.) – Set a cement retainer (CR) at approximately 8,379 ft. inside 7 5/8 inch casing. Set a 50 ft. cement retainer CR between the intervals of approximately 8,329 ft. to 8,379 ft. inside the 7 5/8 inch casing. Set an 800 ft. cement plug between the depths of 8,379 ft to 9,180 ft.

PLUG NO. 2: (Paradox Salt and Leadville 8,040 ft. – 8,140 ft.) – Squeeze cement into all open perforations. Set a 100 ft. balanced cement plug between 8,040 ft. to 8,140 ft. inside the 7 5/8 inch casing.

PLUG NO. 3: (Paradox Salt, 6,026 ft. – 6,126 ft.) – Set 100 ft. cement balanced plugs between 6,026 ft to 6,126 ft. inside the 7 5/8 inch casing.

PLUG NO. 4: (Hermosa, 4,261 ft. – 4,361 ft.) –Set a 100 ft balanced cement plug between 4,261 ft. to 4,361 ft.

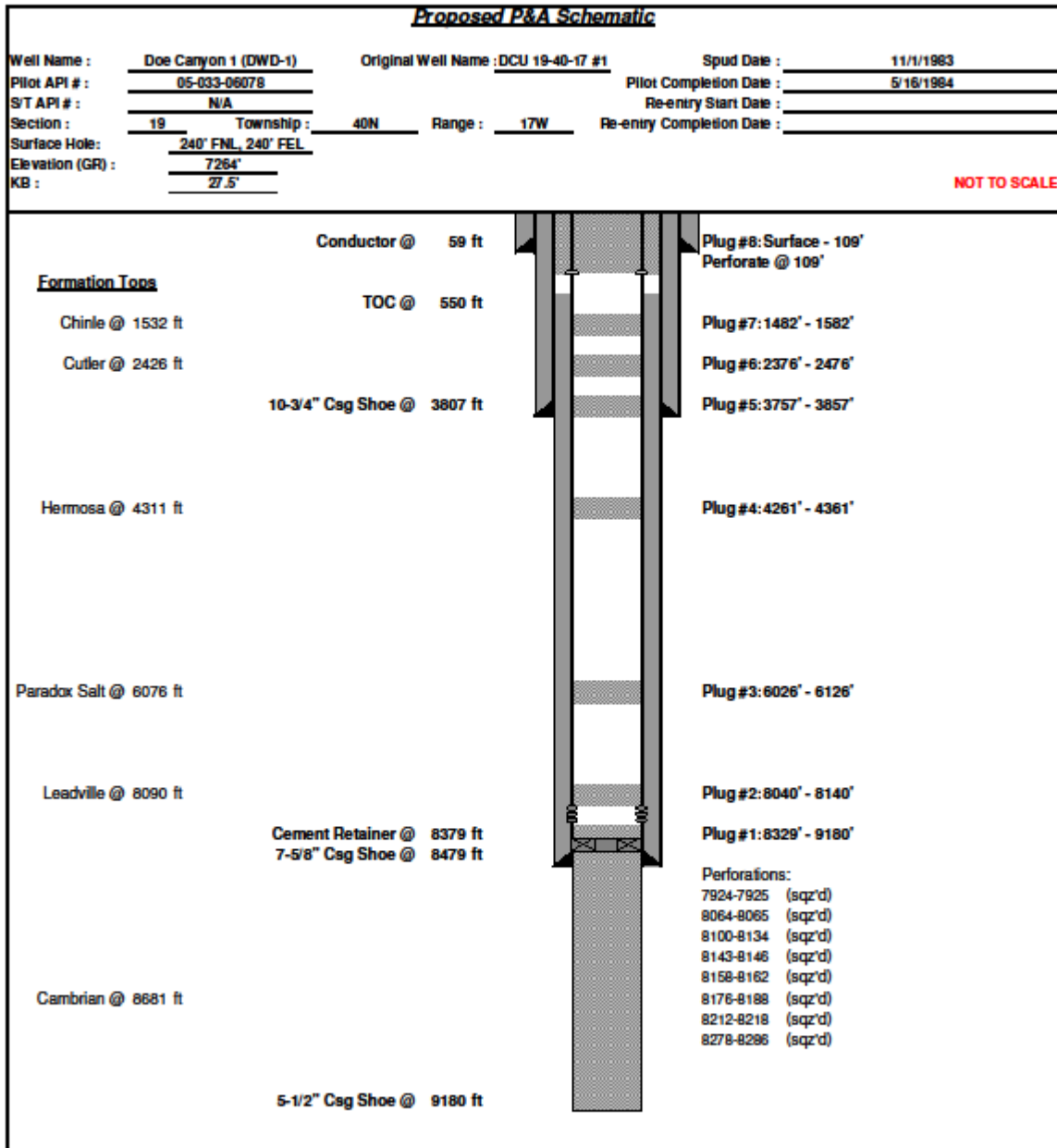
PLUG NO. 5: (10 3/4 inch casing shoe, 3,757 ft. – 3,857 ft.) – Set a 100 ft balanced cement plug between 3,757 ft. to 3,857 ft

PLUG NO. 6: (Cutler, 2,376 ft – 2,476 ft) –Set a 100 ft balanced cement plug between 2,376 ft. to 2,476 ft.

PLUG NO. 7: (Chinle confinement, 1,482 ft – 1,582 ft) –Set a 100 ft balanced cement plug between 1,482 ft. to 1,582 ft. inside the 7 5/8 inch casing.

PLUG NO. 8: (Surface – 109 ft) – Set a cement plug at a minimum from surface - 109 ft. Squeeze cement inside and behind the 7 5/8 inch casing from at least surface to 109 ft.

Cut off the wellhead below the surface casing. Install P&A marker. **Note: Cemented areas using balanced plugs shall be tagged. Class C or similar type cement shall be used to Plug and Abandon the DWD-1 well. Water-based muds, or brines containing a plugging gel, with a density of at least 9.2 lb/gal shall be used during plugging operations, and shall remain between plugs in the well after cement plug placement.**



APPENDIX D LOGGING & TESTING REQUIREMENTS

Logs.

Logs will be conducted according to current UIC guidance. It is the responsibility of the Permittee to obtain and use guidance prior to conducting any well logging required as a condition of this permit.

TYPE OF LOG	DATE DUE
Fracture Finder Log for Open Hole (below 8,479 ft. to Total Depth) of DWD-1 well	Shall be performed and submitted to the EPA Director prior to receiving authorization to commence injection.
Cement Bond Log of DWD-1 well	Shall be performed and submitted to the EPA Director prior to receiving authorization to commence injection.
See the List of Tests Below for Additional Testing and Logging Requirements	

Tests.

Tests will be conducted according to current UIC guidance. It is the responsibility of the Permittee to obtain and use guidance prior to conducting any well test required as a condition of this permit.

-

Well Name: DWD-1

TYPE OF TEST	DATE DUE
Internal (Part I) Mechanical Integrity Test may be demonstrated with a pressure test using fluid or gas.	Shall be performed prior to receiving authorization to commence injection and at least every five (5) years after the last successful demonstration of Mechanical Integrity.

<p>External (Part II) Mechanical Integrity Test shall be demonstrated with either</p> <p>Option 1: a Temperature Log (TL) or Noise Log or</p> <p>Option 2: with the Temperature Log and supplemental Radioactive Tracer Survey</p> <p><i>Additional Requirements:</i></p> <ul style="list-style-type: none"> • TL injection must occur either on a vacuum or at the MAIP • RTS injection for the slug shot test may be performed at normal operating pressures but injection for the time drive test must be performed at the MAIP 	<p>Shall be performed within ninety (90) and one hundred eighty (180) days following the receipt of a limited authorization to inject and at least every five (5) years after the completion of the last successful Part II External demonstration of Mechanical Integrity.</p>
Pore Pressure Measurements	<p>Shall be performed and submitted to the EPA Director prior to receiving authorization to commence injection.</p>
Step Rate Test w/a minimum of six (6) steps and a maximum injection pressure of 1,000 psi and Fall Off Test.	<p>Shall be performed to verify the permitted MAIP within ninety (90) and one hundred eighty (180) days following the receipt of a limited authorization to inject.</p>
Fall Off Test and Calibration Data	<p>Shall be performed within one (1) year after the well has received final authorization to inject and annually, thereafter. An alternate testing procedure may be approved by the Director following the completion and review of Interference Test Data.</p>
Interference Test	<p>An optional Interference Test may be performed after two years of operation and the completion of a second Pressure Fall Off Test with the collection of field data. Interference Pressure Fall Off Test procedures must be submitted for EPA's approval prior to performing the test. The Director may approve an alternate date to perform an Interference Test.</p>

Water Quality Analysis for each of the following: Leadville, Ouray, Undifferentiated Devonian , and Cambrian Formations	An analysis of the formations' water quality for the list of parameters in Appendix G shall be performed and submitted to the Director prior to receiving authorization to commence injection.
Compatibility Analysis of the injectate and the formation fluids	An evaluation of the compatability of the injectate to the formation fluids shall be provided prior to receiving authorization to commence injection.
Stimulation Program	Shall notify the Director within thirty (30) days for approval prior to performing the activity.

APPENDIX E OPERATING REQUIREMENTS

MAXIMUM ALLOWABLE INJECTION PRESSURE:

Maximum Allowable Injection Pressure (MAIP) as measured at the surface shall not exceed the pressure(s) listed below:

Well Name: DWD-1

Maximum Allowed Injection Pressure: 1,000 psi

INJECTION ZONE(S):

Injection is permitted only within the approved injection interval listed below. Injection perforations may be altered provided they remain within the approved injection interval and the Permittee provides notice to the Director in accordance with Part II, Section A.6. Specific injection perforations can be found in APPENDIX A.

Doe Canyon (DWD-1)

FORMATION NAME	APPROVED INJECTION INTERVAL, ft
Leadville-Ouray	8,090 – 8,371
Devonian (Elbert)	8,371 – 8,681
Cambrian	8,681 – 9,180

FORMATION NAME	OPEN PERFORATIONS OR HOLE, ft
Leadville-Ouray	8,100 – 8,286
Devonian (Elbert) - Cambrian	8,479 -9,180

ANNULUS PRESSURE:

The annulus pressure shall be maintained at/or below twenty-five (25) psi gauge as measured at the wellhead. If this pressure cannot be maintained at/or below 25 psi, the Permittee shall follow the procedures listed under Part II, Section D.6 of this permit.

MAXIMUM INJECTION VOLUME:

There is no limitation on the number of barrels per day (bbls/day) of water that shall be injected into this well, provided further that in no case shall injection pressure exceed the limit shown above.

APPENDIX F CORRECTIVE ACTION

No Corrective Action is required.

APPENDIX G ANALYTICAL PARAMETERS

pH	Oil and Grease
Conductivity	Total Coliform
Specific Gravity	Total Organic Halogens
Temperature	Bicarbonate
Total Dissolved Solids	Carbonate
Total Organic Carbon	Hydroxide
Radium 226	Corrosivity
Radium 228	Total Fecal Coliforms
Gross Alpha	Hexavalent Chromium
Gross Beta	Nitrite
Total Alkalinity (As CaCO ₃)	Nitrate
Chloride	Iron
Nitrate+Nitrite	Flouride
Sulfate	
Calcium	
Magnesium	
Potassium	
Sodium	
Barium	
Chromium	
Strontium	