

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL**



STATEMENT OF BASIS

for

**DRAFT Area UIC Permit UT22197-00000 Version 5
(Permit Modification No. 4)**

Newfield Production Company's Class II-R (Enhanced Recovery) Area Injection Well Permit for the Portion of the Monument Butte Oil Field Located within the Uintah and Ouray Indian Reservation, Utah

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General Information and Description of Permit

Permittee:

Newfield Production Company
10530 South County Road 33
Myton, Utah 84052

Facility:

Portion of the Monument Butte Field located within the
Uintah and Ouray Indian Reservation, Utah

EPA Underground Injection Control (UIC) permits regulate the construction and operation of underground injection wells so that injection does not endanger underground sources of drinking water. UIC permit conditions are based on the authorities at 40 C.F.R. parts 144 and 146, and address potential impacts to underground sources of drinking water.

The area covered by this UIC permit is referred to as the Authorized Permit Area and is described in the Permit as: T8S, R17E; T8S, R18E; T8S, R19E; T9S, R17E Except Sections 31 - 36; T9S, R18E Except Sections 25, 26, 27 and Section 31 - 36; Sections 4, 5, 6, 7, 8, 9, N2 17 & N2 18 T9S, R19E S.L.B. & M., Uintah & Duchesne Counties, Utah, except that any well in this area for which the Endangered Species Act section 7(a)(2) or National Historic Preservation Act section 106 compliance process has not been completed by a federal agency is excluded from coverage under this permit.

The Authorized Permit Area covers approximately 95 square miles and includes over 1,600 oil-gas wells of which 668 have been converted to injection wells regulated by the EPA as of February 2016. For additional information regarding the hydrogeologic and geologic settings, injection and confining zones, USDWs, considerations under Federal law and cumulative effects to the environment previously considered by the EPA, the reader is referred to the Final Statement of Basis for Area UIC Permit UT22197-00000 issued December 13, 2012. Copies of this document and subsequently issued permit versions and Statements of Basis are available upon request.

Administrative History for Area UIC Permit UT22197-00000

Initial Permit Issuance:

Draft Area UIC Permit UT22197-00000 and Statement of Basis	August 6, 2012
Final Area UIC Permit UT22197-00000 and Statement of Basis	December 13, 2012

In October 2010, the EPA Region 8 UIC Program began a comprehensive review process to consolidate some 470 injection wells operating under 11 previously issued EPA area permits and many individual permits, into a single Area UIC Permit for Newfield Production Company's (Newfield or Permittee) Monument Butte Field. This effort was seen as necessary following a 2008-2009 backlog of over 100 injection well applications and the unwieldiness of regulation of some 500 disparate sets of rules for protecting groundwater. This large area UIC permit was precedent setting in the following ways:

- It implemented an area approach for calculating maximum injection pressures of injection wells, dividing EPA’s portion of the field into 95 Fracture Gradient Areas (FGA) within which step rate test data would be averaged to determine the fracture gradient to be used in wells in each of the 95 areas. Such an approach was necessary because the EPA was unable to continue processing the volume of individual well Maximum Allowable Injection Pressure (MAIP) changes requested by the Permittee, sometimes between 10 and 15 per week.
- It contained the first EPA permit language addressing well stimulation and specifically the hydraulic fracturing of injection wells.
- It pioneered the use of electronic notification emails to and from the Permittee en lieu of many formally signed letters, saving the agency admin review time and reducing paper/postage cost. Email notification, paired with the use of a publicly available Director-signed decision document to the permit file, enabled the communication of approvals for many wells at a time, dramatically improving EPA’s processing efficiency.
- It deployed the use of a database with the location, status and well construction data for more than 1,600 oil-gas wells in the Monument Butte Field (the “List of Wells” database) improving EPA’s oversight and regulation of injection wells and significantly reducing EPA processing times.
- It implemented quarterly reporting to EPA of newly drilled oil-gas wells in the AoR to keep EPA’s database records current and it implemented quarterly financial responsibility reporting to the Technical Enforcement Program, seen as critically important following a two-year lapse in the Permittee’s Financial Responsibility demonstration to the EPA.
- The UIC Program also deployed a new approach for compliance with the National Historic Preservation Act, establishing a Programmatic Agreement between the EPA, the BLM, the Uinta and Ouray Tribe and the Utah State Historic Preservation Office.

This permit updated and standardized groundwater protection across a 100-square mile area and improved EPA’s oversight capability in one of the largest oil fields in the nation, while at the same time accommodating injection well conversion rates of more than 100 per year during a time of significant budget constraint and staffing reduction across the Federal government.

Permit Modification No. 1:

Draft Area UIC Permit UT22197-00000 Version 2 and Statement of Basis	September 13, 2013
Final Area UIC Permit UT22197-00000 Version 2 and Statement of Basis	November 5, 2013

Permit Modification No. 1 provided clarification regarding quarterly reporting, streamlined Part 13 (Well Stimulation) protocols and consolidated 95 Fracture Gradient Areas into 65. This modification also removed the requirement for the Permittee to obtain the Director’s permission to conduct a well rework, replacing this requirement with a requirement to provide prior notice only. The rationale for this change was that written EPA approval to conduct a rework is unnecessary so long as the rework activity is in compliance with permit conditions. The EPA also reasoned that if the Permittee were to notify of a well rework activity requiring a permit modification, the EPA would be able to advise the Permittee prior to the activity beginning.

Permit Modification No. 2

Draft Area UIC Permit UT22197-00000 Version 3 and Statement of Basis	July 11, 2014
Final Area UIC Permit UT22197-00000 Version 3 and Statement of Basis	August 25, 2014

Permit Modification No. 2 incorporated 50 new step rate tests into the suite of fracture gradient data and had the result of raising or lowering the average fracture gradient for 36 of the 65 Fracture Gradient Areas, thereby changing the MAIP of many wells operating under the permit. Newfield used an “interpolated grid methodology” to establish the 65 areas and this methodology, including the EPA’s rationale for approving it, has been included in the Statements of Basis for Permit Modifications No. 2 and Modification No. 3 discussed below. For the sake of brevity, the EPA has elected to not include this information in the Statement of Basis for Permit Modification No. 4 (this document). Copies of previously issued Permit versions or Statements of Basis that describe the interpolated grid methodology are available upon request.

Permit Modification No. 3

Draft Area UIC Permit UT22197-00000 Version 4 and Statement of Basis	October 10, 2014
Final Area UIC Permit UT22197-00000 Version 4 and Statement of Basis	December 12, 2014

Permit Modification No. 3 incorporated 25 new step rate tests into the suite of fracture gradient data and had the result of raising or lowering the average fracture gradient for 18 of the 65 Fracture Gradient Areas, thereby changing the MAIP of many wells operating under the permit. The EPA also corrected omissions and typos to the table of values for calculating the MAIP.

Permit Modification No. 4

Draft Area UIC Permit UT22197-00000 Version 5 and Statement of Basis	March 22, 2016
Revised Draft UIC Permit UT22197-00000 Version 5 and Statement of Basis	May 16, 2016
Final Area UIC Permit UT22197-00000 Version 5 and Statement of Basis	Proposed/Pending

This Statement of Basis gives the derivation of proposed modifications to Final Area UIC Permit UT22197-00000 Version 4 issued December 12, 2014, and the reasons for them. If the EPA approves the proposed modifications as final they would be included in Final Area UIC Permit UT22197-00000 Version 5 shown above. The EPA is soliciting comment on this proposed modification a second time to incorporate comments received during and after the first public comment period. The revised draft clarifies a new mechanical integrity test notification requirement (Item 7 below), corrects a typo (Item 14 below) and retracts a previously proposed (March 22, 2016) change to the plugging and abandonment plan.

Proposed Modifications to Area UIC Permit UT22197-00000 Version 4 (Currently Proposed Changes to the Area Permit)

On November 17, 2015, the Permittee requested that Part 24 of Area UIC Permit UT22197-00000 Version 4 (issued December 12, 2014) be updated to reflect 33 additional step rate tests provided for injection wells within the EPA’s permit area. In addition to making the requested changes to the table in Part 24, the EPA intends to update the Permit’s formatting and language to current standards, practices and UIC Program policies.

1. **General Formatting and Updating to Current Agency Standards:** These updates include 0.75 inch margins, the addition of the Agency’s logo on the title page of the permit and reformatting of

the footer, along with changes to internal document references to reflect organizational changes in the Permit discussed in items 9 and 12 below.

2. **Permittee Address:** The previous address stated in the Permit was Newfield’s Denver office, which closed during the summer of 2015. The address has been updated to Newfield’s Field Office in Myton, Utah, where day-to-day management of the permit is handled.
3. **Table of Contents:** The EPA has added a table of contents for ease of use.
4. **Formatting and Clarification Under Part 3 Quarterly Reporting:** While quarterly reporting requirements are not proposed to be changed, the formatting of this section was updated and the following heading titles were added for clarity: “New Wells in Area of Review” and “Financial Responsibility”
5. **Part 5 List of Wells Database:** The language under this section has been updated to reflect actual practice and use of the List of Wells database. Initially, the EPA had envisioned a live database of injection well data on its website that would be updated in real time by the UIC Program. Following the 2012 issuance of the permit, the UIC Program learned that regional communication policies prohibited the posting to the web of an MS Access document and a pdf of the data table had to be posted instead, severely limiting the database’s functionality as reference tool.

The “live” updating and export of a pdf for subsequent posting on the regional website each time a change was made was also found to be unrealistic from a staffing and resource perspective. EPA has been unable to update the pdf on the website on a well-specific basis, which would sometimes require multiple daily updates.

Since 2012, no member of the public has contacted EPA Region 8 regarding Newfield’s List of Wells database and the pdf was eventually removed in late 2015 as part of national updates to the EPA’s internet presence. In practice, the EPA has managed the List of Wells database as described and shared this data with the Permittee as requested. While no member of the public has ever requested a copy of the database, the UIC Program would informally share this data if requested and would not require the filing of a Freedom Of Information Act (FOIA) request unless the volume of public requests were to increase significantly.

To better align the permit with current practice, the EPA has modified the language in Part 5 as follows:

Due to the large scope of Area UIC Permit UT22197, EPA intends to record information related to this permit in a document called the List of Wells for Area UIC Permit UT22197-00000 (LW). The LW is solely intended to serve as an administrative tool to organize and communicate oil-gas well data and other information related to Area UIC Permit UT22197-00000 for the Permittee and the public. It is publicly available at <http://www.epa.gov/region8/water/uic/> and maintained by EPA Region 8. Injection wells regulated by EPA and subject to the terms and conditions of this Permit are listed in the LW with EPA Permit number UT22197 and are assigned a unique well identification number by EPA.

has been changed to:

Due to the large scope of Area UIC Permit UT22197, EPA intends to record information related to this permit in a

database called the List of Wells for Area UIC Permit UT22197-00000 (LW). The LW is solely intended to serve as an administrative tool to organize and communicate oil-gas well data and other information related to Area UIC Permit UT22197-00000. It is maintained by EPA Region 8 and available to the Permittee and the public upon request. Injection wells regulated by EPA and subject to the terms and conditions of this Permit are listed in the LW with EPA Permit number UT22197 and are assigned a unique well identification number by EPA.

- Part 8 Mechanical Integrity:** The EPA Region 8 website address for well testing Guidance and Guidelines has been updated and a 90-day limit to re-establish Mechanical Integrity (MI) after MI loss has been added. Ninety days is the time limit referenced by the Region 8 UIC Technical Enforcement Program in letters to oil-gas operators when they report Loss of MI events, as required by permit. The proposed language does allow for an alternate time frame (longer or shorter) as determined to be appropriate by the Director based on well-specific circumstances and on a case-by-case basis. The purpose of this change is to better-align permit language with current EPA practice and policy regarding MI Loss.

The EPA has added the following statement under Part 8 Mechanical Integrity:

A demonstration of mechanical integrity shall be re-established within 90 days of any loss of mechanical integrity unless written approval of an alternate time period has been given by the Director.

- Prior Notification of Mechanical Integrity Testing:** Prior notification of MI testing is required by permit as a matter of general policy in EPA Region 8 to enable Region 8 UIC staff to witness these tests, where possible. This requirement was waived in Newfield's original area permit (described in Permit Modification No. 1 above) due to the high frequency of MI testing in the Monument Butte Field and based on the fact that EPA Region 8 staff are rarely able to witness these tests even when prior notice is provided. EPA Region 8 has recently shifted its focus to witnessing MI testing to the extent possible and at the time and place of its choosing. To enable this to occur, the EPA has eliminated the following sentence in Permit Version 4:

Prior notification of mechanical integrity testing is not required under Area UIC Permit UT22197-00000.

and replaced this sentence with the following statement in Permit Version 5:

At least once each calendar year, the Permittee shall report to the UIC Enforcement Coordinator a list of planned mechanical integrity tests during each of the next 52 week-long periods; this annual notification shall delineate 52 Monday through Friday periods and list the well names and EPA well IDs the Permittee anticipates testing for mechanical integrity each week.

This language is intended to enable the UIC Technical Enforcement Program to better coordinate its inspection schedule with the planned MI testing dates for injection wells so as to be able to witness mechanical integrity tests.

- Part 9 Testing and Logging Requirements:** The EPA has clarified that the title for testing and logging section should be "procedures" because testing and logging "requirements" are covered elsewhere in the permit. The web address for EPA Guidance and Guidelines was updated and EPA mailing addresses were also reformatted.
- Removal of Part 13 Well Stimulation:** As described above, the 2012 Final Area UIC Permit for the Monument Butte Field deployed new language specifically to address well stimulation such as

hydraulic fracturing, polymer gel treatment and “acid jobs.” This language was developed because Newfield was found to be modifying the construction (opening new injection perforations) and stimulating the injection zone in roughly 10 percent of EPA approved well conversions without giving prior notice or obtaining EPA approval. Newfield had also previously requested EPA permission to conduct a polymer gel injection in several wells and it was seen that these requirements could facilitate well stimulation activities without the need for issuance of well-by-well approvals with written instructions as had been done in the past by EPA Region 8.

Since this language was deployed in 2012 and subsequently refined in Permit Modification No. 1, the EPA has found little value added in terms of USDW protection, given the additional paperwork required by both Newfield and the EPA. As such, and to better reflect current oil-gas industry practice and terminology, the EPA is now proposing to include well stimulation as a Well Rework activity, requiring prior notification and follow up reporting to the EPA under Part 14 of the Area Permit. The EPA has already incorporated this approach into a Class II area UIC permit on the Blackfeet Indian Reservation and is currently including it in the development of Class II individual well permit template language for EPA Region 8.

Under the proposed change, the Permittee would give prior notice to the EPA as required for all well reworks, but EPA would not need to grant permission for well stimulation to begin. The MAIP would be waived during well stimulation activities and re-establishing MI and follow up reporting would occur under Well Reworks instead of a dedicated section for Well Stimulation. Any loss of MI that occurred during the well stimulation activity would continue to be reported as such under Part 8 (Mechanical Integrity) of the permit.

This change would eliminate Part 13 Well Stimulation from the permit entirely and would include the following language under Part 14 Well Reworks, clarifying that well stimulation is now covered by Well Rework protocols:

Workovers include well stimulation activities such as hydraulic fracturing, polymer gel injection and the delivery of acid to the injection zone formation. EPA Region 8 does not consider the temporary filling of the wellbore with acid to descale tubulars, or the use of biocides to prevent algal growth, to constitute a well rework.

The EPA has also added “exceeds the MAIP of the well” as cause for requiring a Part I Mechanical Integrity Test (MIT) following a well rework under Part 14. Even if tubing-packer assembly is not removed for well stimulation and it is not accidentally unseated during well stimulation, the EPA believes a new MIT is necessary if the MAIP for the injection well is exceeded. This phrase has been incorporated under Part 14 Well Reworks as indicated below:

A successful demonstration of Part I (internal) mechanical integrity is required following the completion of any well workover, well stimulation or alteration which affects the casing, tubing, or packer, or exceeds the MAIP for the well. Injection operations shall not be resumed until the well has successfully demonstrated Part I mechanical integrity, and if the well lost mechanical integrity, the Director has provided written notice.

- 10. Part 11 Maximum Allowable Injection Pressure (MAIP):** To accommodate the inclusion of well stimulation as a Well Rework activity not requiring Director approval, the following statement has been added under Part 11 of the Permit:

Except during well stimulation, the injection pressure as measured at the surface, shall not exceed the MAIP.

11. **Part 14 Well Reworks:** To accommodate the elimination of Part 13 Well Stimulation, Part 14 Well Reworks has now become the Part 13 of the permit document. In addition to this administrative change, Well Reworks has been reformatted and labeled for clarification as follows:

1. **Definition:** Any addition, physical alteration or activity that may affect tubing, packer or casing is a well rework activity covered under Part 13 of this Permit. Workovers include well stimulation activities such as hydraulic fracturing, polymer gel injection and the delivery of acid to the injection zone formation. EPA Region 8 does not consider the temporary filling of the wellbore with acid to descale tubulars, or the use of biocides to prevent algal growth, to constitute a well rework.
2. **Procedures:** Workovers and alterations to the injection well shall meet all conditions of Area UIC Permit UT22197-00000. Prior to beginning any well rework activity, the Permittee shall give advance notice to the Director. Such notice may be given via email correspondence, faxed letter or post. The Permittee shall record all workovers and changes to well construction on a Well Rework Record (EPA Form 7520-12) and when appropriate, provide an updated well bore diagram, and shall provide this and any other record of well workover, including monitoring, logging or test data to the Director within 30 calendar days of completion of the activity.
3. **Re-establishing Mechanical Integrity:** A successful demonstration of Part I (internal) mechanical integrity is required following the completion of any well workover, well stimulation or alteration which affects the casing, tubing, or packer, or exceeds the MAIP for the well. Injection operations shall not be resumed until the well has successfully demonstrated Part I mechanical integrity, and if the well lost mechanical integrity, the Director has provided written notice.

Except as described in item 9 above and relating to well stimulation, language regarding Well Reworks has not changed and the reformatting is for the purpose of clarification only.

12. **Organizational Changes in Parts 17-22:** Language in Parts 17-22 has been merged into a single section titled “Part 16 Conditions Applicable to All Permits.” While no permit language has been changed, the numbering and references in Parts 17-22 have been updated to incorporate this new organization and formatting, and the removal of Part 13 Well Stimulation. The intent of this change is to simplify the permit document for the user.

13. **Changes to the Fracture Gradient Areas in Part 24:** To accommodate the removal of Part 13 Well Stimulation and the consolidation of Parts 17-22, Part 24 has been administratively changed to Part 19 in Permit Version 5.

As discussed in the Statement of Basis for Final Area UIC Permit UT22197-00000 issued December 13, 2012, the EPA anticipated future permit modifications to Part 24 to increase or decrease the fracture gradients used for Fracture Gradient Areas and stated this would be handled according to requirements at 40 CFR §144.39 (via a Major Permit Modification process requiring public notice and comment). The EPA stated that such modification would be based on the Permittee’s request and submission of updated step rate test data to replace existing data points in the EPA’s data set or new step rate tests conducted on more recently constructed injection wells that would supplement the EPA’s existing data.

On November 17, 2015, Newfield submitted 33 step rate tests to the EPA and requested modification of the table in Part 24 of the Permit. The EPA independently evaluated each of the submitted step rate tests and where the EPA’s analysis agreed with the Permittee’s analysis, the

fracture gradient for that well in the EPA's data set was either updated with a revised fracture gradient or added anew if that well was not previously included in the data set. Where the EPA calculated a slightly higher or lower fracture gradient than the Permittee using the same data, the EPA approved whichever fracture gradient was lower, or more conservative from a USDW protection standpoint. The EPA then recalculated averages for each Fracture Gradient Area to determine necessary updates to the table in Part 24. Proposed modifications to the table in Part 24 (to become Part 19 in Version 5 of the permit) are shown in Table 1.

14. **Corrected Typos:** In addition to the updates shown in Table 1, the EPA is correcting the values for Fracture Gradient Areas 42 and 43 as typos from Final Permit Version 4, which incorrectly listed these to be 0.655. Permit Version 4 should have updated the values for Fracture Gradient Areas 42 and 43 to 0.708 and 0.723, respectively, based on data submitted by the Permittee in its request for Permit Modification No. 3. The EPA is correcting these as typos in Permit Version 5.

Table 1: Proposed changes to the table in Part 24 (Proposed Part 19) of the Permit.

Fracture Gradient Area Number	Geographic Description	Fracture Gradient in Permit Version 4	Proposed Fracture Gradient for Permit Version 5
1	Sections 6, 7, 8, 17, 18 and the NW, SW and SE quarters of section 5, T9S-R17E	0.87	0.872
3	Sections 32 & 33, T8S-R17E	0.789	0.795
4	Sections 19, 20 and the NW and W2NE quarters of section 30, T8S-R17E	0.743	0.778
5	Section 31 and the W2 and the W2E2 of section 29, S2 and the E2NE of section 30, T8S-R17E	0.748	0.744
7	Section 27, T8S-R17E	0.73	0.739
10	Section 3, and the S2S2, E2NE, N2SW of section 4, and N2N2 of section 9, T9S-R17E	0.797	0.802
12	Section 34, T8S-R17E	0.732	0.740
22	Section 4, T9S-R18E	0.724	0.758
23	Section 8, T9S-R18E	0.736	0.758
29	Section 14, T9S-R17E	0.724	0.764
32	Section 7, T9S-R18E	0.729	0.737
36	Section 32, T8S-R18E	0.718	0.808
37	Sections 19 and 30 of T8S-R18E	0.698	0.722
46	W2 of section 24, T8S-R17E	0.659	0.664
47	E2 of section 24, E2, E2E2W2, and E2W2E2W2 of section 25, T8S-R17E.	0.719	0.723
50	Sections 20, 21, and 28 of T8S-R18E	0.695	0.699
51	Sections 25, 26 and 27 of T8S-R18E	0.655	0.739
53	Sections 23, 24, 25 and 26 of T9S-R17E	0.655	0.690

The UIC Program is soliciting public comment only regarding the changes described in this Statement of Basis for Draft Area UIC Permit UT22197-00000 Version 5, and as the proposed changes relate to the protection of groundwater resources. Comments regarding previously issued final permits or previously issued modifications, and comments not related to the protection of groundwater may not be considered substantive comments by the EPA. If substantive comments are received during the public comment period for this proposed modification, the EPA will provide a written response to the commenter(s) and the effective date of any final EPA decision will be thirty days after the Director's signature date to allow for an appeal of the final decision.

For additional information about these proposed revisions to Area UIC Permit UT22197-00000 Version 4, including copies of documents, maps of the permit area, step rate test data or the methodology used, please contact Jason Deardorff by email at deardorff.jason@epa.gov or phone at 303-312-6583.