



Region 6  
1445 Ross Avenue  
Dallas, Texas 75202-2733

UIC Permit No. 06SNMU2P9104  
Well No.: Horseshoe Gallup Unit

#191

## AUTHORIZATION TO CONVERT A WELL TO A INJECTION WELL UNDER THE UIC PROGRAM UTE MOUNTAIN UTE TRIBE

In compliance with the provisions of the Safe Drinking Water Act, (hereafter referred to as "the Act" or "SDWA") as amended (42 U.S.C. §300f et seq.),

Biya Operators, Inc.  
P. O. Box 5226  
Farmington, New Mexico 87499

is authorized to convert a well to a Class II enhanced oil recovery injection well. This well is located at:

2215 feet from the north line and 660 feet from the west line, Northwest Quarter, Section 34, Township 31N, Range 16W into the injection interval at a depth of 1253 to 1289 feet below land surface in the Gallup formation in accordance with the construction and operation requirements, injection pressure limits, reporting and monitoring requirements, and other conditions set forth in Parts I and II of this permit and the New Mexico Indian Lands Class II Underground Injection Control Program and Regulations.

**Unless authorization to inject is granted, this permit shall remain in effect for one year from the effective date shown below. Authorization to inject fluids into the well shall be granted only upon compliance with permit conditions, I.A.1., I.A.2., I.A.3., and I.B.1. Authorization to inject fluids into the well may be verbally granted by the Chief, Ground Water/UIC Section or by written "Authorization to Inject" from the Director, Water Quality Protection Division (6WQ). Upon authorization to inject, this permit shall remain in effect until the well is plugged or the permit is terminated.**

This permit shall become effective on

Prepared by

Issued on

\_\_\_\_\_  
Bill Hurlbut  
Geologist  
Ground Water/UIC Section  
(6WQ-SG)  
6WQ-SG: BHURLBUT: 9/2/10  
6WQ-SG      6WQ-S  
DELLINGER DWYER

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Miguel I. Flores  
Director  
Water Quality Protection  
Division  
06SNMU2P9104.1

Part I. SPECIAL PERMIT CONDITIONSA. Construction Requirements

1. The surface casing shall be set at 108 feet below land surface and the long string casing shall be set at 1427 feet below land surface cemented with 100 sacks of cement.
2. The well shall be equipped with standard female fittings with cut-off valves connected to the tubing and the tubing/casing annulus so that the injection pressure and annulus pressure may be measured by an EPA representative by attaching a gauge having a standard male fitting.
3. Tubing and packer shall be installed. The packer shall be run on the tubing and set inside the casing.

B. Operating Requirements

1. Authorization to inject will not be granted until the permittee shows to the satisfaction of the Director, Water Quality Protection Division, pursuant to 40 CFR §146.8 that the well has mechanical integrity. The well's mechanical integrity must be demonstrated prior to the start of injection and at least every five years thereafter. The permittee must notify the Osage UIC office at least five (5) days prior to mechanical integrity testing so that an EPA representative can witness the test.
2. Injection pressure at the wellhead shall not exceed 250 psig.
3. The permittee is authorized to inject salt water for enhanced oil recovery.
4. Injection volume shall be limited to 3000 barrels per month.

Scan Code: 07

Permit No.: 06SNMU2P9104

REPLY TO: 6WQ-S

Certified Mail #7006 0810 0005 9535 5471 - Return Receipt Requested

Mr. Richard Baldwin  
Biya Operators, Inc.  
P. O. Box 5226  
Farmington, New Mexico 87499

Re: Draft UIC Permit and Statement of Basis  
Permit No. 06SNMU2P9104 – San Juan Co., New Mexico

Dear Mr. Baldwin:

Enclosed are the public notice, statement of basis, and the permit which have been drafted by this Agency under the authority of the Safe Drinking Water Act. Any comments you wish to make may be submitted in writing by the due date stated in the public notice to Ms. Evelyn Rosborough at the EPA address above.

The Bureau of Land Management (BLM) also requires that you apply for and receive authorization to complete the work described in the referenced permit application. Both EPA and BLM authorizations must be received prior to the commencement of this work. Please contact the BLM office at (505) 599-8900 for further information.

If you have any questions, or would like to discuss this permit, please contact the permit writer, Mr. Bill Hurlbut at (214) 665-8305.

Sincerely yours,

Stacey B. Dwyer, P.E.  
Associate Director  
Source Water Protection Branch

Enclosures

cc: with enclosures  
BIA, Albuquerque Area Office  
P. O. Box 26567, Plaza Maya Building, Albuquerque, NM 87102

BLM, 1235 La Plata Highway, Farmington, NM 87401  
Ute Mountain Ute Tribe  
Mr. Rick Davis, EPA Field Office

6WQ-SG: BHURLBUT: 9/21/10: 06SNMU2P9104.3  
6WQ-SG  
DELLINGER

September 21, 2010  
STATEMENT OF BASIS

For proposed Underground Injection Control Permit No.06SNMU2P9108 to convert a well to an enhanced oil recovery injection well.

Issuing office: U.S. Environmental Protection Agency  
Region 6  
1445 Ross Avenue  
Dallas, Texas 75202-2733

Applicant: Biya Operators, Inc.  
P. O. 5226  
Farmington, New Mexico 87499

1. As described in the application, the well is located in San Juan Co., New Mexico, 2215' FNL, 660' FWL, NW/4, Section 34, Township 31N, Range 16W.
2. On the basis of preliminary staff review, the Environmental Protection Agency has made a tentative determination to draft a permit for the construction of this well as described in the application.
3. The following is an explanation of the derivation of the conditions of the draft permit and the basis for them as required under 40 CFR §147.1600 dated October 25, 1988:

40 CFR §147.3009(a)

The area around the proposed injection well or project must be evaluated to ensure that the proposed injection will not cause movement of fluid into through improperly sealed, completed, or abandoned wells. The permit applicant submitted information on all wells of public record penetrating the injection interval within 1/2 mile of the proposed injection site and can inject a maximum of 3000 barrels per month (B/M).

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EPA did not calculate a "zone of endangering influence" (the lateral area around the proposed injection in which injection pressures may cause movement of fluid into a USDW) since there is no USDW at this location.

40 CFR §146.22(a)

The well must be sited so that injection is into a formation which is separated from by a confining zone free of known open faults or fractures within the area of review. The proposed injection interval in the Gallup is at a depth of 1253 feet to 1289 feet below land surface. A review of available data has shown no evidence of faults or fractures in the confining zone within the area of review.

40 CFR §146.22(b)

The well must be cased and cemented to prevent fluid movement. There is no USDW at this location. Since the surface casing has been set at 108 feet below land surface and the 5 1/2" long string casing has been set at 1427 feet below the land surface and cemented with 100 sacks of cement, construction is adequate in this case.

40 CFR §146.23(a)

To assure the protection adjacent to the well bore, injection must be through an adequate tubing and packer. Since the top of the injection interval is at 1253 feet, the packer in this well will be set inside the casing [40 CFR §146.23(a)(2)]. Injection pressure at the wellhead shall be limited so that it does not initiate new fractures or propagate existing fractures in the confining zone [40 CFR §146.23(a)(1)]. In this well, the maximum injection pressure at the wellhead shall not exceed 250 psig.

To assure protection from injection fluids, the well must maintain mechanical integrity. Mechanical integrity must be demonstrated prior to operation and at least once every five years thereafter [40 CFR §146.23(b)(3)].

For additional information, please contact:

Ms. Evelyn Rosborough  
Administrative Support Team (6WQ-CA)  
U.S. Environmental Protection Agency  
Region 6  
1445 Ross Avenue  
Dallas, Texas 75202-2733  
(214) 665-7515

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**Scan Code: 07**

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**Permit No.: 06SNMU2P9104**

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The Environmental Protection Agency (EPA) has received a complete Underground Injection Control (UIC) permit application number 06SNMU2P9104 from

Biya Operators, Inc.  
P. O. Box 5226  
Farmington, New Mexico 87499

The permittee proposes to convert well number 191, to an enhanced oil recovery injection well located in the NW Quarter, Section 34, Township 31N, Range 16E, San Juan Co., New Mexico. The application requests authorization to inject salt water into the Gallup at an injection interval depth of 1253 to 1289 feet for enhanced oil recovery. The Underground Source of Drinking Water is at a depth of 0 feet below land surface. A maximum of 3000 barrels/month will be injected at a maximum pressure of 300 psig.

The permit application, supporting data submitted by the applicant, the EPA draft permit modification and statement of basis are available for public review Monday through Friday from 8:00 a.m. to 4:00 p.m. at the Environmental Protection Agency, 1445 Ross Avenue, Dallas, TX 75202-2733, (214) 665-7165. Comments on the permit application and draft permit should be submitted to the Dallas office within 30 days of the date of this notice. Anyone desiring a hearing must submit a written request, identifying the issue(s) for discussion at the hearing, to the EPA office in Dallas, Texas, before the close of business on the last day of the comment period. EPA will give at least 30 days notice of the public hearing, if a hearing is held.

6WQ-SG: BHURLBUT: 9/21/10 06SNMU2P9104  
6WQ-SG  
DELLINGER

ROC		PHONE CALL		CONFERENCE	DATE: 9/21/10
	X	DISCUSSION		FYI	TIME: 8:00 am
TO: FILE					
FROM: Bill Hurlbut					
SUBJECT: Recommendation for permit #06SNMU2P9108 for well Horseshoe Gallup Unit #191, NW/4, Sec. 34, T31N, R16W, San Juan Co., New Mexico for Biya Operators, Inc.					

PERMIT REQUEST: The operator has requested to convert this well to an enhanced oil recovery injection well in the Gallup formation. The operator needs this well to enhance the production of oil from his surrounding oil production.

STATS: The well was drilled and completed in 11/26/58, to a T.D. of 1429. The well has 5 1/2" casing set at 1427' and cemented with 100 sacks of cement. It then has 8 5/8" surface casing set at 108' and cemented to the surface with 100 sacks of cement. The base of the treatable water in this area is at 0 feet and therefore a ZEI was not calculated. The fluid level on this well was shot and was at 1252' below ground level.

FLUID STATS: The fluid level was shot by the operator, and was found to be at 1252' below the ground level.

RECOMMENDATION: The permit will allow the operator to inject 3000 bpm at an injection pressure of 250 psig. Operating at the maximum injection rate and injection pressure, the well will not endanger the USDW. Injection pressure was calculated by  $0.2 \times \text{depth}$  ( $0.2 \times 1253 = 250$  psig).

Reviewer bh Permit # 06SNMU2P9108  
 Date 9/21/10 Company Biya Operators, Inc.  
 Well # Horseshoe Gallup Unit 191  
 Location: NW /4; Sec 34, T 31N, R 16 W; 2215' F NL 660' F W L

### TECHNICAL REVIEW

Type of Injection Well: SWD/Conversion/Active

Injection: Continuous

Approximate # Days operating/year 365  
 Rate (B/M): Average    Maximum 3000  
 Wellhead Pressure (psi): Average    Maximum     
 Fluid: TDS    SP.GR.    Analysis Included: [Yes/No]  
 Source (Formation Name): Gallup

Geologic Data (All references to depths are below land surface)

Base of Historical Usable Water:  
 Base of USDW and How Determined: 0'  
 Injection Interval: Top 1253-1289

Effective Thickness 34''

Formation Name Gallup Lithology  
 Porosity (%)    Initial Reservoir Pressure    Date  
 Permeability (md)

Confining Zones: Thickness between injection zone & USDW 0'  
 Lithology  
 Cumulative Shale    Thickest Shale Zone    (Interval)

Well Data: (All references to depths are below land surface)

Surface Elevation GL 5391' Total Depth 1429'  
 Date Drilled or to be Drilled 11/26/58 Plugged Back Depth  
 Date Converted  
 Type Logs Available (this well/offset well): (By reference/included)

Test Data (By reference/included)

	Size (In.)	Depth Interval	Sacks of Cement	Hole Size	Cement Interval	How Determined
Construction:						
Surface Csg.	<u>8 5/8"</u>	<u>0-108'</u>	<u>100</u>	<u>12 1/4"</u>	<u>0-108'</u>	<u>Calculated</u>
Intermediate Csg.	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>
Long String Csg.	<u>5 1/2"</u>	<u>0-1427'</u>	<u>100</u>	<u>7 7/8"</u>	<u>746-1427'</u>	<u>Calculated</u>
Liner Csg.	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>	<u>  </u>
Tubing						
				Packer type & depth <u>Tension - 2706'</u>		
Type Cement =	ft <sup>3</sup> / Sx.	X	# of Sx.	Total ft <sup>3</sup> of Cement	Lin ft / ft <sup>3</sup> from tables	Lin. ft. = of Cement
	<u>1.18</u>		<u>100</u>	<u>118</u>	<u>2.4229</u>	<u>285'</u>
	<u>1.18</u>		<u>100</u>	<u>118</u>	<u>5.7719</u>	<u>681'</u>

Area of Review (AOR) (1/4 mile - Osage; 2 mile - O.I.L.)

Map Submitted: Yes      Tabulation of Wells Submitted: Yes

Faults Located: None Present

Number of Wells in AOR: Abandoned 0 Production 16 SWD\_EOR 0

Number of Wells in Zone of Endangering Influence

Number of Wells Requiring Corrective Action: SWD \_ EOR

<u>Well</u>	<u>Well Type</u>	<u>Problem</u>	<u>Corrective Action Required</u>
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Maximum Injection Pressure Calculation:  $P_m = (\text{Frac Gradient} - (.433 \times \text{SP.GR.})) \times \text{Depth}$

$P_m = (.75 - (.433 \times \underline{\quad})) \times \underline{\quad} = \underline{\quad} \text{ (Psi) (Used 250 psig. } .2 \times 1253 = 250 \text{ psig.)}$

Well **Passes** Technical Review

Date 9/21/1008 Reviewer BH