



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5

77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:
WU-16J

STATEMENT OF BASIS FOR ISSUANCE OF UNDERGROUND INJECTION CONTROL
(UIC) MAJOR CLASS II PERMIT MODIFICATION

Permit Number: MI-143-2R-0016

Facility Name: Norwich Unit #6-13

Merit Energy Company of Dallas, Texas has applied for a major modification to the U.S. Environmental Protection Agency (EPA) permit for the existing Norwich Unit #6-13 enhanced oil recovery injection well in the Norwich oil field, Roscommon County, Michigan. The application seeks a change in the pressure limitation to correct an error. The value of the maximum injection pressure in the existing permit was calculated incorrectly.

In accordance with the conditions set forth in Title 40 of the Code of Federal Regulations (40 CFR) 144.39(a)(1) and 124.5(a), the following permit conditions are proposed for modification:

PAGE/PERMIT CONDITION	MODIFICATION
Page 1/Effective date	Updated signature and effective date
Att. A-1/Injection Pressure Limitation	Change 2,849 psig to 2,944 psig

In accordance with 40 CFR 124.5(c)(2), only the conditions proposed to be modified above shall be reopened for public comment. All other existing conditions of the permit shall remain in full force and effect for the duration of the unmodified permit.

Review of the request for a major modification indicates that no significant environmental impact should result from the proposed permit modification. In accordance with the provisions of the Safe Drinking Water Act, as amended (42 U.S.C. 300f et seq., commonly known as the SDWA) and implementing regulations promulgated by EPA at Parts 124, 144, 146, and 147 of 40 CFR, EPA intends to issue a permit modification for the above-mentioned well.

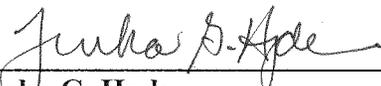
Issuance and Effective Date of Major Modification: In accordance with 40 CFR 124.15, the major modification will become effective immediately upon issuance if EPA does not receive public comments that request a change in the draft major modification. However, in the event that EPA receives public comments that request a change in the draft major modification, then the major modification will become effective 30 days after the date of issuance. In accordance with 40 CFR 144.36(a), the major modification will be in effect for the life of the facility, unless it is otherwise modified, revoked and reissued, or terminated as provided at 40 CFR 144.39, 144.40 and 144.41. The permit will be reviewed by EPA at least once every five years from its effective date for consistency with new or revised Federal regulations.

Questions and requests for additional information may be submitted to Stephen Roy at

(312) 886-6556 or roy.stephen@epa.gov. The public comment period will close as described in the Public Notice. The public comment period for this draft permit includes the required 30 days for the public comment period and an additional three days for the delay caused by mailing. If EPA receives written comments indicative of public interest that warrants a hearing on this action, a public notice of a scheduled hearing will be published locally and mailed to interested parties.

To preserve your right to appeal any final permit decision that may be made in this matter under 40 CFR Part 124, you must either send in written comments or participate in a public hearing on the draft permit decision. (A hearing is not planned at this time.) The first appeal must be made to the Environmental Appeals Board; only after all agency review procedures have been exhausted may you file an action in the appropriate Circuit Court of Appeals for review.

U.S. Environmental Protection Agency
Region 5 (WU-16J)
77 West Jackson Boulevard
Chicago, Illinois 60604-3590



Tinka G. Hyde
Director, Water Division



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA)
UNDERGROUND INJECTION CONTROL MAJOR PERMIT MODIFICATION:
CLASS II

Permit Number: MI-143-2R-0016

Facility Name: Norwich Unit #6-13

Pursuant to the provisions of the Safe Drinking Water Act (SDWA), as amended (42 U.S.C. §300f *et seq.*) and implementing regulations promulgated by the U.S. Environmental Protection Agency at Parts 124, 144, 146 and 147 of Title 40 of the Code of Federal Regulations (40 CFR),

Merit Energy Company of Dallas, Texas

is hereby authorized to continue operation of an existing injection well located in Michigan, Roscommon County, T24N, R4W, Section 7, 1/4 Section SE, for injection into the Richfield Formation at depths between 4,318 and 4,489 feet, upon the express condition that the permittee meet the restrictions set forth herein.

The purpose of the injection is limited to enhanced recovery of oil from production wells owned or operated by Merit Energy Company.

All references to Title 40 of the Code of Federal Regulations are to all regulations that are in effect on the date that this permit is effective.

This permit is a major modification of an existing permit which was signed on March 5, 1997. This permit shall become effective on _____ and shall remain in full force and effect during the operating life of the well, unless this permit is otherwise revoked, terminated, modified or reissued pursuant to 40 CFR §§144.39, 144.40 or 144.41. This permit shall also remain in effect upon delegation of primary enforcement responsibility to the State of Michigan, unless that State chooses to adopt this permit as a State permit. This permit will be reviewed at least every five (5) years from the effective date specified above.

Signed and dated: _____

DRAFT

Tinka G. Hyde
Director, Water Division

This permit contains 13 pages and attachments A through C.

PART I

GENERAL PERMIT COMPLIANCE

A. EFFECT OF PERMIT

The permittee is allowed to engage in underground injection in accordance with the conditions of this permit. The underground injection activity, otherwise authorized by this permit or rule, shall not allow the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any Primary Drinking Water Regulation pursuant to 40 CFR Part 142 or may otherwise adversely affect the health of persons. Any underground injection activity not specifically 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 State or local law or regulations. Compliance with the terms of this permit does not constitute a defense to any action brought under Section 1431 of the Safe Drinking Water Act (SDWA), or any other law governing protection of public health or the environment.

B. PERMIT ACTIONS

This permit may be modified, revoked and reissued, or terminated for cause as specified in 40 CFR 144.39, 144.40 and 144.41. The filing of a request for a permit modification, revocation and reissuance, 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.

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 Section 144.5, any information submitted to the USEPA pursuant to this permit may be claimed as confidential by the submitter. Any such claim must 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, USEPA 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:

- 1) The name and address of the permittee; and,
- 2) Information which deals with the existence, absence or level of contaminants in drinking water.

E. 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 pursuant to 40 CFR Section 144.34. Any permit noncompliance constitutes a violation of the SDWA and is grounds for enforcement action, permit termination, revocation and reissuance or modification.
2. Penalties for Violations of Permit Conditions - Any person who operates this well in violation of permit conditions is subject to civil penalties, fines, and other enforcement action under the SDWA and may be subject to such actions under the Resource Conservation and Recovery Act. Any person who willfully violates a permit condition is subject to criminal prosecution.
3. Need to Halt or Reduce Activity not a Defense - It shall not be a defense for a permittee in an enforcement action to state that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
4. 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.
5. 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 the permit.
6. Duty to Provide Information - The permittee shall furnish to the Director, within thirty (30) days, 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 by this permit to be retained.

7. 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 must be retained under the conditions of this permit;
- (c) Inspect at reasonable times any facilities, equipment (including monitoring equipment), practices, or operations regulated or required under this permit; and,
- (d) Sample or monitor the injected fluids, at reasonable times, for the purposes of assuring permit compliance, or as otherwise authorized by the SDWA, at any location.

8. Records

- (a) The permittee shall retain records of all monitoring information, including all calibration and maintenance records 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. The permittee shall also maintain records of all data required to complete this permit application and any supplemental information submitted under 40 CFR 144.27, 144.28 and 144.31. These periods may be extended by the Director at any time by written notice to the permittee.
- (b) The permittee shall retain records concerning the nature and composition of all injected fluids until three (3) years after the completion of plugging and abandonment in accordance with the plugging and abandonment plan, contained in Part III(B) of this permit. The owner or operator shall continue to retain the records after the three (3) year retention period unless he delivers the records to the regional Administrator or obtains written approval from the Regional Administrator to discard the records.
- (c) Records of monitoring information shall include:
 - (i) The date, exact place, and the time of sampling or measurements;
 - (ii) The name(s) of the individual(s) who performed the sampling or measurements;
 - (iii) A precise description of both sampling methodology and the

handling of samples;

- (iv) The date(s) analyses were performed;
- (v) The name(s) of the individual(s) who performed the analyses;
- (vi) The analytical techniques or methods used; and,
- (vii) The results of such analyses.

9. Notification Requirements

- (a) Planned Changes - The permittee shall notify and obtain the Director's approval at least thirty (30) days prior to any planned physical alterations or additions to the permitted facility, or changes in the injection fluids. Within ten (10) days prior to injection, an analysis of new injection fluids shall be submitted to the Director for approval in accordance with Parts II(B) (2) and II(B) (3) of this permit.
- (b) Anticipated Noncompliance - The permittee shall give at least thirty (30) days advance notice to the Director for his/her approval of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
- (c) Transfer of Permits - This permit is not transferrable to any person except after notice is sent to the Director at least thirty (30) days prior to transfer and the requirements of 40 CFR 144.38 have been met. The Director may require modification or revocation of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the SDWA.
- (d) 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 to the Director no later than thirty (30) days following each schedule date.
- (e) Twenty-Four (24) Hour Reporting
 - (i) The permittee shall report to the Director any noncompliance which may endanger health or the environment. This information shall be provided orally within twenty-four (24) hour from the time the permittee becomes aware of the circumstances, and shall include the following information:
 - (a) Any monitoring or other information which indicates that any contaminant may cause an endangerment to an

underground source of drinking water; 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 as soon as possible but no later than five (5) days from 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 recurrence of the noncompliance.
 - (f) Other Noncompliance - All other instances of noncompliance shall also be reported by the permittee in accordance with Part I(E) (9) (e) (i) and (ii) of this permit.
 - (g) Other Information - If or when the permittee becomes aware that he/she 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 promptly submit such facts or corrected information in accordance with 40 CFR 144.51(1) (8).
 - (h) Report on Permit Review - Within thirty (30) days of receipt of a final issued permit, the permittee shall report to the Director that he/she has read and is personally familiar with all the terms and conditions of this permit.
10. Commencing Injection - The permittee shall not inject until any corrective procedures described in Parts I(E) (16) and III(C) of this permit are complete, and;
- (i) The permittee has submitted a report on the corrective work to the Director; and,
 - (ii) The Director has inspected or otherwise reviewed the corrective work and notified the permittee in writing that he/she is in compliance with the conditions of this permit.
11. Signatory Requirements - All reports or other information requested by the Director shall be signed and certified according to 40 CFR 144.32.
12. Notice of Plugging and Abandonment - The permittee shall notify the Director at least forty-five (45) days before conversion or

abandonment of the well.

13. Plugging and Abandonment - The permittee shall plug and abandon the well as provided in the plugging and abandonment plan contained in Part III(B) of this permit. Plugging shall occur as soon as practicable after operation ceases but no later than two (2) years thereafter. During the period of non-operation, the well must be tested to ensure that it maintains mechanical integrity, unless the permittee fulfills the other requirements under 40 CFR 144.52(a)(6) prior to the expiration of the 2 year period. The permittee shall notify the Director of plugging and abandonment in accordance with the reporting procedures in Part I(E)(12) of this permit.
14. Financial Responsibility - The permittee shall maintain financial responsibility and resources to plug and abandon the underground injection well in accordance with 40 CFR 144.52(a)(7) as provided in Attachment R of the administrative record corresponding to this permit action which is hereby incorporated by reference as if it appeared fully set forth herein. The permittee shall not substitute an alternative demonstration of financial responsibility from that which the Director has approved, unless the permittee has previously submitted evidence of that alternative demonstration to the Director and the Director has notified the permittee in writing that the alternative demonstration of financial responsibility is acceptable. The financial responsibility mechanism shall be updated periodically, upon request of the Director; except when financial statement coverage is used as a financial mechanism; this coverage must be updated on an annual basis.
15. Insolvency
 - (a) In the event of the bankruptcy of the trustee or issuing institution of the financial mechanism, or a suspension or revocation of the authority of the trustee institution to act as trustee or the institution issuing the financial mechanism to issue such an instrument, the permittee must submit an alternative demonstration of financial responsibility acceptable to the Director within sixty (60) days after such event. Failure to do so will result in the termination of this permit pursuant to 40 CFR 144.40(a)(1).
 - (b) An owner or operator must 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 of a corporate guarantee must make such a notification if the permittee is named as debtor, as required under the terms of the guarantee.

16. Corrective Action

The permittee shall shut in the injection well whenever he/she or USEPA determines that operation thereof may be causing upward fluid migration through the wellbore of any improperly plugged or unplugged well in the area of review and shall take such steps as he/she can to properly plug the offending well(s). Any operation of the well which may cause upward fluid migration from an improperly plugged or unplugged well will be considered a violation of this permit. If the permittee or USEPA determines that the permitted well is not in compliance with 40 CFR 146.8, the permittee will immediately shut in the well until such time as appropriate repairs can be effected and written approval to resume injection is given by the Director. In addition the permittee shall not recommence injection until any and all corrective action has been taken in accordance with any plan contained in Part III(C) of this permit and the requirements in Part I(E) (10) of this permit have been met.

17. Mechanical Integrity

- (a) The permittee must establish and shall maintain mechanical integrity of this well, in accordance with 40 CFR 146.8.
- (b) A demonstration of mechanical integrity, in accordance with 40 CFR 146.8, shall be performed at least every five (5) years from the date of the last approved demonstration. The permittee shall notify the Director of his/her intent to demonstrate mechanical integrity at least thirty (30) days prior to such demonstration.
- (c) The permittee shall demonstrate the mechanical integrity of the well by pressure testing whenever: (i) the tubing is removed from the well or replaced; (ii) the packer is reset; or, (iii) a loss of mechanical integrity occurs. Operation shall cease whenever one of the above-mentioned conditions occurs and not resume until the Director gives approval to recommence injection.
- (d) The Director may, by written notice, require the permittee to demonstrate mechanical integrity at any time.
- (e) The permittee shall cause all gauges used in mechanical integrity demonstrations to be calibrated prior to the demonstration.
- (f) The permittee shall cease injection if a loss of mechanical integrity is discovered during a test, or a loss of mechanical integrity, as defined by 40 CFR 146.8, becomes evident during operation. Operations shall not be resumed until the Director gives approval to recommence injection.

- (g) The permittee shall notify the Director of the loss of mechanical integrity, in accordance with the reporting procedures in Parts II(B) (3) (d) and I(E) (9) (e) of this permit.
 - (h) The permittee shall report the results of a satisfactory mechanical integrity demonstration as provided in Part II(B) (3) (d) of this permit.
18. Restriction on Injected Substances - The permittee shall be restricted to the injection of oil field brines or those fluids used in the enhancement of oil and gas production as specified in 40 CFR 146.5(b). Further, no fluids other than those from sources noted in the administrative record and approved by the Director shall be injected.

PART II

WELL SPECIFIC CONDITIONS FOR UNDERGROUND INJECTION CONTROL PERMITS

A. CONSTRUCTION REQUIREMENTS

1. Siting - Notwithstanding any other provision of this permit, the injection well shall inject only into a formation which is separated from any USDW by a confining zone that is free of known open faults or fractures within the area of the review.
2. Casing and Cementing - Injection wells shall be cased and cemented to prevent the movement of fluids into or between USDWs. Specifics on the casing and cement to be used in the construction of the well shall be as contained in Attachments L and M of the administrative record corresponding to this permit action which are hereby incorporated by reference as if they appeared fully set forth herein.
3. Tubing and Packer Specifications - Injection shall only take place through tubing with a packer set in the long string casing within or below the nearest cemented and impermeable confining system immediately above the injection zone. Tubing and packer specifications shall be as represented in engineering drawings contained in Attachments L and M of the administrative record corresponding to this permit action which are hereby incorporated by reference as if they appeared fully set forth herein. Any proposed changes shall be submitted by the permittee in accordance with Part I(E) (9) (a) and (b) of this permit.
4. Wellhead Specifications - For every injection well, the operator shall provide a female fitting, with a cutoff valve, to the tubing at the wellhead, so that the amount of injection pressure being used may be measured by a representative of the USEPA by attaching a gauge having a male fitting.
5. Prohibition of Unauthorized Injection - Any underground injection, except as authorized by permit or rule issued under the UIC program, is prohibited. The construction, including drilling, of any well required to have a permit is prohibited until the permit has been issued.

B. OPERATING, MONITORING AND REPORTING REQUIREMENTS

1. Operating Requirements

- (a) Beginning on the effective date of this permit, the permittee is authorized to operate the injection well, subject to the limitations and monitoring requirements set forth herein. The

injection pressure and injected fluid shall be limited and monitored as specified in Parts I(E) (18) and III(A) of this permit.

- (b) Injection at a pressure which initiates fractures in the confining zone or causes the movement of injection or formation fluids into or between USDWs is prohibited.
- (c) Injection between the outermost casing protecting USDWs and the well bore is prohibited.
- (d) The annulus between the tubing and the long string casing shall be filled with a liquid designed to inhibit corrosion. The annulus liquid will be monitored in accordance with Parts II(B) (2) (d) of this permit. Any specific annulus requirements are contained in Part III(A) of this permit.

2. Monitoring Requirements

- (a) Samples and measurements, taken for the purpose of monitoring as required in Part II(B) (3) shall be representative of the monitored activity. Grab samples shall be used to obtain a representative sample of the fluid to be analyzed. Part III(A) of this permit describes the sampling location and required parameters for injection fluid analysis. The permittee shall identify the types of tests and methods used to generate the monitoring data. The monitoring program shall conform to the one described in Part III(A) of this permit.
- (b) Analytical Methods - Monitoring of the nature of injected fluids shall comply with applicable analytical methods cited and described in Table I of 40 CFR Section 136.3 or in Appendix III of 40 CFR Part 261 or by other methods that have been approved by the Director.
- (c) Injection Fluid Analysis - The nature of the injection fluids shall be monitored as specified in Part III(A) of this permit. An initial analysis of the injection fluid is contained in Attachment H of the administrative record corresponding to this permit action which is hereby incorporated by reference as if it appeared fully set forth herein. The Director may, by written notice, require the permittee to sample and analyze the injected fluid at any time.
- (d) Injection Pressure, Annulus Pressure, Annulus Liquid Loss, Flow Rate and Cumulative Volume - Injection pressure, annulus pressure, flow rate and cumulative volume shall be recorded at least weekly and shall be reported annually as specified in Part III(A) of this permit. Annulus liquid loss shall be recorded at least semi-annually and shall be reported in accordance with the provisions

of Part II(B) (3) (a), as the volume of liquid added to the annulus to keep it filled in accordance with Part II(B) (1) (d). All gauges used in monitoring shall be calibrated in accordance with Part I(E) (17) (e) of this permit.

3. Reporting Requirements - Copies of the monitoring results and all other reports shall be submitted to the Director at the following address:

U.S. Environmental Protection Agency
Region 5
77 West Jackson Street
Chicago, Illinois 60604-3590
Attn: UIC Branch, Direct Implementation (WU-16J)

- (a) Annual Reports - Monitoring results obtained during each week shall be recorded on a form which has been signed and certified according to 40 CFR 144.32. Reports shall be submitted at the end of each anniversary year and shall be postmarked no later than the 10th day of the first month of the following year. The first report shall be sent no later than the 10th day of the month following the month of the final issued permit. Reports shall include the weekly measurements of injection pressure, annulus pressure, flow rate and cumulative volume as required in Parts II(B) (2) (d) and III(A) of this permit. Reports shall also contain the semi-annually measurements of annulus liquid fluid additions or subtractions as required in Parts II(B) (2) (d) and III(A) of this permit. Reports shall also contain the monitoring results obtained each year during measurement of injected fluid characteristics as required in Parts II(B) (2) (c) and III(A) of this permit.
- (b) Reports on Well Tests, Workovers and Plugging and Abandonment - The permittee shall provide the Director with the following reports and test results within sixty (60) days of completion of the activity:
- (i) Mechanical integrity tests, except tests which the well fails in which case twenty-four (24) hour reporting under Part I(9) (e) is applicable;
 - (ii) Logging or other test data;
 - (iii) Well workovers (Using EPA Form 7520-12); and,
 - (iv) Plugging and abandonment.

PART III

SPECIAL CONDITIONS

These special conditions include, but are not limited to plans for maintaining correct operating procedures, monitoring conditions and reporting, as required by 40 CFR Parts 144 and 146. These plans are described in detail in the permittee's application for a permit, and the permittee is required to adhere to these plans as approved by the Director as follows:

- A. OPERATING, MONITORING AND REPORTING REQUIREMENTS (ATTACHED)
- B. PLUGGING AND ABANDONMENT PLAN (ATTACHED)
- C. CORRECTIVE ACTION PLAN (ATTACHED)

ATTACHMENT A
OPERATING, MONITORING AND REPORTING REQUIREMENTS

CHARACTERISTIC	LIMITATION	MINIMUM MONITORING REQUIREMENTS		MINIMUM REPORTING REQUIREMENTS
		Frequency	Type	Frequency
*Injection Pressure	2,944 psig (MAXIMUM)	weekly		monthly
Annulus Pressure		weekly		monthly
Flow Rate		weekly		monthly
Cumulative Volume		weekly		monthly
**Annulus Liquid Loss		semi-annually		quarterly
***Chemical Composition of Injected Fluid		annually	grab	annually

SAMPLING LOCATION: Sample tap at the storage tanks.

- * The limitation on wellhead pressure serves to prevent confining-formation fracturing. This limitation was calculated using the following formula: $[\{ 1.14 \text{ psi/ft} - (0.433 \text{ psi/ft})(\text{specific gravity}) \} \times \text{depth}] - 14.7 \text{ psi}$. The maximum injection pressure is dependent upon depth and specific gravity of the injected fluid. The Richfield Formation at 4,318 feet was used as the depth and a specific gravity of 1.05 was used for the injected fluid. The fracture gradient (1.14 psi/ft) was obtained from the field rules published in the Federal Register / Vol. 58, No. 224 / Tuesday, November 23, 1993 / Notices.
- ** Measurements of annulus liquid loss and the additions or subtractions necessary to keep the annulus filled shall be made at least twice per year, with no two measurements, additions or subtractions made at intervals greater than six months apart.
- *** Chemical composition analysis shall include, but not be limited to, the following: Sodium, Calcium, Magnesium, Barium, Total Iron, Chloride, Sulfate, Carbonate, Bicarbonate, Sulfide, Total Dissolved Solids, pH, Resistivity (ohm-meters @ 75°F), and Specific Gravity.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460



PLUGGING AND ABANDONMENT PLAN

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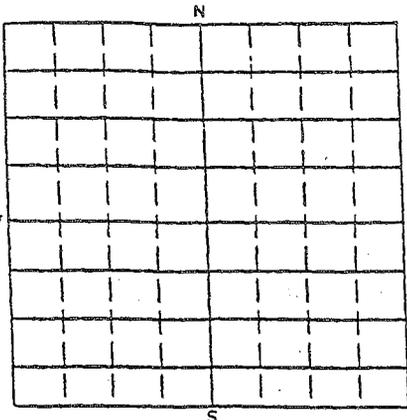
NAME AND ADDRESS OF FACILITY

NORWICH #6-13 Well

NAME AND ADDRESS OF OWNER/OPERATOR

Merit Energy Company
12222 Merit Drive, Suite 1500
Dallas, TX, 75251

LOCATE WELL AND OUTLINE UNIT ON SECTION PLAT - 640 ACRES



STATE COUNTY PERMIT NUMBER
MI Roscommon 33339

SURFACE LOCATION DESCRIPTION
1/4 of ~~5~~ 1/4 of ~~SW~~ 1/4 of ~~7~~ 1/4 of Section ~~14~~ Township ~~4W~~

LOCATE WELL IN TWO DIRECTIONS FROM NEAREST LINES OF QUARTER SECTION AND DRILL

Surface Location 330 ft. from (N/S) S Line of quarter section
and 550 ft. from (E/W) W Line of quarter section

TYPE OF AUTHORIZATION WELL ACTIVITY

Individual Permit
 Area Permit
 Rul.

Number of Wells 1

CLASS I
 CLASS II
 Brine Disposal
 Enhanced Recovery
 Hydrocarbon Storage
 CLASS III

Lease Name NORWICH

Well Number 6-13

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT(LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
8 5/8	# 28	869'	869'	
5 1/2	# 14	4560'	3560'	

METHOD OF EMPLACEMENT OF CEMENT PLUGS

- The Balance Method
 The Dump Bailer Method
 The Two-Plug Method
 Other

CEMENTING TO PLUG AND ABANDON DATA:

	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #
Size of Hole or Pipe in which Plug Will Be Placed (inches)	5 1/2	5 1/2 - 8 5/8	8 5/8			
Depth to Bottom of Tubing or Drill Pipe (ft.)	4560	1050	50			
Sacks of Cement To Be Used (each plug)	58	121	15			
Slurry Volume To Be Pumped (cu. ft.)	58	142	18			
Calculated Top of Plug (ft.)	4058	519	0			
Measured Top of Plug (if tagged ft.)						
Slurry Wt. (Lb./Gal.)	15.6	15.6	15.6			
Type Cement or Other Material (Class III)	A	A	A			

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)

From	To	From	To
4318	4325	4477	4479
4345	4350	4484	4489
4356	4365		
4379	4381		
4416	4433		

Estimated Cost to Plug Wells

\$ 22,000 ea.

CERTIFICATION

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

NAME AND OFFICIAL TITLE (Please type or print)

Rusty Ginnetti

SIGNATURE

DATE SIGNED

2/05/99

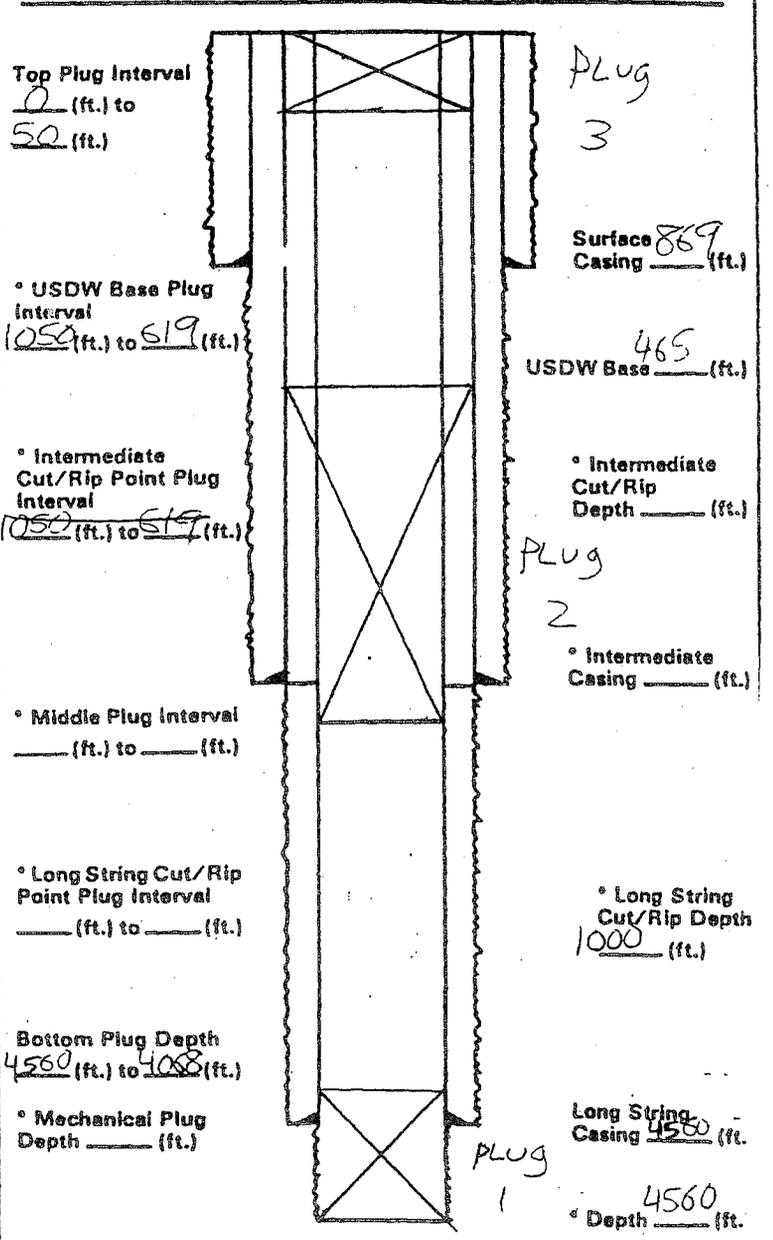
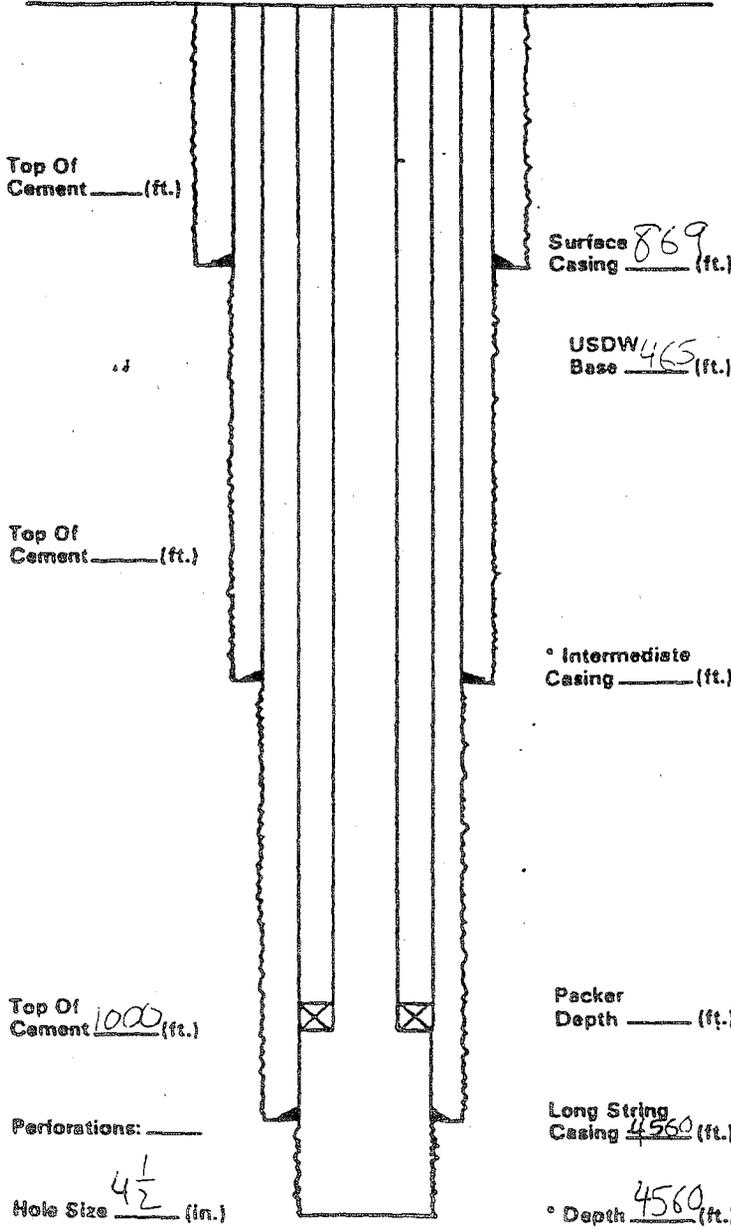
ORIGINAL WELL CONSTRUCTION DURING OPERATION

PLUGGING AND ABANDONMENT

6-13

Surface

Surface



** Add Any Additional Information
* May Not Apply

** Add Any Additional Information
* May Not Apply

LIST OF ALL OPEN AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED

Specify Open Hole/Perforations/Varied Casing	From	To	Formation Name
PERFS	4318	4325	FROM 4484 TO 4489
	4345	4350	
	4356	4365	
	4379	4381	
	4416	4433	
	4477	4479	

Facility Name: Norwich Unit 6-13
Missaukee County, Michigan

Attachment Q

Plugging and Abandonment Minimum Requirements

At such time as the well is plugged, the following requirements will be met. The attached plugging and abandonment forms or those forms applicable at the time of plugging will be prepared.

1. The owner/operator will notify the USEPA 45 days prior to the commencement of plugging operations unless specified otherwise.
2. Downhole material and/or debris located above the injection zone will be removed.
3. A cement plug that extends at least 250 feet immediately above the injection zone will be placed. Alternatively, a mechanical plug may be set immediately above the injection zone to isolate the injection zone; however, 50 feet of cement will be placed on top of all mechanical plugs.
4. All uncemented ("free") casing will be removed from the well.
5. A 100 foot cement plug will be placed at all casing cut/rip points. This plug will extend from at least 50 feet below the cut/rip point to at least 50 feet above the rip point.
6. To properly isolate Underground Sources of Drinking Water (USDWs), a cement plug will be placed extending from at least 50 feet below the lowermost USDW to the surface. However, in Michigan, if approved by Region V, a top and bottom plug could be used to isolate USDWs. The bottom plug will extend from at least 50 feet below the lowermost USDW to at least 50 feet into the surface casing or 50 feet above the base of the lowermost USDW (whichever is more stringent). The top of the plug will extend from at least 50 feet to the surface (NOTE: if the base of the lowermost USDW is less than 500 feet below the surface, a single cement plug as described above, will be used.)
7. Casing will be cut off 3-5 feet below land surface and the surface will be restored to its original condition.

CORRECTIVE ACTION PLAN

No corrective action is required at this time.