

LARAMIE ENERGY, LLC
Cascade Creek 797-05-52 Pad
Hydrogen Sulfide (H₂S) Operations Plan

PERSONNEL TRAINING

H2S Awareness Training for all Piceance Employees by 3rd party Safety Company (JZ Safety)
H2S Gas Alert monitors issued to all Laramie Energy, LLC personnel.
Water Haulers- Have own H2S awareness and training programs
Chemical Companies- Have own H2S awareness and training programs

SITE DESCRIPTION

Operator Name: **Laramie Energy, LLC**
Location Id: **Cascade Creek 797-05-52 Pad (ID: 276680)**

Well Name: **Cascade Creek 797-05-52**
API no: **05-045-10512**
Lat/Long: **39.470408/-108.24399**
Legals: **SESW S5, T7S, R97W 6th**
County: **Garfield**

OPERATOR KEY PERSONNEL

Eric Lane
Production Superintendent
Manages Field Wide Production Operations
O: 970-487-3582
M: 970-230-1011
mjohnson@laramie-energy.com

John Grubich
Completions Manager
Oversees Completion and Workovers
O: 970-812-5312
M: 970-589-9496
jgrubich@laramie-energy.com

Wayne P. Bankert
Senior Regulatory and Environmental Coordinator
Regulatory and Environmental Permitting and Compliance
O: 970-812-5310
M: 970-985-5383
wbankert@laramie-energy.com

Robert G. Hea
EVP & Chief Operating Officer
O: 303-339-4925
M: 303-842-4982
bhea@laramie-energy.com

RESCUE & MANAGEMENT PERSONNEL

Emergency: 911

Laramie Energy Emergency:	1-800-891-6191
Garfield County Sheriff:	970-625-8095 (Non-Emergency)
Mesa County Sheriff:	970-242-6707 (Non-Emergency)
Colorado State Patrol HazMat	970-242-6707

DeBeque Fire Department (Non-Emergency)	(970) 283-8632
Plateau Valley Fire Department (Non-Emergency)	(970) 268-5283
Garfield County Dispatch	(970) 625-8095
Mesa County Dispatch (Cascade Creek & Collbran)	(970) 242-1234
Rio Blanco County Dispatch	(970) 878-9620
LEPC Cascade Creek (Local Emergency Planning Committee):	(970) 945-0453
Chris Bornholdt, Garfield County Emergency Manager	
LEPC Collbran (Local Emergency Planning Committee):	(970) 244-1763
Andrew Martsolf, Mesa County Emergency Manager	
St. Mary's CareFlight Helicopter	(970) 332-4923

St. Mary's Hospital 970-298-2273
2635 N 7th St.
Grand Junction, CO 81501

WELL SITE DIAGRAM

See Attached Exhibit

ACCESS, EGRESS, and ROADS

See Attached Exhibit for Roads and Access.

Traffic Control - Supplied by 3rd Party Safety Contractor (ex. Onsite Safety, Inc.)
Attendance Roster - Supplied by 3rd Party Safety Contractor (ex. Onsite Safety, Inc.)

PROTECTIVE EQUIPMENT FOR ESSENTIAL PERSONNEL

Supplied by contracted H2S Safety Contractor

Including: Onsite H2S Awareness Training
 2 H₂S Specialists (with SCBA and Personal Monitors)
 Breathing Air Trailer
 Escape Packs
 Monitor System for Location (To be installed by Safety Contractor before work but will be unique to each workover operation to be performed).

H₂S DETECTION AND MONITORING EQUIPMENT

See Above list of equipment supplied by H₂S Safety Contractor

VISUAL WARNING SIGNS

H₂S placarding and wind socks in place

METALLURGY

2 3/8" L-80 Tubing in wellbore
ANSI 600 1440 psi working pressure gathering. (buried)

WELL CONTROL(DRILLING OPERATIONS)

H₂S was introduced in well with contaminate completion water during the stimulation process. No H₂S was detected in any well during drilling at this location.

MUD PROGRAM (DRILLING OPERATIONS)

See above explanation for Drilling Operations.

Laramie Energy, LLC
Cascade Creek 797-05-52 Pad
Site Diagram and Equipment Layout



Laramie Energy, LLC
Cascade Creek 797-05-52 Pad
H₂S Remediation Details



H₂S Notice to Operators

Hydrogen Sulfide (H₂S) Notice to Operators Attachment C Reporting Guidance Questionnaire

Operators shall complete and submit Attachment C (Reporting Questionnaire) of this NTO to COGCC concurrent with submittal of an Operations Plan, and if required, a Public Protection Plan pursuant to BLM Onshore Order No. 6.

Operator Name: Laramie Energy, LLC (10433)
Well Name: Cascade Creek #797-05-52
API Number: 05-045-10512
Legal Location: SESW Sec. 5 T7S, R97W 6th
Field Name: Grand Valley (31290)
County: Garfield
Operator Contact: Wayne P. Bankert
Title: Senior Reg. & Env. Coordinator
Phone: O: 970-812-5310 C: 970-985-5383
Email: wbankert@laramie-energy.com

Description of operation underway or circumstances:

During routine meter calibration for the referenced well, H₂S was detected at the separator in excess of 120 ppm concentration. The following day another Draeger tube test was conducted at the wellhead pegged at 120 ppm. Well was shut in to conduct further tests to assess concentration level(s).

Date of sampling was 9/14/2016.

Based on the calculated ROE calculated for this well, a Public Protection Plan is not required.

Distance to closest normally occupied building or structure (feet): 440
Number of buildings or structures within 3,000 feet: 3
Distance to closest public road (feet): 1500
Name of public road: County Road 213
Prevailing wind direction: Generally South Easterly

H₂S Notice to Operators

Notifications

COGCC: Verbal ☐ **Written(attach documentation)** ☒

If Yes:

Name of Contact(s): Craig Burger

Contact Date(s): 9/13/2016 Form 4 Doc no. 401109323

Local Governmental Designee: Verbal ☒ **Written(attach documentation)** ☐

If Yes:

Name of Contact(s): Kirby Winn

Contact Date(s): Verbal and Email 9/13/2016

Gas Sampling & Analysis

Reservoir Name/Completed Zone: Mesa Verde (WMFK, Cozzette-Corcoran)

Description of Sample Location: Sample port on Separator

Is the sample "representative" of reservoir concentrations (see NTO narrative for a definition of a "representative" sample): **Yes** ☒ **No** ☐

Well casing or drill pipe volume from surface to TMD(cubic feet): 113.6 ft³

Estimated continuous cumulative flow volume at time of sample (cubic feet): 220 mcf

Flow rate at time of sample (cubic feet per day): 220,000 cf

Absolute Open Flow of well (cubic feet per day): 279,000 cf

Reservoir pressure (psig): 795 psig

Reservoir temperature (°F): 155

Tubing Data: 2 3/8" 4.6# L-80 @ 5234'

Volume: 0.02171 ft³/ft

H₂S Notice to Operators

Radius of Exposure

Equations Assume:

Pressure = 14.7 psig

Temperature = 60 °F

100 ppm Radius of Exposure:

H₂S (ppm) = 120

H₂S mole fraction (ppm divided by 1 million) = 0.000120

Q (CFD) = 279,000 at atmospheric pressure

$$R = [(1.589) \cdot (\text{H}_2\text{S mole fraction}) \cdot (Q)]^{0.6258}$$

R = Radius of Exposure (feet) 12.02

500 ppm Radius of Exposure:

H₂S (ppm) = 120

H₂S mole fraction (ppm divided by 1 million) = 0.000120

Q (CFD) = 279,000 at atmospheric pressure

$$R = [(0.4546) \cdot (\text{H}_2\text{S mole fraction}) \cdot (Q)]^{0.6258}$$

R = Radius of Exposure (feet) 5.49

Tanks, Pressure and Storage Vessels Sampling/Measurement

1 # Tank(s) NA # Free Water Knockouts (FWKO) NA # Pressurized Vessels
#001056

Largest Tank: 400 bbls Free water knockout: NA bbls

Largest Tank: 20 height (feet) Free water knockout: NA height (feet)

Liquid level: 0.5 feet to liquid from thief hatch in top

Sample point: 0.5 feet above liquid level

H₂S Notice to Operators

Liquid level: NA feet of liquid in pressure vessel

Working Pressure: NA psi in pressure vessel

Tank: 1 H₂S ppm FWKO: NA H₂S ppm Pressurized Vessels: NA H₂S ppm

H₂S Notice to Operators

Additional Required Information

Description of Well Control Equipment:

NA

Description of H₂S mitigation and management:

See Attached exhibits

Has the need for compliance with the most current NACE MR0175 standard been determined and what is the H₂S partial pressure of the system with a description of equipment metallurgy to be used.

Check and report on flow lines and gathering line(s) leaving well pad:

NA Water: Outside Diameter:____in Rate:____bbls/day H₂S:____ppm Working pressure:____psi
Gas: Outside Diameter:6____in Rate: 0____bbls/day H₂S:____ppm Working pressure:____psi
NA Oil: Outside Diameter:____in Rate:____bbls/day H₂S:____ppm Working pressure: psi

Gas Gathering line. 6" 0.188" wall ANSI 600 WP 1440 psi