REVIEWED
By Mike Buchanan at 11:01 am, Jan 26, 2024

Review of the Energen Delineation of Ground Water: Content Satisfactory and Received for the Record.
1. Please include a brief memo into the incident file why 2019 was missed for sampling monitoring wells.

Date: **Jan 29, 2021**

Ramona Marquez
New Mexico Oil Conservation Division

RE: ***Energen Resources Corporation West Lovington Strawn Unit No. 8***
UL "L" Section 34-Township 15 South, Range 35 East, Lea County New Mexico
OCD No. 1RP-2457
Delineation of Ground Water

Dear Ms. Marquez:

I write this letter at the request of Brad Billings of the New Mexico Oil Conservation Division to provide evidence of authorization of Wayne Price of Price, LLC to, consistent with the understanding set forth in this letter, represent and submit documents on behalf of Energen Resources Corporation ("Energen"). Energen is a wholly owned subsidiary of Diamondback Energy, Inc.

Mr. Price has been retained by Energen to consult and advise concerning claims of groundwater contamination associated with the West Lovington Strawn Unit No. 8. In that regard he has been authorized to submit documents on behalf of Energen to the New Mexico Oil Conservation Division, and in particular to submit those documents necessary to obtain approval for the installation of four additional ground water monitoring wells, as set forth in his letter of January 4, 2021 to Mr. Brad Billings and subsequent communication between he and Mr. Billings.

I trust that this gives you the information necessary to properly document the authorization of Mr. Price to act on behalf of Energen.

Very truly yours,

Andy Cobb

From: **Wayne Price** wayneprice@q.com
Subject: 1RP-2457 Amended
Date: January 19, 2021 at 8:25 AM
To: EMNRD Billings Bradford Bradford.Billings@state.nm.us
Cc: Wayne Price wayneprice@q.com, Richard Olson rolson@hinklelawfirm.com, Clayton Barnhill cmbenviro@gmail.com

Dear Brad,

Please find attached the amended plan pursuit to our recent telephone conference call. I will also insert this E-mail and aerial view showing the additional MW-10 down-gradient well and the moved location of the up-gradient MW-9 well in your new electronic submittal system. Per your phone instructions we may begin the project.

Thank you for your assistance.

Wayne Price-Price LLC
7 SYCAMORE LANE
GLENWOOD NM 88039
wayneprice@q.com
505-715-2809

January 05, 2021

Mr. Brad Billings-NMOCD-Albuquerque Office,
5200 Oakland Avenue, N.E. Suite 100, 87113
Via E-mail: EMNRD Billings Bradford <Bradford.Billings@state.nm.us

Reference: Energen Resources Corporation
West Lovington Strawn Unit#8
UL "L" Sec 34–TS15S Rg 35E
Lea County, NM
OCD Case # 1RP-2457

Subject: Delineation of Groundwater

Dear Brad,

On behalf of the Energen Resources Corporation Project, Price LLC (Wayne Price) request OCD approval to install three (3) additional groundwater monitoring wells at the above reference location. The objective is to further define the vertical and horizontal extent of contamination at the site.

Our plan is to install an up-gradient well and two additional down-gradient wells. Please refer to the attached aerial plat for approximate locations. The attachment includes a simple dilution box model that assisted in determining the down-gradient distance for these wells. The estimated depth was taken from area wells logs and "Triassic" Red Bed maps for the area. (REF: USGS Hydrologic Investigation Atlas HA-62) complete report enclosed for reference.

The down-gradient well locations were place in order to assure future protection of known fresh water resources in the area.

Each well will be an EPA approved type nested well containing three isolated 2" well bores with isolation seals and proper sand/gravel pack, all completed in a 6" PVC casing. The top well will be equipped with 20 foot slotted screen, 5 feet above he current water level and 15 ft. below. The second well will be similar in construction and will have 15 feet of screen in the mid-range of the aquifer, and the third well will have 15 feet of screen for monitoring the bottom of the aquifer.

This will allow samples to be collected at the top, middle and bottom of the aquifer to pick up floating hydrocarbons or density gradient constituents such as chlorides.

Before installation of additional monitor wells, we plan on collecting water samples from each existing monitor well for WQCC volatiles, semi –volatiles, metals, and

inorganic constituents to establish a new baseline and constituents of concern (COC's).

The first round of sampling of the three new wells will also include these COC's. Attached is the most recent water analysis that was collected in 2018 with up-dated site plat. The 2019 event is missing, and we will report the next results in the first quarter of 2021.

Once the new wells have been installed, levels measured, we will utilize EPA protocols, properly purge with Ph., Conductivity, and Temperature measurements to ensure we are obtaining a stabilized sample before collecting, preserve, and then analyzed at an approved Laboratory.

A report will be sent to you with findings, conclusions and recommendations.

If you have any questions, concerns or comments please contact me at wayneprice@q.com or 505-715-2809.

Sincerely,

W Price

Wayne Price-Price LLC
7 Sycamore Ln
Glenwood, NM 88039

CC: Richard Olson-Hinkle Shanor LLP
Bill B. Caraway-Deputy General Counsel Diamondback Energy
Andy Cobb-Diamondback Energy Inc.
Clay Barnhill-CMB Environmental & Geological Services
Wayne Price-Jr BSME Environmental Engineer

Attachments:

1- Aerial view of proposed wells.
2- GW Model.
3- USGS- Geography, Geology and Groundwater and Histoy.
4- Annotated Site Map with most recent Chlorides.
5- Nov 2018 analytical result report

Dilution Box Model
Energen Resources-W. Lov. Strawn Unit #8
UL I-Sec 34-Ts15S-R34E
OCD 1RP-2457

Model Objective: To determine a reasonable distance for installing down-gradient monitor wells to define the outer limit of the contamination.

Model Description: A simple volumetric dilution model that compares the estimated source volume at certain worst case concentration of Chlorides, to an estimated volume of down-gradient fresh water, and calculates the DAF (Diluton Attenuation Factor) for the site. By varing the down-gradient length (a manuel reiterative process), then the assumptions provides a calculated distance for the installation of down-gradient wells. Model assumtions for the initial source area was taken from the site diagram and initial depth estimated. The mixing zone lateral width of 100 feet was used as several EPA DAF models use this default dimension. The depth was determine from the estimated depth of the first confinin layer in the Ogalla aquifer in this area.

Model Limitations: This model is for estimation of MW placement, and only provides an Initial starting point. Depending upon future sampling results will actul determine future delineation work.

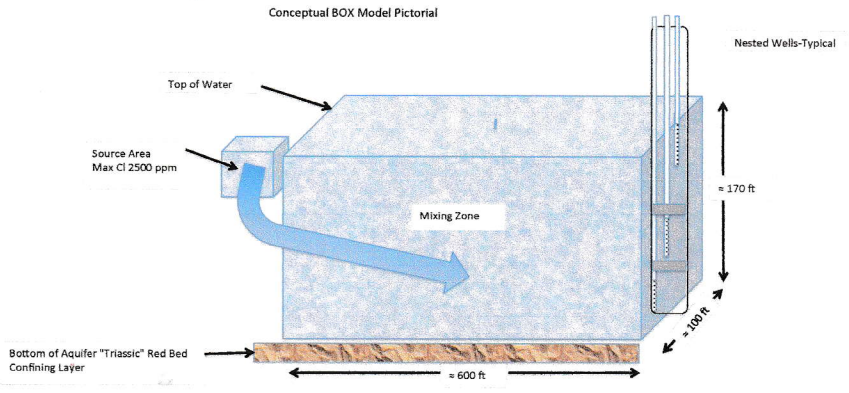
Model Results: The model results indicate that the wells can be approximately 600 ft down-gradient and still maintain a Chloride level of the natural background.

	Wide ft	Sat thickness Depth ft	Length ft	VOL Ft3	Gal/ft3		
Source Area Volume	50	50	50	125000	7.46	932,500	Galloms
Diluted Volume Down-Gradient	100	170	600	10200000	7.46	76,092,000	Galloms

81.6 DAF

Source	2,500 ppm		2500 PPM	
Diluted down Gradient		2500/Daf=	31 PPM	Estimated Chlorides within statistical range for background

Conceptual BOX Model Pictorial



DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE NEW MEXICO STATE ENGINEER

HYDROLOGIC INVESTIGATIONS
ATLAS HA-62 (SHEET 1 OF 2)

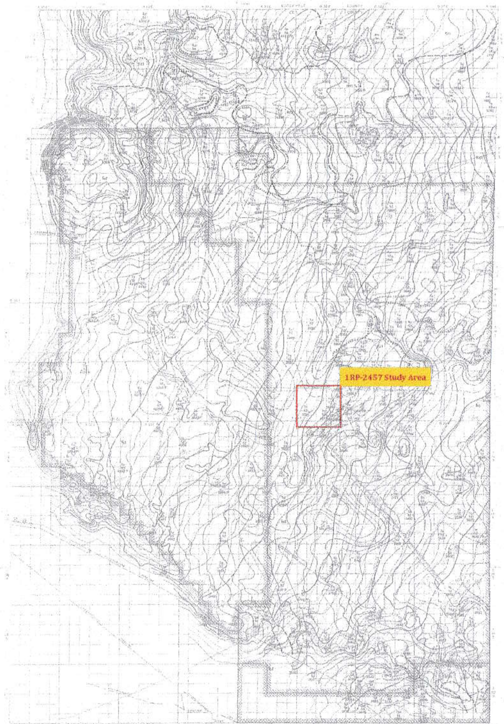


FIGURE 2.—SECTION ALONG A-A' FROM MESCALERO RIDGE TO THE NEW MEXICO—TEXAS STATE LINE IN NORTHERN LEA COUNTY, NEW MEXICO

EXPLANATION

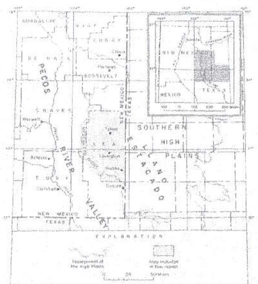


FIGURE 1.—INDEX MAP SHOWING THE LOCATION OF THE NORTHERN LEA COUNTY AREA AND ITS RELATION TO THE HIGH PLAINS AND THE PECOS RIVER VALLEY

INTRODUCTION

Northern Lea County, New Mexico, is dependent chiefly on ground water for its water supply. It also is one of many areas in New Mexico in which ground water is being mined; that is, more water is being withdrawn from the ground-water reservoir both by natural means and by pumping for irrigation, municipal, stock, and industrial use than is being recharged to the reservoir. The magnitude of the pumping and the volume of the water in storage are such that in places the depletion of the reservoir may be measured in a few tens of years on the basis of the rate of use of water in 1959.

The State Engineer of New Mexico declared the Lea County Underground Water Basin in 1931 subject to regulation of the development of water in this area. New Mexico water policy is based on the philosophy that the withdrawal of water from an area of ground-water mining should be limited to a rate that will permit amortization of the investment in farms irrigated with ground water over a period of 40 years (Reynolds, 1960, p. 233-234). In parts of northern Lea County, the ground-water supply is considered to be fully appropriated. In these areas the users of ground water for irrigation can expect about 40 years of supply at the rate of use in 1963 and extending from that date unless additional supplies are discovered in deeper water-bearing formations. Beyond such a period there will remain in storage sufficient water for stock and municipal use and, to some extent, water for industrial use for many years to come. In other parts of the declared basin water was still unappropriated in 1960.

PURPOSE AND SCOPE

The purpose of this atlas is to make available in convenient form information on the ground-water reservoir in northern Lea County, New Mexico, an area dependent chiefly on ground water for its water supply. The atlas shows by means of maps the saturated thickness of the principal ground-water reservoir and indirectly the volume of water in storage in northern Lea County. Other maps show the depth to water and areas in which water levels have declined in the past several years. The atlas was prepared as a part of the general program of ground-water investigations being made by the U.S. Geological Survey in cooperation with the State Engineer Office of New Mexico. The information contained in the atlas should lead to a better understanding of the availability of water in this important part of the State.

...

tion. The loam strips are surrounded, in most places, by an cultivated scabland or by sand hills. The scabland is chiefly thin, rocky loam, and the sand hills are chiefly sandy loams. The sand hills, like the loams, occur in long narrow strips.

The northwest-southeast lineation of the soils and sand hills is well illustrated on the soil map of the area around Lovington (Harper and Smith, 1935). The cause of the lineation is unknown; however, the trend, thickness, and location of the soil strips suggest that the lineation may be related to streams of Tertiary age which originated to the west and flowed southeastward at the time the Ogallala formation was being deposited. The lineation may also be related to older sand-dune patterns developed from prevailing southwesterly winds.

Generally, only clay is found on the floors of the shallow closed depressions because the coarser materials are deposited at the margins as the water flows to the depressions; only very fine materials can be carried by the weak currents in the ephemeral lakes.

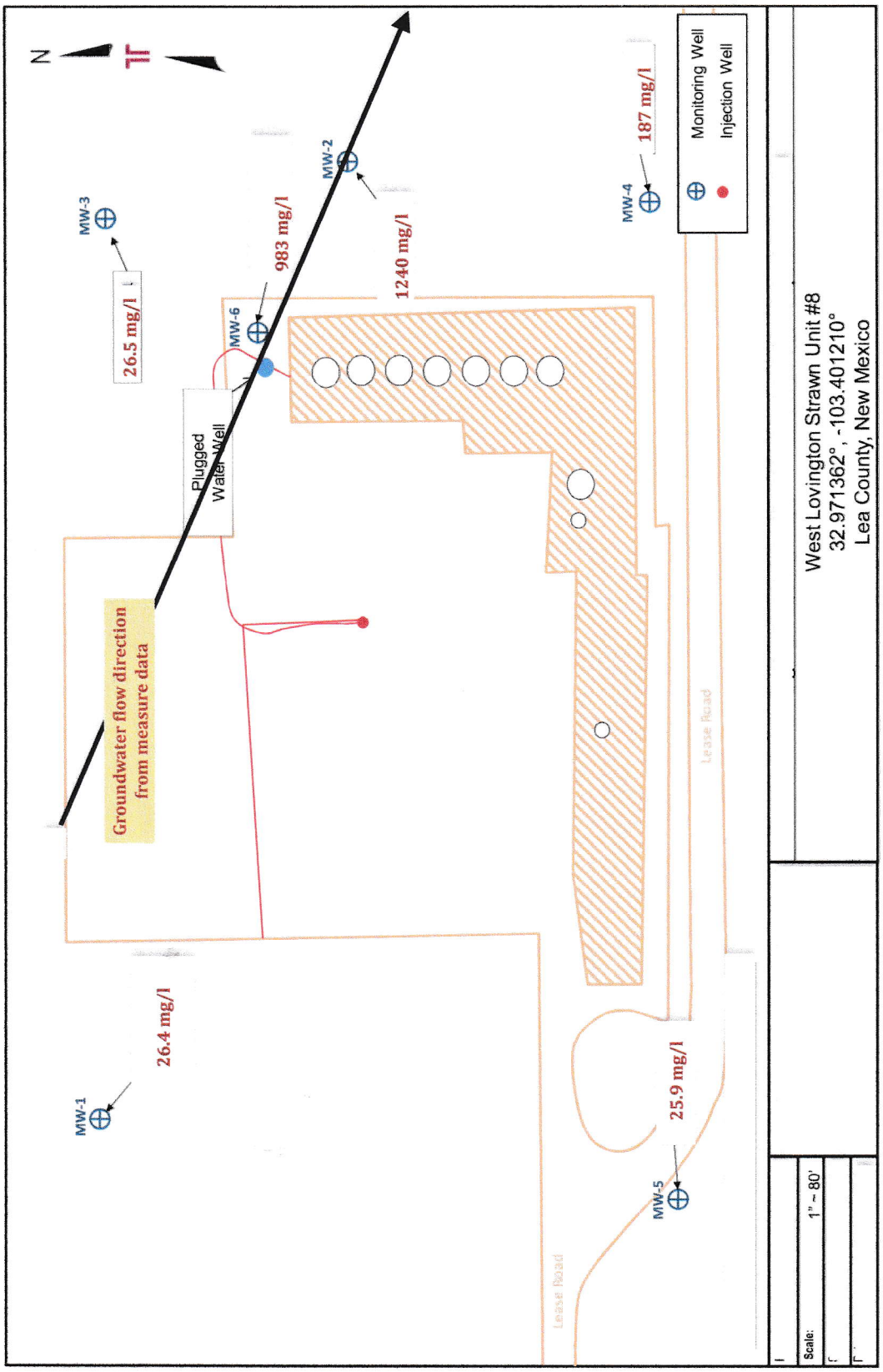
CLIMATE

The climate of northern Lea County is semiarid; the humidity is low, the rate of evaporation is high, and the mean annual temperature is about 60° F. The average annual precipitation at Tatum is 16.20 inches, at Lovington 14.82 inches, and at Hobbs 15.26 inches. More than two-thirds of the annual precipitation falls during the growing season, which lasts from April through September. At Hobbs and Lovington the average number of frost-free days per year is 200 and at Tatum is 193 days per year. The average date of the last killing frost at Lovington is April 11 and the first killing frost is November 3. Climatological data, from records of the United States Weather Bureau (1953-59) are summarized in the following table for three stations in northern Lea County:

GROUND-WATER CONDITIONS IN NORTHERN LEA COUNTY, NEW MEXICO

By
Sidney R. Ash
1963

HYDROLOGIC INVESTIGATIONS
ATLAS HA-62 (SHEET 1 OF 2)



Plat copied from OCD Well File Annotated by Price LLC to show the Nov 2018 chloride sample results: Analysis attached herein. Jan 05, 2021

Certificate of Analysis Summary 606107

Terracon Lubbock, Lubbock, TX

Project Name: West Lovington Strawn Unit #8

Project Id: AR157026
Contact: Brett Dennis
Project Location:

Date Received in Lab: Tue Nov-20-18 08:45 am
Report Date: 29-NOV-18
Project Manager: Kelsey Brooks

Analysis Requested													
	Lab Id:	606107-001		606107-002		606107-003		606107-004		606107-005		606107-006	
	Field Id:	MW-1		MW-2		MW-3		MW-4		MW-5		MW-6	
	Depth:												
	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	Sampled:	Nov-19-18 13:25		Nov-19-18 14:45		Nov-19-18 14:15		Nov-19-18 13:50		Nov-19-18 12:55		Nov-19-18 15:20	
Chloride by EPA 300	***Extracted:***	Nov-28-18 15:00		Nov-28-18 15:00		Nov-28-18 15:00		Nov-28-18 15:00		Nov-28-18 15:00		Nov-28-18 15:00	
	Analyzed:	Nov-28-18 16:21		Nov-28-18 16:59		Nov-28-18 17:11		Nov-28-18 17:23		Nov-28-18 17:36		Nov-28-18 17:48	
	Units/RL:	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL	mg/L	RL
Chloride		26.4	12.5	1240	250	26.5	12.5	187	25.0	25.9	12.5	983	250

Houston - Dallas - San Antonio - Atlanta - Tampa - Boca Raton - Latin America - Odessa - Corpus Christi

Kelsey Brooks
Project Manager

Final 1.000

606107

Terracon

CHAIN OF CUSTODY RECORD 606107

Laboratory: Xenco
Address: 6701 Aberdeen
Lubbock, Texas 79424

Office Location: Lubbock
Project Manager: Brett Dennis
Sampler's Name: Brett Dennis
Phone:
Contact:
SRS #:
Sampler's Signature:

ANALYSIS REQUESTED

LAB USE ONLY
DUE DATE:
TEMP OF COOLER WHEN RECEIVED (°C): 2.0 / 2.3

Project Number: AR157026
Project Name: West Lovington Strawn Unit #8

Matrix	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	Start Depth	End Depth	No. Type of Containers: 250 ml Poly	Chloride (EPA Method 300)	Lab Sample ID
GW	11/19/2018	13:25		X	MW-1			1	X	1
GW	11/19/2018	14:45		X	MW-2			1	X	2
GW	11/19/2018	14:15		X	MW-3			1	X	3
GW	11/19/2018	13:50		X	MW-4			1	X	4
GW	11/19/2018	12:55		X	MW-5			1	X	5
GW	11/19/2018	15:20		X	MW-6			1	X	6

TURNAROUND TIME: ☑ Normal ☐ 48-Hour Rush ☐ 24-Hour Rush

TRRP Laboratory Review Checklist ☐ Yes ☐ No

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time
	11-20-18	8:45		11/20/18	8:45

NOTES:

e-mail results to:
brett.dennis@terracon.com
kcwilliams@terracon.com
kristina.kohl@terracon.com

Matrix: WW-Wastewater; W - Water; S - Soil; L - Liquid; A - Air Bag; C - Charcoal tube; SL - Sludge
Container: VOA - 40 ml vial; A/G - Amber Glass 1L; 250 ml - Glass wide mouth; P/O - Plastic or other

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Operator: ENERGEN RESOURCES CORPORATION 3510 N A St Midland, TX 79705	OGRID: 162928
	Action Number: 18037
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
michael.buchanan	Review of the Energen Delineation of Ground Water: Content Satisfactory and Received for the Record. 1. Please include a brief memo into the incident file why 2019 was missed for sampling monitoring wells.	1/26/2024