



COLORADO
Division of Water Resources
Department of Natural Resources

1313 Sherman Street, Room 821
Denver, CO 80203

MEMORANDUM

TO: Robert P. Koehler, PhD, Oil & Gas Conservation Commission
FROM: Andrew Flor, Hydrogeologist
DATE: June 19, 2018
SUBJECT: Water Injection Project - Elk Springs Unit #4 (API: 081-06837)
NWSE Section 30, T5N, R98W, 6th PM
Lyster Oil Company Inc., Moffat County

On April 9, 2018 your office sent a memo describing a proposal by Lyster Oil Company Inc. to use an existing well, Elk Springs Unit #4, for commercial injection disposal into the interval 4,770-4,805 feet below ground surface (measured depth). This interval represents the approximate depth for the Entrada Formation. The Elk Springs Unit #4 well is located in the NW¼ of the SE¼ of Section 30, Township 5 North, Range 98 West of the Sixth Principal Meridian in Moffat County. The well will be located on the southeast side of the community of Elk Springs, approximately 20 miles southwest of the community of Maybell.

The existing well completion information indicates that this well was constructed with 16-inch conductor casing set and grouted from surface to 57 feet, and 9-5/8-inch surface casing set from ground surface to a depth of 940 feet and grouted from 940 feet back up to the surface. 5-1/2-inch casing extends to a depth of 9,500 feet and was cemented from 9,500 feet back up to 7,405 feet and again from 7,175 feet back up to 4,560 feet.

There are 6 water supply wells of record within ½ mile of the proposed injection well, as shown in Table 1. Most of the existing water supply wells in this area likely produce from the shallow quaternary sediments or the underlying Browns Park Formation or Mancos Shale. There are 3 water right structures within ½ mile of the proposed wellhead, as shown in Table 2. There are 5 COGCC oil/gas wells within ½ mile of the proposed wellhead, as shown in Table 3. A PDF output from Aquamap delineating a ½ mile radius from the proposed injection well is attached. Water supply wells are shown with green or red circles, decreed water rights structures are shown with magenta squares, and oil & gas wells are shown in blue squares. There are zero dams within 10 miles of this injection well as shown on the attached map.

Due to the depth, remote area, and assumed poor water quality of the injection zone formation (TDS= approximately 2,640 mg/L), it is not considered to be a source of potable groundwater at this location. Based on the information provided, injection to the Entrada Formation through a properly constructed well should not negatively impact existing groundwater or surface water resources in the vicinity. If you have any questions or require additional information, please feel free to contact me (303-866-3581 x8218).





COLORADO
Oil & Gas Conservation
Commission

Department of Natural Resources

1120 Lincoln Street, Suite 801
Denver, CO 80203

MEMORANDUM

April 9, 2018

TO: Andrew Flor
Division of Water Resources
FROM: Robert P. (Bob) Koehler, PhD.
Oil and Gas Conservation Commission (OGCC)
SUBJECT: Need for Hydrologic Information

The OGCC has received an application for a water injection project, summarized as follows:

| LOCATION | COUNTY | FIELD |
|--|--------|------------------------|
| Surface NWSE Section 30, Township 5 North, Range 98 West, 6th P.M. | Moffat | Elk Springs # 19500 |

| WELL NAME | Lyster Oil Company Inc: Elk Springs #4 (API: 05-081-06837) | |
|---------------------------------|--|---------|
| INJECTION ZONE FORMATION | Entrada Formation | |
| DEPTH OF INJECTION INTERVAL | 4770-4805 (Measured Depth) | feet |
| PROPOSED INJECTION PRESSURE | 700-765 | psig |
| FRAC GRADIENT OR PRESSURE (BHP) | 0.6 (assumed) | psi/ft |
| VOLUME OF FLUID TO BE INJECTED | 400-600 | bbl/day |
| TDS OF INJECTION ZONE FLUID | TBD | mg/L |
| TDS OF FLUID TO BE INJECTED | TBD | mg/L |

| WELL CONSTRUCTION DATA: Elk Springs #4 Original Hole & Plugged Sidetrack | | | | | | | | |
|--|-----------|-------------|---------|---------|-----------|---------------|------------|---------------|
| CASING STRING | HOLE SIZE | CASING SIZE | CSG WT. | CSG TOP | SET DEPTH | CEMENT VOLUME | CEMENT TOP | CEMENT BOTTOM |
| Conductor | | 16" | 55# | 0' | 57' | 40 sks | 0' | 57' |
| Surface String | 14-3/4" | 9-5/8" | 36# | 0' | 940' | 746 sks | 0' | 940' |
| First String | 8-3/4" | 5-1/2" | 15.5# | 0' | 9,500' | 280 sks | 7,405' | 9,500' |
| DV Tool | 8-3/4" | 5-1/2" | 15.5# | 0' | 7,175' | 225 sks | 4,560' | 7,175' |
| Sidetrack #-01* | 4-1/2" | 2-7/8" | | 5979' | 6512' | ? | | |

*Sidetrack P&A: Horizontal, drilled to 6846', 2-7/8" tubing cut off @ 5979'-pulled, sidetrack squeezed with 150 sacks

Please furnish the OGCC with the name and depth of any aquifer in the area of injection that is a known or potential fresh water stratum. We would also like a list of the water wells within one half mile of this location. Any other information with regard to distance to streams, ditches or outcrops would be very helpful. Thank you.

P 303.894.2100 F 303.894.2109 www.colorado.gov/cogcc

Commissioners: John H. Benton - Chair, Howard Boigon - Co-Vice Chair, Tommy Holton - Co-Vice Chair,
Ashley L. Ager, James W. Hawkins, Kent Jolley, Erin A. Overturf, Robert W. Randall, Dr. Larry Wolk
John W. Hickenlooper, Governor | Robert W. Randall, Executive Director, DNR | Julie Murphy, Director



Table 1

| RECEIPT | PERMIT | WELL NAME | USE | AQUIFER | DEPTH | OWNER |
|--------------------------|----------|-----------|-----------------|----------------------|-------|----------------------------------|
| 9119407 | 41455 | | Domestic | All Unnamed Aquifers | 175 | CO DIV HIGHWAYS |
| 9119742 | 114905 | | Domestic | All Unnamed Aquifers | 160 | DOHERTY BRYAN |
| 49961 | 49961-MH | | Monitoring Hole | All Unnamed Aquifers | 17 | ELK SPRINGS RECYCLE and RECOVERY |
| 106118 | 106511 | | Domestic | All Unnamed Aquifers | 100 | KLINK THOMAS and BARBARA |
| 0310250A | 37072-F | | Domestic | All Unnamed Aquifers | 220 | TUTTLE HALBERT |
| 3652262 | 286728 | | Monitoring Hole | All Unnamed Aquifers | 17 | ELK SPRINGS RECYCLE and RECOVERY |

Table 2

| Structure Type | WDID | Associated Permits | Associated Case Numbers | Structure Name | More Info |
|----------------|---------|--------------------|-------------------------|------------------|---|
| Well | 4306167 | | 81CW0177 | Doherty Well | http://www.dwr.state.co.us/structure/structure.aspx?wd=43&strid=6167 |
| Well | 4305036 | | W1736-72 | Elk Springs Well | http://www.dwr.state.co.us/structure/structure.aspx?wd=43&strid=5036 |
| Spring | 4301762 | | 90CW0026 | Tuttle Spring 4 | http://www.dwr.state.co.us/structure/structure.aspx?wd=43&strid=1762 |

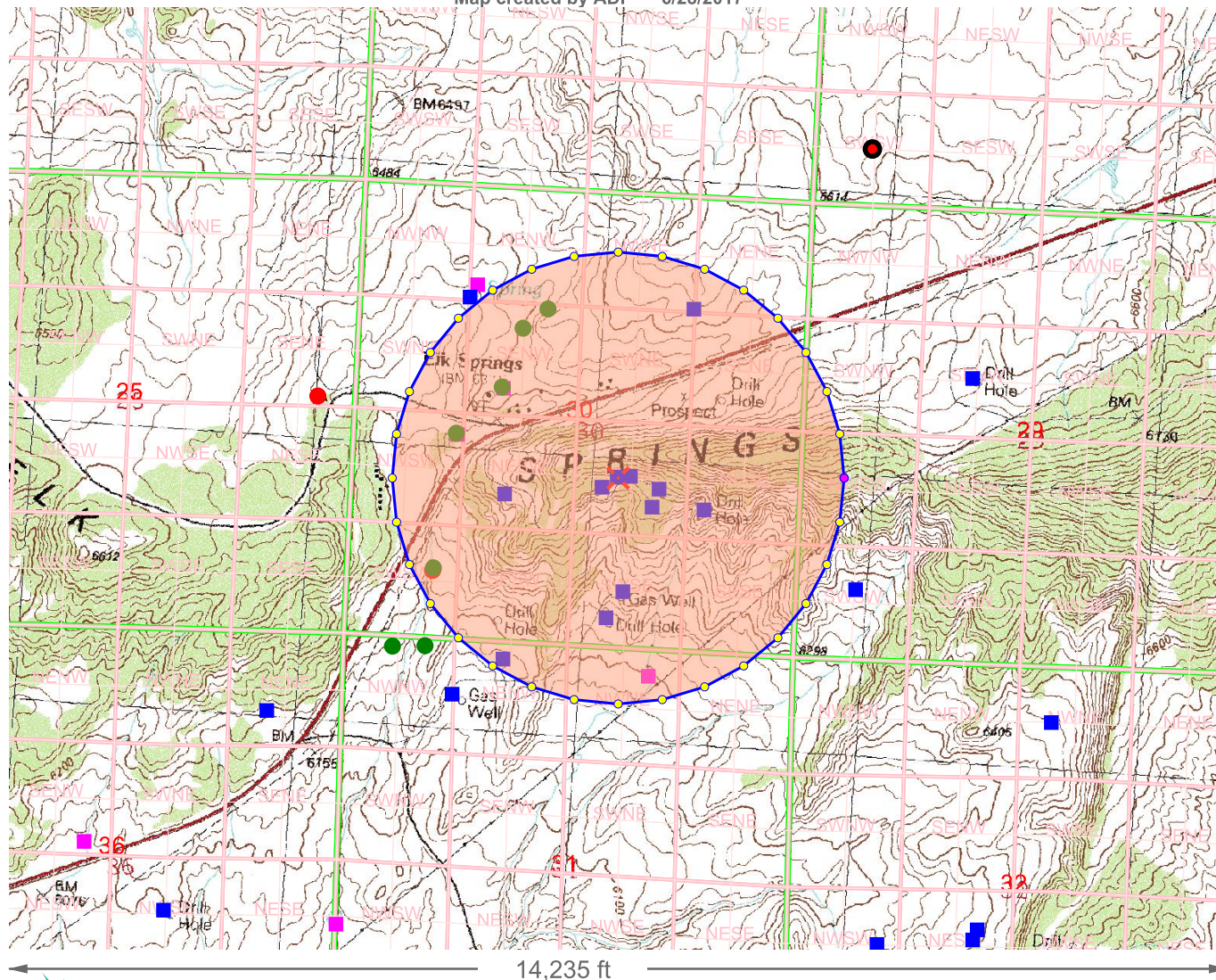
| | | | | |
|--------------|------------------------|-----------------------|------------------|---------------------------------|
| Table 3 | | | | |
| API_NUM | WELL_NAME | WELL_STATUS | PLSS_LOCATION | OPERATOR_NAME |
| 05-081-06445 | ELK SPRINGS UNIT 3 | ABANDONED LOCATION | NWSE 30 5N 98W 6 | PETRO QUEST INC |
| 05-081-06764 | ELK SPRINGS UNIT 33-30 | ABANDONED LOCATION | NWSE 30 5N 98W 6 | CABOT OIL AND GAS PRODUCTION |
| 05-081-05254 | M V SMITH 6 | DRY AND ABANDONED | SWSE 30 5N 98W 6 | CONOCO PHILLIPS COMPANY |
| 05-081-05261 | M V SMITH 3 | DRY AND ABANDONED | NESW 30 5N 98W 6 | CONOCO PHILLIPS COMPANY |
| 05-081-05251 | MORGAN 1 | PLUGGED AND ABANDONED | NENW 31 5N 98W 6 | UNION OIL COMPANY OF CALIFORNIA |

AQUAMAP

Colorado Division of Water Resources

Lyster Oil Co Elk Springs Unit 4 081 06837

Map created by ADF 6/28/2017



Based on work developed at <http://www.carto.net>

Address location by Bing Maps
AquaMap Version 3.0.1 July 5, 2009

MAP NAVIGATION

Click to create PDF
 UTM X, Zone 13: 308886
 UTM Y, Zone 13: 4266404
 Long: -107° 11' 32.6"
 Lat: 38° 31' 31.9"
 UTM and Geographic(LL) coordinates in NAD 83

DATA DISPLAY

☒ Background
☒ Counties
☒ Water Well Application
☒ PLSS
☐ DWR Parcels
☐ Roads
☒ EPA Well Notification
☐ Hydrography
☒ Oil/Gas Well Location
☐ County Parcels (No Public Access)
☐ Towns

☐ Low ☒ High
☐ Transparency

LOCATION

Section: 30
 Township: 5
 Range: 98
 Meridian: Sixth

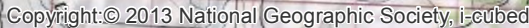
PRINTING

Output Scale: 24,000
 Page Size: 8.5x11
 User: ADF

Title: Lyster Oil Co Elk Springs Unit 4 081 06837

Note: The well locations displayed on AquaMap are based on location information provided by well permit application forms and are only as accurate as the information provided. The actual physical location of all wells have not been field verified and may vary from the location displayed. Refer to a copy of the original well permit file, available on the Division of Water Resources website, for well location details.





1 inch = 10,000 feet

0 0.5 1 1.5 2 Miles