



COLORADO

Oil & Gas Conservation Commission

Department of Natural Resources

1120 Lincoln Street, Suite 801
Denver, CO 80203

MEMORANDUM

April 16, 2015

TO: Robert P. (Bob) Koehler, PhD.
Oil and Gas Conservation Commission

FROM: Chris Eisinger
Colorado Oil & Gas Conservation Commission

SUBJECT: Seismic Evaluation, NGL #C6A, API # 123-40968

The location for the proposed injection well was reviewed using public maps and data; no site-specific subsurface data was evaluated.

The proposed formations of injection include a suite of lower Permian and Pennsylvanian targets. The planned bottom hole for this well has an estimated TVD of 10,955' in the Fountain Formation. Based on the regional stratigraphy, this would likely place the bottom hole within 500' of the crystalline basement. There is limited data, however, to constrain the precise depth of the basement at this location.

The USGS National Earthquake Hazard Map shows areas susceptible to ground shaking during fifty year intervals. This part of Colorado is an area that has been designated as being susceptible to a modest PGA (~0.1 g).

The proposed injection well is being sited adjacent to the existing NGL C6 disposal wells. The C6 well has been injecting at depths of between 9,000 and 9,600'. No induced seismicity has been associated with any of this well. There is another existing disposal well roughly 2 miles to the NE (HPD Platteville).

No earthquakes or mapped faults are within ten miles of the proposed well according to published geologic maps.

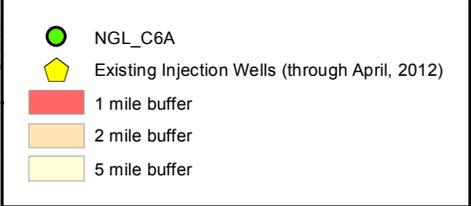
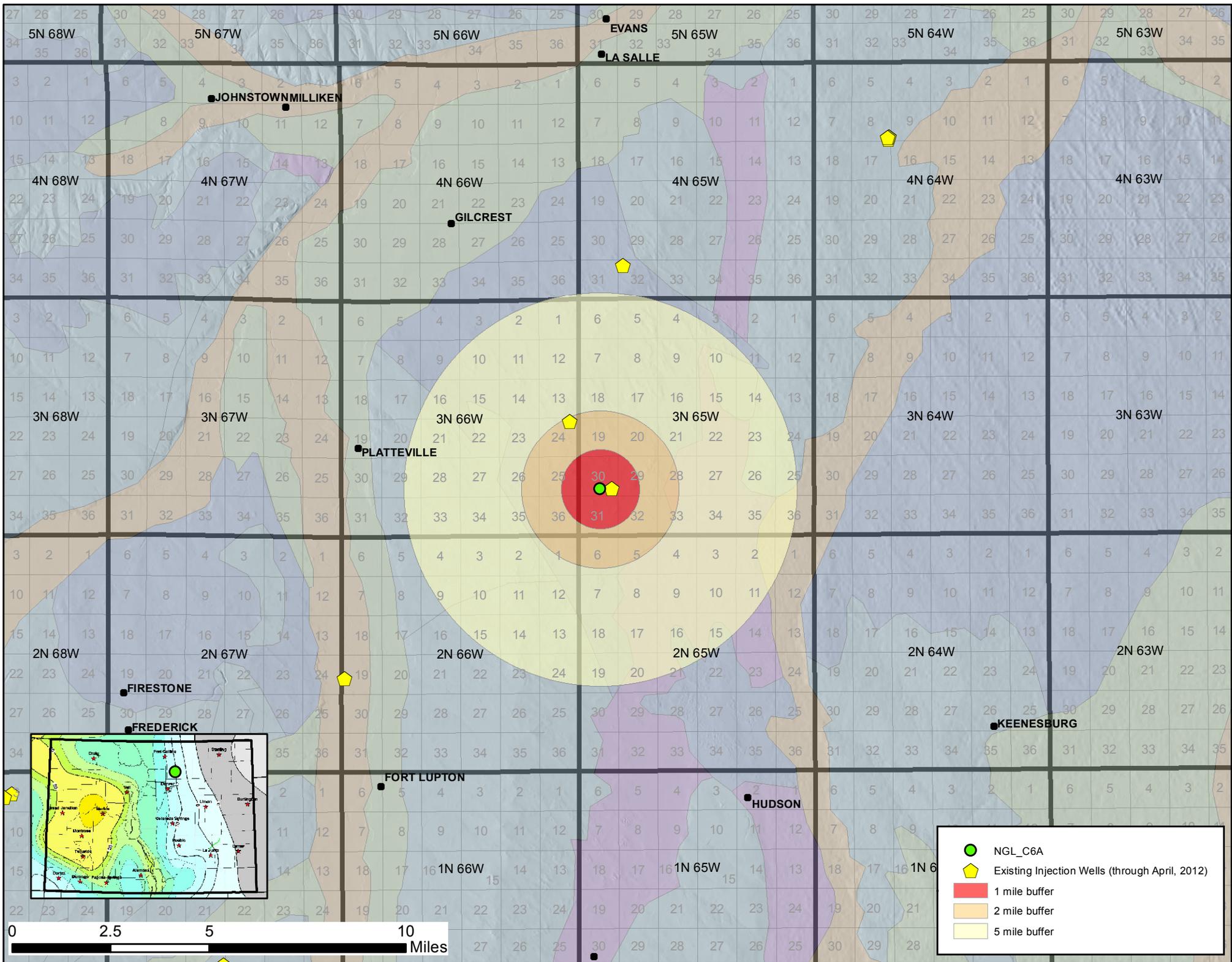
The proposed high volume (10,000 – 19,440 bbls/day) of water disposal should be approached cautiously. If permitted, the operator should increase the injection rate via steps with careful observations from a local seismometer being made. If a rate step is reached that has induced seismic events occurring with greater frequency and magnitude, it is recommended a cap on the permitted injection volume be placed.

While the likelihood of triggering earthquakes at this location appears low, caution should be taken as the deepest proposed injection interval is proximal to the Precambrian basement. If any seismic



activity is detected subsequent to the initiation of injection, a local seismometer would help determine whether activity is related to the injection, and allow for possible management of injection volumes and rates.







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TO: Chris Eisinger, Oil and Gas Conservation Commission (OGCC)

FROM: Robert P. (Bob) Koehler, Phd., OGCC

SUBJECT: Need for Seismic Evaluation

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

LOCATION	COUNTY	FIELD
SWSE Section 30 Township 3 North Range 65 West, 6th P.M.	Weld	Wattenberg #90750

WELL NAME	NGL: NGL C6A API: 123-40968	
INJECTION ZONE FORMATION	DJINJ = Lyons, L. Satanka, Wolfcamp, Amazon, Council Grove, Admire, Virgil, Missouri, Fountain, Des Moines, Atoka, and Morrow Formations	
DEPTH OF INJECTION INTERVAL	Open Hole: 9,294-10,955'	feet
PROPOSED INJECTION PRESSURE	2,200 to 2,250	psig
FRAC GRADIENT OR PRESSURE (BHP)	0.67	psi/ft
VOLUME OF FLUID TO BE INJECTED	10,000 to 19,440	bbl/day
TDS OF INJECTION ZONE FLUID	12,846-16,960	mg/L
TDS OF FLUID TO BE INJECTED	TBD (Commercial Disposal)	mg/L

WELL CONSTRUCTION DATA					
CASING STRING	HOLE SIZE	CASING SIZE	DEPTH	AMOUNT CEMENT	CEMENT TOP
Surface	12-1/4"	9-5/8"	819'	215 sks	0'
1st String*	8-3/4"	7"	9,344'	150 sks	7,903'
1st Liner**	6-1/8"	4-1/2"	10,963'	NA	NA

*DV Stage Tool @ 7,903' with 750 sks cement.

**External Casing Packers @ 9,929', 10,034', 10,223', & 10,534'; Top of Liner is 9,224'.

Please evaluate and express any concerns you have regarding seismic activity and faulting in the area that may be affected by this underground injection control project. Thank you.

