COLORADO
Oil & Gas Conservation Commission
Department of Natural Resources

1120 Lincoln Street, Suite 801
Denver, CO 80203

MEMORANDUM

May 11, 2017

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

FROM: Chris Eisinger
Colorado Oil & Gas Conservation Commission

SUBJECT: Seismic Evaluation, NGL #C5B, API # TBD

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 10,600' in the Atoka Formation. Based on the regional stratigraphy and information submitted from the operator, the bottom hole may be within 500' of the crystalline basement. There is limited data, however, to constrain the precise depth of the basement at this location.

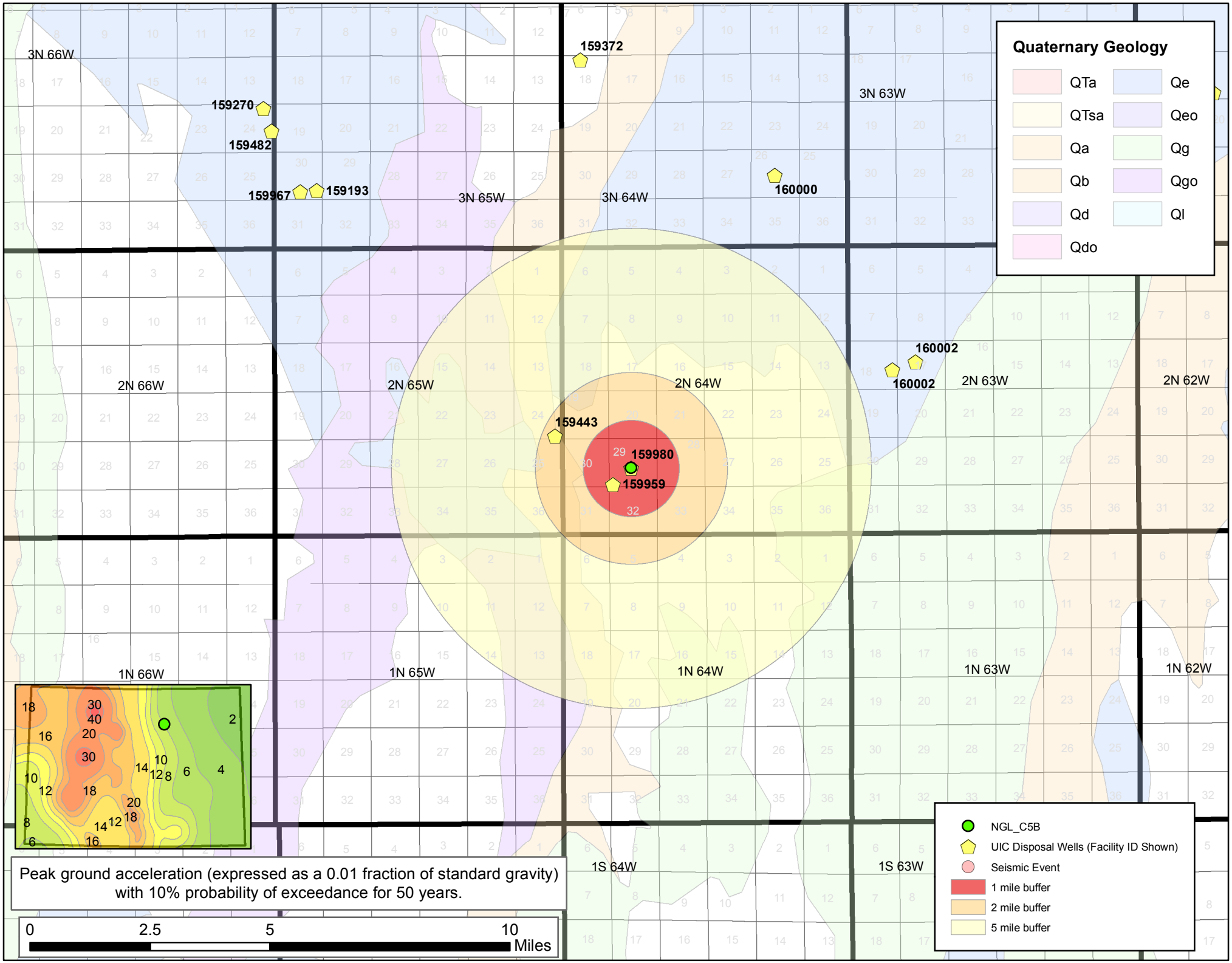
The USGS National Earthquake Hazard Map shows areas susceptible to ground shaking during fifty year intervals. This part of Colorado is an area that has been designated as being susceptible to a modest PGA (~0.06 g).

The NGL C5B bottom hole will be located roughly 0.75 miles northwest of the NGL C5A bottom hole. The proposed injection rate will be 10,000-24,000 bbls/day.

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

The proposed high volume of water disposal should be approached cautiously. If permitted, the operator should monitor for seismicity as injection rate is step increased. If a rate step is reached that induces seismic activity or results in a greater frequency and magnitude than an established threshold, it is recommended a cap on the permitted injection volume be placed.

Additionally, it should be noted the deepest proposed injection interval for this well 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.


Quaternary Geology
QTa
Qe
QTsa
Qeo
Qa
Qg
Qb
Qgo
Qd
Ql
Qdo
159372
159270
159482
159967
159193
160000
160002
160002
159443
159980
159959
3N 66W
3N 65W
3N 64W
3N 63W
2N 66W
2N 65W
2N 64W
2N 63W
2N 62W
1N 66W
1N 65W
1N 64W
1N 63W
1N 62W
1S 64W
1S 63W
NGL_C5B
UIC Disposal Wells (Facility ID Shown)
Seismic Event
1 mile buffer
2 mile buffer
5 mile buffer
Peak ground acceleration (expressed as a 0.01 fraction of standard gravity) with 10% probability of exceedance for 50 years.
0
2.5
5
10
Miles