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February 26, 2021

To: City of Greeley Honorable Mayor and Council

Subject: Terry Ranch - New Water Source

Greetings:

I am a Registered Professional Engineer in Colorado, Texas and Wyoming with Degrees in Civil Engineering and Environmental Science. I have approximately 50 years of experience in the water industry and was the City of Greeley Water Department's Chief Engineer for 22 years between 1979 and 2001. During my time at the Greeley Water & Sewer Department I acquired permits for and rehabilitated all of the City's High Mountain Dams, managed the purchase of millions of dollars of water rights, managed the operations of and improvements to the supply system, water treatment plants, approximately 700 miles of transmission and distribution system and administered and planed the Department's budget, including setting water rates. In addition, I managed all engineering and construction for the department.

The City of Greeley is on the verge of changing the quality, cost, and perception of Greeley's drinking water forever. This will happen if the City Council approves an agreement, signed by the City of Greeley Water & Sewer Board and Wingfoot Water Resources, LLC dated June 17, 2020.

Attached are some exhibits and discussions, including the body of a letter previously sent to your Honor Mayor and the Council, which I think would highlight some my concerns regarding the Terry Ranch groundwater purchase.

**Cost of Uranium Removal from Poudre River Water in Comparison to Terry Ranch groundwater**

See the attached uranium graph comparison of the Poudre River vs Terry Ranch groundwater. The average uranium concentration in the Poudre River is 0.85 ug/L. The cost of treating uranium out of the Poudre is incidental to the normal treatment process. The total cost of treating Poudre River water for all contaminates is $0.27 per 1000 gallons.
What is the approximate cost to treat uranium out of the Terry Ranch?
Based on Terry Ranch's most productive well, the uranium concentration is 43 ug/L. The cost of uranium removal to non-detectable level is approximately $4.50 per 1000 gallons as stated in City Staff presentation to the Water & Sewer Board during the Sept 2019 meeting (executive session). The cost of uranium removal was determined also in a study in Jefferson County ,Co (Jelinek, R. T., R. L. Clemmer, AND F. J. Johns. URANIUM REMOVAL FROM DRINKING WATER USING A SMALL FULL-SCALE SYSTEM. U.S. Environmental Protection Agency, Washington, D.C., EPA/600/2-89/012 (NTIS 89-169890), 1989.) to be $4.30/1000 gallons.

The cost to remove uranium from either source for the same amount of water, 12,121 acre-feet per year is:
Poudre River - $1,066,330 per year
Terry Ranch - $17,772,000 per year

**Trichloroethylene Ground Water Pollution Heading for Terry Ranch**

I have included a couple of maps showing the Trichloroethylene (TCE) groundwater pollution plume resulting from the Atlas D Site 4 Missile Silo in Wyoming and a discussion regarding TCE plume's significance to the Terry Ranch groundwater. the TCE plume is 12 miles long and 3 miles wide and is the largest in the Nation. TCE is a known carcinogen and causes birth defects. The missile site is 18 miles from Terry Ranch. The TCE plume has advanced 12 miles of the 18 miles in 60 years. It is now 6 miles from Terry Ranch's highest production water well. The US Army Corps of Engineers (USACE) has been monitoring the plume and has increased the monitoring area to the Northern border of Terry Ranch. Because of the complexity of the underground geology USACE is unable to accurately model the direction and speed the plume will take. See the attached dialogue for the map of the TCE plume. I believe the City Staff and their consultants are irresponsibly ignoring or dismissing a massive risk to the health and financial wellbeing of Greeley Citizens as well as those who will be consuming and paying the real cost of the Terry Ranch Project including residents in Evans, Milliken, and Windsor.

**Oil and Gas Drilling on Terry Ranch**

See the attached Oil Gas Well Map. I have shown the Colorado Oil and Gas Commission Interactive Map data on a map of Terry Ranch. It shows many plugged and abandoned wells, pending wells and horizontal boring (fracking) patterns proposed for the site. I have not included the oil and gas drilling map for Wyoming, but it is similar to Colorado activity. All those existing oil and gas well casings, as well as all the product pipelines crossing Terry Ranch pose significant hazard to the groundwater aquifer that is intended to be a permanent municipal water supply.

**City of Fort Collins Sewage Sludge Disposal on Terry Ranch Groundwater Recharge Area**

See any of the attached maps. The maps show the Meadow Springs Ranch, which is just West of Terry Ranch. The City of Fort Collins disposes of over 2,000 metric tons of sewage sludge per year on the Terry Ranch aquifer recharge area which is on the Meadow Springs Ranch. While this disposal method was all the fad in past years, recent discovery of chemicals other than nutrients have been ruining ground water aquifers thought the USA. The chemicals of concern include perfluoroalkyl substances. Perfluoroalkyl substances (PFAS) are known as “forever chemicals” because once released into the environment they do not break down, and they build up in our blood and organs. Exposure to Perfluoroalkyl substances (PFAS) increases the risk of cancer, harms the development of the fetus and causes other health problems. The sewage sludge can also contaminate groundwater with pharmaceuticals breakdown products and pseudo-estrogen compounds.

**Summary**

Greeley is in the enviable position of having the best drinking water in the nation. This water supply is from the snow melt in the high mountains. Greeley still has the opportunity

to obtain more high-quality water from the mountains through the enlargement of Milton Seaman Reservoir. Greeley currently owns 15,000 acre-feet of conditional water rights intended to be captured in an enlarged Milton Seaman Reservoir. Despite the City Staff's current claims that permitting the Milton Seaman Reservoir Enlargement is too difficult for them to accomplish and more expensive than Terry Ranch, I believe that the Milton Seaman Reservoir Enlargement project can be accomplished. (See the attached EIS Milestones Table) The table shows the progress of the City of Greeley in comparison to the City of Fort Collins in obtaining the required US Army Corps of Engineers Permit. Because of the many personnel changes, poor city management, and no diligent and determined effort, the City has made no progress in obtaining a permit. The City of Greeley's progress stopped in 2006. While the City Staff claims to have spent $19,000,000 on permitting, I have yet to see a detailed accounting of that number. In contrast the City of Fort Collins has made reasonable progress with their Halligan Reservoir Enlargement Project. I also believe that the cost of Milton Seaman Reservoir has been exaggerated to support a preconceived goal to close on the deal with Wingfoot, LLC. When members of our Save Greeley's Water group requested detailed cost estimate with quantities, unit costs and assumptions for the MSR enlargement through the Colorado Open Records Act, the City responded with a $3,600 bill for supplying the detailed estimate. SGW is an volunteer group of concerned citizens. I think we have already paid for the requested records though our monthly water bills. If these reports and estimates are up to date, then they should be in pdf format and available to the public in a digital library.

At least one other thing should be considered. That one thing is the perception of Greeley when it changes its water supply from award winning mountain snow melt, to what could be considered a potential Super Fund Site. Greeley will become a less desirable place to live and home values could plummet. At that point future development may be unnecessary.

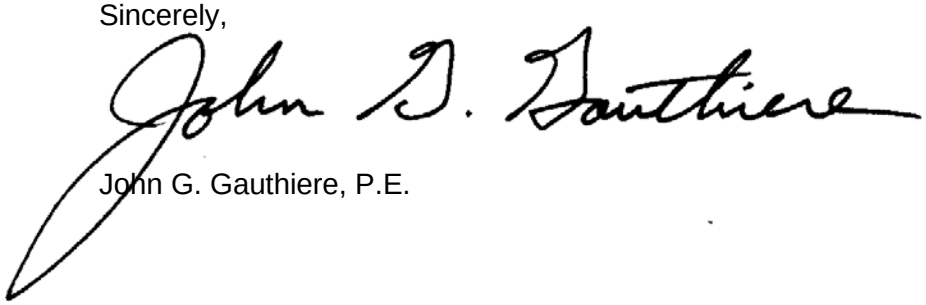
The top level of the Water Department, who are pushing Terry Ranch, do not live in Greeley. They do not understand what our clean mountain drinking water means to us. To them, this is just a business deal.

Thank you for taking the time to investigate this issue. Please vote no to reject the Terry Ranch/Wingfoot purchase agreement.

Thank you.

If you have any questions, please give me a call at (970) 330-0855 or (970) 302-0039 or email john@gauthiere-engineering.com.

Sincerely,



John G. Gauthiere, P.E.

ATLAS D MISSILE SITE 4

ATLAS D MISSILE SITE 4 TRICHLOROETHYLENE (TCE) PLUME

LONE TREE CREEK

LONE TREE CREEK DRAINAGE BASIN

WYOMING
COLORADO

US ARMY CORPS OF ENGINEERS TRICHLOROETHYLENE (TCE) EXPANDED STUDY AREA

CITY OF FORT COLLINS SEWAGE SLUDGE DISPOSAL AREA UPSTREAM OF TERRY RANCH AQUIFER

WINGFOOT-TERRY RANCH URANIUM ORE BEARING AQUIFER & WELL FIELD

NCMC LAND FROM CH

40 MILE WINGFOOT-TERRY RANCH PIPELINE TO GREELEY WATER CUSTOMERS

CITY OF THORNTON 42" WATER SUPPLY PIPELINE IN LARIMER COUNTY (1041 PERMIT DENIED)

Cache la Poudre River

BELLVUE WATER TREATMENT PLANT

CITY OF GREELEY 60" TREATED WATER TRANSMISSION LINE

GREELEY BOYD LAKE WATER TREATMENT PLANT

TO THORNTON

CITY OF THORNTON 42" WATER SUPPLY PIPELINE IN WELD COUNTY (UNDER CONSTRUCTION)

CHEYENNE
Carr
Wellington
Nunn
Pierce
Ault
Eaton
Fort Collins
Windsor
Loveland
Greeley

LARIMER COUNTY
WELD COUNTY

80
25
85
14
392
34

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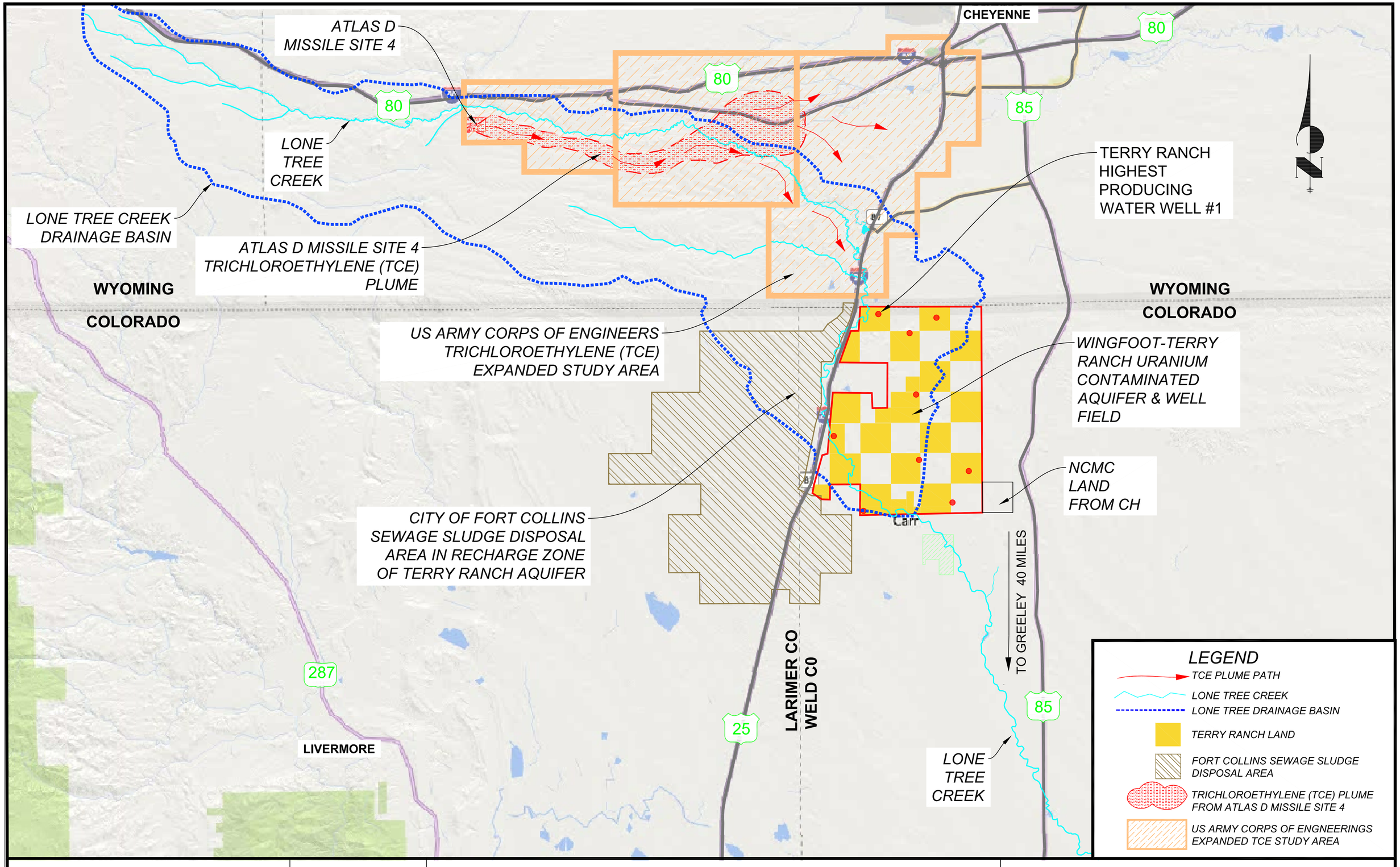
TERRY RANCH LOCATION

2 1 0 2 4 6

SCALE IN MILES

EXHIBIT "A"
AQUIFER
RISK MAP

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DATE:
2/17/2021

# TERRY RANCH LOCATION

2 1 0 2 4 6
SCALE IN MILES

## ATLAS D MISSILE SITE 4 EXHIBIT

TRICHLOROETHYLENE PLUME (TCE) IS 12 MILES LONG BY 3 MILES WIDE AND IS THE LARGEST IN THE NATION. THE PLUME HAS TRAVELED 12 MILES OF THE 18 MILES TOWARD TERRY RANCH IN THE PAST 60 YEARS. THE PLUME IS WITHIN 6 MILES OF TERRY RANCH'S HIGHEST PRODUCING WATER WELL. TCE IS A CARCINOGEN AND CAUSES BIRTH DEFECTS.

The Atlas D Missile Site 4 trichloroethylene (TCE) plume is the largest TCE plume in the nation. Trichloroethylene is a known carcinogen and is a cause of birth defects.

This dialogue is intended to explain the map of the trichloroethylene (TCE) plume which originated at the Atlas D Missile Site 4 eighteen miles west of Cheyenne, Wyoming. It is important to understand the location of the Atlas D Missile Site 4 Trichloroethylene ground water contamination plume in relation to Terry Ranch.

The Atlas D Missile Site 4 is just South of I-80. *The (TCE) plume emanating from it is now 12 miles long and 3 miles wide, according to the Wyoming Department of Environmental Quality. Atlas Site 4's TCE concentrations in the groundwater exceeds 240,000 parts per billion, well above Safe Drinking Act limit of 5 parts per billion*.[1] As a matter of fact, the TCE at the site is 48,000 times the safe drinking water limit.

It is quite possible that the TCE plume will turn South and follow the Lone Tree Creek geology to Terry Ranch and its Upper Laramie aquifer recharge area . The TCE plume has advanced 12 miles in 60 years towards the Ranch. The TCE plume is within 6 miles of the Northern border of Terry Ranch and the highest capacity water producing well on the Ranch. Judging from the historic rate of travel it could take 30 years, plus or minus, to get to Terry Ranch.

As a practical matter, the geology in the area is complex, and the presence, location, nature, and extent of lenses of highly permeable material, fractures and solution holes are never completely understood. However, *buried paleo-drainages that generally mimic the surface topography exist, such as the drainage pattern of Lone Tree Creek. These paleo-drainages represent preferential groundwater flow pathways*.[2]

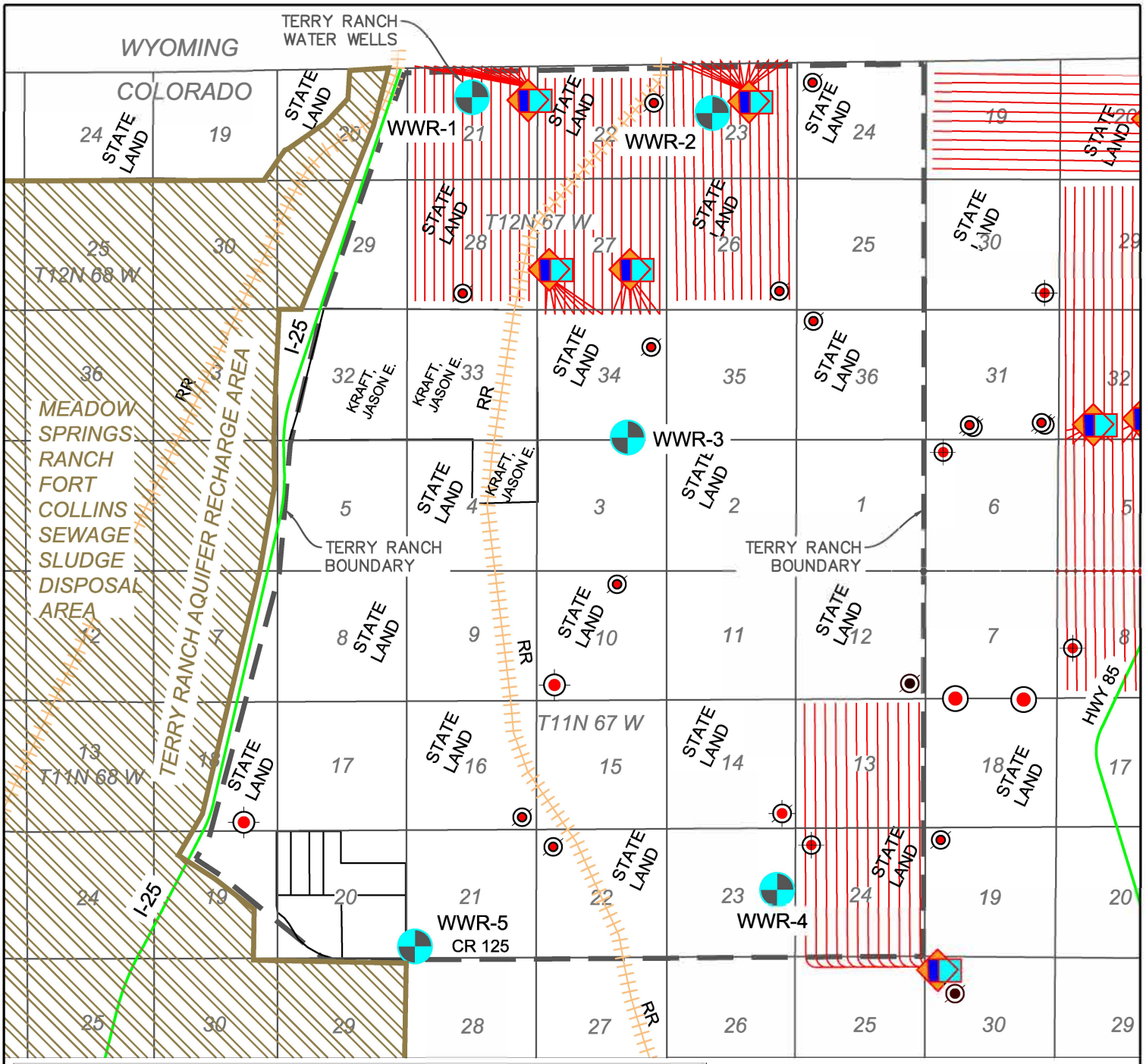
If this is true, then the TCE plume would likely follow the Lone Tree Creek pathway and travel to the Terry Ranch. While the City of Greeley's staff considers the Brule Member of the White River geologic formation a confining impermeable geologic formation that might impede downward seepage of the TCE plume into the Upper Laramie (Terry Ranch) formation, it would be a mistake to do so. *It would likely be incorrect, however, to simply consider the Brule a confining unit throughout the Site 4 study area*.[3]

The US Corps of Engineers (USACE) has been trying to model the trajectory of the TCE plume but is having difficulty producing a reliable model because of the complexity of the geological formations. Note the USACE Expanded Study area which covers the area between the East end of the plume and the Northern border of Terry Ranch. The expanded study area indicates that USACE believes the plume could possible head south to Terry Ranch. It is hard to ignore the US Corps of Engineers' good judgement. However,

[1] STATEMENT OF THE HONORABLE JOHN BARRASSO, A UNITED STATES SENATOR FROM THE STATE OF WYOMING, Cleaning Up Our Nation's Cold War Legacy Sites, Homeland Security digital Library March 29, 2017, page 4
[2] US Army Corps of Engineers, Final Area-Wide Remedial Investigation Report Former Atlas D Missile Site 4, P XIV
[3] US Army Corps of Engineers, Final Area-Wide Remedial Investigation Report Former Atlas D Missile Site 4, P 5

Adam Jokerst, Deputy Director of the Greeley Water Department, seems more than willing to ignore this good judgment.

Considering the interesting surprises that lurk in underground geology, the City of Greeley should not invest in or depend on the Terry Ranch as its future source of water for Greeley Citizens. Greeley Citizens deserve the right to vote on this most important issue.




Data Source: Colorado Oil & Gas Commission Website
Date of Data: January 23, 2021
Compiled and Drawn By: John G. Gauthiere, P.E.

# SAVE GREELEY'S WATER
# TERRY RANCH OIL, GAS RISK MAP

SCALE: 1"=6000'

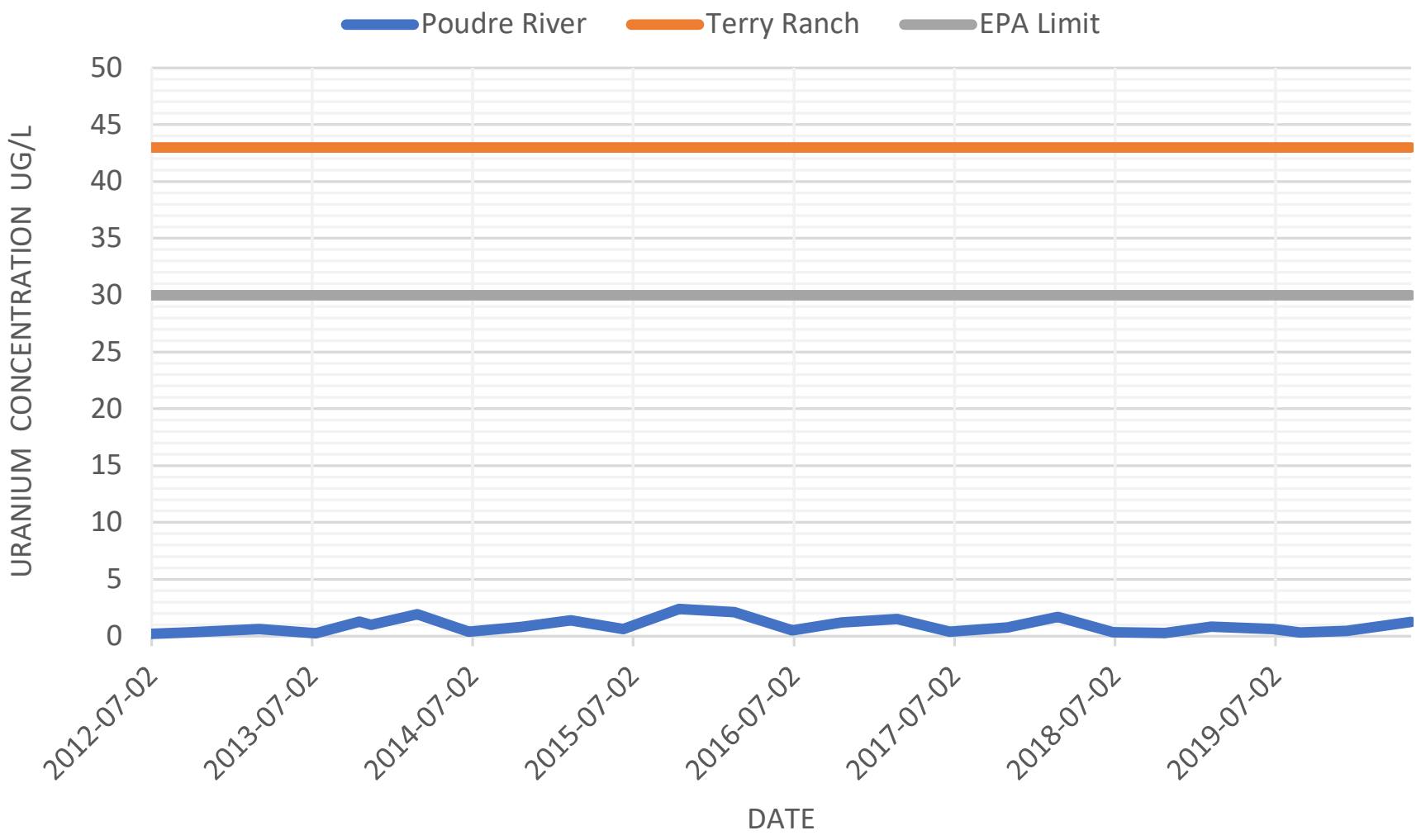
# Terry Ranch Aquifer Contamination Risk Map

This map is intended to give a sense of the potential aquifer contamination sources in the vicinity of the Terry Ranch aquifer. The potential for groundwater contamination is directly related to the intensity and type of land use above the aquifer or in the aquifer's off-site recharge areas or upstream drainage areas such as the Meadow Spring Ranch or in Wyoming. Some of the potential aquifer contamination sources would include spills or leaks from oil, gas and mining operations, railway accidents and highway (I-25) accidents. The area contains many abandoned oil and gas well sites as well as approved and pending well sites which will be drilled in the future. Note the intensity of approved and pending horizontal well bores. Also note the Meadow Springs Ranch which is part of the recharge area for the Terry Ranch aquifer. The Meadow Springs Ranch is owned and utilized by the City of Fort Collins for disposal of their municipal sewage sludge.

Not shown on the map are potential sources of contamination from activities in Wyoming. For example, the upstream drainage area for Terry Ranch in Wyoming to the northwest includes groundwater contamination from Atlas D Missile Site 4 located in Laramie County. The groundwater at Atlas D Missile Site 4 is contaminated with trichloroethylene (TCE), a solvent used to clean defense equipment. The U. S. Army Corps of Engineers is aware of the TCE groundwater contamination. TCE is a known human carcinogen. The TCE groundwater contamination plume seems to be moving southwesterly toward Terry Ranch. We are currently investigating the TCE groundwater contamination issue and other issues yet to be investigated by the City of Greeley and its consultants. We will provide this information as soon as it becomes available.

The City of Greeley's investigation of the area upstream of Terry Ranch in Wyoming seems to have escaped their pre-purchase diligence efforts.

# POUDRE RIVER VS. TERRY RANCH
# URANIUM CONCENTRATION




NOTES:

1. PRESENT EPA MAXIMUM CONTAMINANT LEVEL (MCL) FOR URANIUM = 30 UG/L
2. EPA MAXIMUM CONTAMINANT LEVEL GOAL (MCLG) FOR URANIUM = 0 UG/L
3. POUDRE RIVER DATA SHOWN IS FOR UNTREATED WATER
4. TERRY RANCH DATA IS FOR WELL #1 WHICH IS THE HIGHEST OUTPUT CAPACITY WELL
5. DATA SOURCE IS CITY OF GREELEY WATER & SEWER DEPARTMENT


WE ALREADY TREAT URANIUM
so how much & at what cost?
Poudre River
uranium concentration
0.85 ug/L
cost to treat 1,000 gal
$0.27
Terry Ranch
uranium concentration
43 ug/L
cost to treat 1,000 gal
$4.50
cost to treat 12,121 acre-feet/yr
$1,066,330
$17,772,000

| U. S. Army Corps of Engineers Permitting Status | | |
|---|---|---|
| **EIS Milestones Completed** | **Greeley Milton Seaman Enlargement Project** | **Fort Collins Halligan Enlargement Project** |
| **Publish Notice of Intent to Prepare Draft EIS** | Feb 1,2006 | Feb 1, 2006 |
| **Hold Public Scoping Meeting** | May 30,2006 | May 30,2006 |
| **Publish Notice of Availability and Issue Draft EIS** | Not Complete | Nov 22,2019 |
| **Publish Notice of Public Hearing** | Not Complete | Nov 22,2019 |
| **Draft EIS** | Not Complete | Nov 22,2019 |
| **Draft EIS Comments Due** | Not Complete | Feb 26,2020 |
| **Public Hearing Held** | Not Complete | Jan 13,2020 |
| **Final EIS** | | Pending |
| **Corps Permit Decision** | | Pending |