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RE: Public Comment on White Mesa RML Renewal: Modification to Groundwater Quality Discharge Permit No. UGW370004 and Amendment #10 of the 11e.(2) Byproduct License No. UT1900479 for Energy Fuels Resources, Inc. White Mesa Uranium Mill

To whom it may concern:

I write on behalf of the Bikepacking Roots not-for-profit organization and our 5,000+ members in expressing dismay at the interpretations of monitoring well data from down hydraulic gradient of the White Mesa Mill site. These analyses and interpretations would never stand up in peer reviewed scientific journals, and that is absolutely unacceptable when there exists the potential long-term poisoning of local communities and the broader landscape. DEQ completely neglects equally viable interpretations of data specifically from monitoring well MW-30 that could legitimately show groundwater contamination from at least one of the tailings impoundments beginning around 2010. Thus, without further scrutiny of these and other data, no discharge permit amendments or byproduct license amendments should be made for the White Mesa Mill – no increases in groundwater compliance limits (GWCLs), no increase in materials to be added to tailings impoundments, and no acceptance of materials from other countries for processing.

Our mission at Bikepacking Roots is to advocate for the bikepacking experience and for the landscapes through which we ride on behalf of the bikepacking community and our members. The Bears Ears and Grand Canyon regions are both popular among bikepackers, and the potential for future uranium mining in these region's futures, as well as any related contamination of the landscape, are especially concerning. We also have worked extensively with colleagues and organizations on Navajo Nation, and the long-term toxic impacts of uranium mining are all too real there. Given that Energy Fuels Resources owns the uranium mines in the Grand Canyon region (currently flooded with contaminated groundwater) and lobbied heavily for areas underlain by uranium-bearing bedrock to be removed from the original boundaries of Bears Ears National Monument, we find it important to engage in this current process related to the White Mesa Mill.

In writing this comment, I am representing the Bikepacking Roots organization and our members. As a geologist with a background in geochemistry, I personally have the expertise to delve into the data from the White Mesa Mill.

What is particularly dismaying is that in DRC-2019-006502, the DEQ memo reviewing the 2019 Source Assessment Report for MW-30, the DEQ

1. Accepts the linear regression fits through the 2005-2018 groundwater chemistry data despite the fact that the data show a clear change in behavior around 2010. Forcing a linear regression through this full dataset is nothing more than sloppy and deceptive statistical analysis.
2. Accepts the argument that a minor decrease in pH (less than 0.5 pH units) could alter uranium concentrations. This would *only* be the case if the groundwater was nearly saturated with respect to uranium, and that is very much not the case. Minor changes in pH in the historic range of groundwater pH values will *not* change uranium concentrations.
3. Accepts that tailings solution indictor parameters conclusively do not suggest contamination. Below I share an equally plausible interpretation of the same data and plots that point to contamination being able to just as easily explain the geochemistry trends at MW-30
4. Points to "long-standing upward trends" in SAR parameters. Again, uranium, sulfate, chloride, and pH all show a marked change in any trends around 2010. Forcing a linear regression through a longer period does not prove the existence of a long-standing trend.
5. Points to a 2008 University of Utah study that dated the groundwater in MW-30 to being older than the mill construction date of 1980. That may in fact be completely correct. But it is still possible to contaminate "old" water.

Each of these points on their own raises flags about the veracity of the interpretations of groundwater chemistry data coming from any of the monitoring wells at the White Mesa Mill site. But the fact that the validity of five of the six primary conclusions of the 2019 SAR summarized in the DRC-2019-006592 DEQ memo can be called into question is *hugely* problematic. The statistical analyses and interpretations of the 2019 SAR data from MW-30 (and likely other wells) would not stand up to any sort of scientific peer review, and DEQ's seemingly unquestioning acceptance of those analyses and interpretations does nothing to inspire faith in DEQ oversight.

Let's explore a bit of the geochemistry data from MW-30 over the years in a bit more depth, including some past interpretations of those data.

An analysis of historic chloride concentrations in a variety of wells at the White Mesa Mill site using data from 1983 to 2006 demonstrates that "chloride values are similar from 1983 to 2005-2006, indicating that, in spite of the variable magnitude of concentrations across the site, these comparative snap shots demonstrate that there has been little change in concentrations in samples from each well" (BGQR12292006). It was not until 2010 that chloride concentrations in MW-30 began to rise steadily (see MW-30 data plots at the end of comment with pre- and post-2010

periods highlighted for clarity; plots are taken directly from DRC-2019-000747). This increase in chloride concentrations around 2010 occurred at roughly the same time as uranium concentrations in MW-30 began to rise. It was also around 2010 that a steady decrease in sulfate concentrations at MW-30 leveled out. And no notable change in pH at MW-30 occurred at this time. Since 2010 at MW-30, the data show a steady rise in uranium and chloride concentrations and generally steady sulfate concentrations and pH; fluoride trend interpretation is hampered by high scatter pre-2010.

What might all this mean, and how should each of these indicators be interpreted? In the discussion of the merits of various "indicators of potential impact" in BGQR1229-2006 (a 2006 Background Groundwater Quality Report for the White Mesa Mill), chloride is identified as a "primary indicator of potential tailings impact." Fluoride, which has similar chemical properties as chloride, can have solubility controlled along ground water flow paths by the trace mineral apatite, resulting in fluoride being considered secondary to chloride in terms of reliability as an indicator of impact. Similarly, solubility differences between calcium chloride and calcium sulfate mineral species complicates the interpretation of sulfate data.

Returning to the MW-30 data, the steady decrease in sulfate concentrations at MW-30 between 2005 and 2010 levels off. 2010 is approximately the year that uranium and chloride concentrations at MW-30 began to increase steadily. *If* the steady decrease in sulfate concentrations between 2005 and 2010 was due to influences external to the mill site (as argued in the 2019 MW-30 SAR), groundwater contamination from mill operations could responsible for the relatively steady sulfate concentrations since 2010 as sulfate from tailings could have offset that prior decrease in sulfate concentrations (or in other words, the longer-term decrease in sulfate concentration due to environmental factors external to the mill site is masking contamination since 2010).

To summarize this simply, *all the trends observed* in uranium, chloride, and sulfate concentrations at MW-30 could potentially be explained by groundwater contamination from the mill site. The conclusions from the 2019 MW-30 SAR accepted by DEQ are not the *only* viable explanation for these trends, and I would argue that what I have presented is arguably a *more* viable explanation.

As explained in detail in BGQR12292006, the interpretation of indicators of potential impact is complicated by environmental variability in groundwater geochemistry. Thus, if interpretation of monitoring well data shows *any* potential sign of contamination, the onus is on the DEQ to require a far more thorough analysis and investigation than has been done. Decisions regarding potential uranium contamination must not be based on difficult to interpret data, shoddy and deceptive statistical analyses or conclusions that ignore other viable explanations. Far too much is at stake.

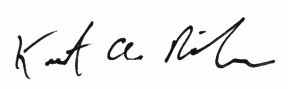
Based on all this, we request that

1. No changes be made in the uranium GWCLs be made. It has not been demonstrated convincingly that the increasing trends in uranium are not due to contamination.

2. No license amendment be issued for an increase in the annual limit of material added to the tailings impoundments be granted.
3. No license amendment be issued for the acceptance of alternate feed material from Estonia be granted.

The toxic legacy of uranium contamination is all too visible today across the Colorado Plateau, and particularly on Navajo Nation where so many families face the realities of cancer, birth defects, poisoned wells, and so much more as a result of past uranium mining. And just down hydraulic gradient a few miles from the White Mesa Mill sits the White Mesa Community, poised to intercept *any* groundwater contamination from the mill. One undetected leak is all it would take. And it has not been convincingly demonstrated that the changes in groundwater geochemistry at MW-30 are not evidence of a contamination that began around 2010.

Respectfully,



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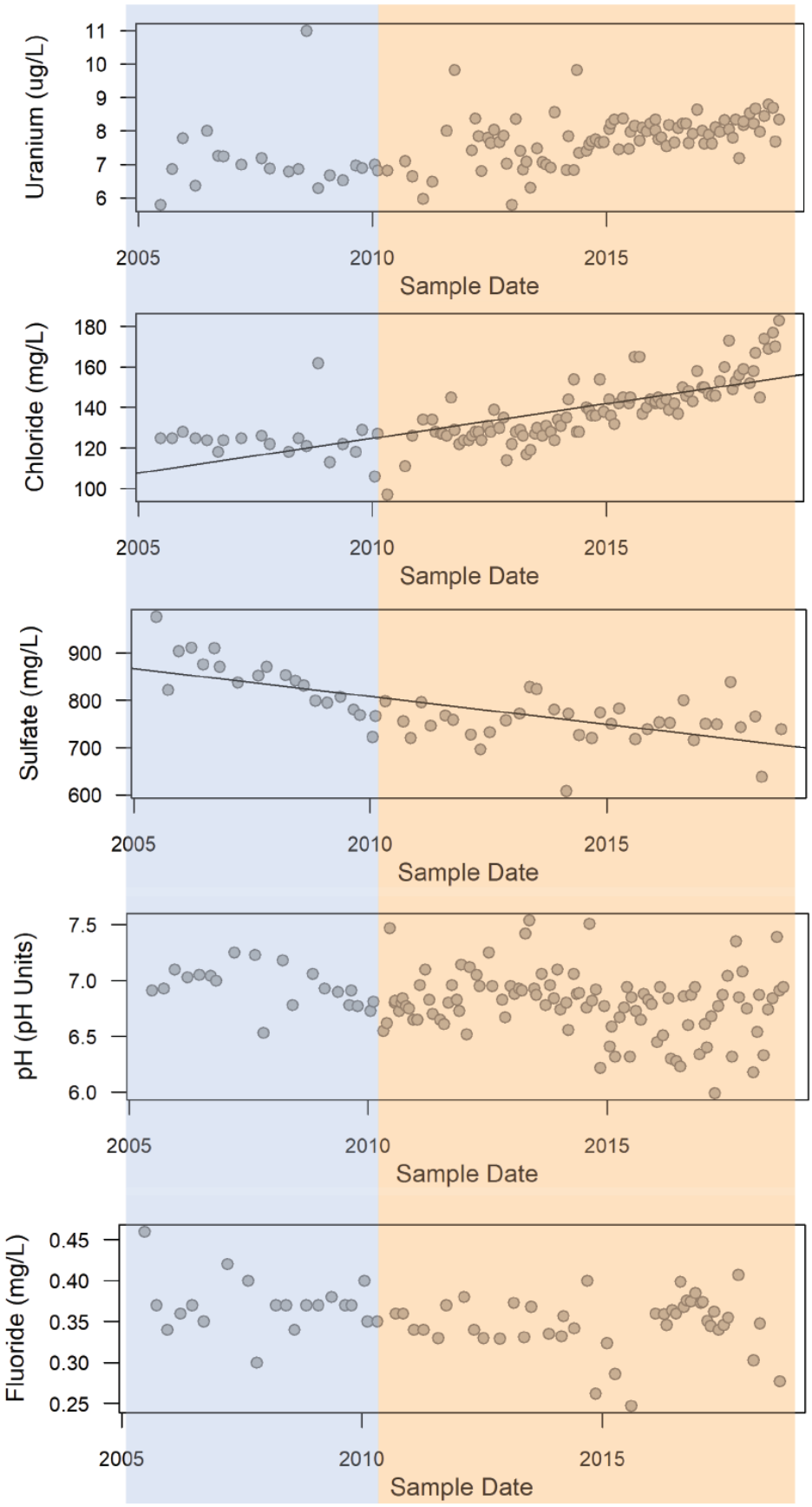
Executive Director


Uranium (ug/L)
11
10
9
8
7
6
2005
2010
2015
Sample Date
Chloride (mg/L)
180
160
140
120
100
2005
2010
2015
Sample Date
Sulfate (mg/L)
900
800
700
600
2005
2010
2015
Sample Date
pH (pH Units)
7.5
7.0
6.5
6.0
2005
2010
2015
Sample Date
Fluoride (mg/L)
0.45
0.40
0.35
0.30
0.25
2005
2010
2015
Sample Date