Uranium Watch

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February 8, 2022

Drummond Earley
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RE: Proposed Aquifer Exemption for a Portion of the Aquifer in Lower Lisbon Valley, San Juan County, Utah. Lisbon Valley Mining Co. LLC. UTU-37-AP-5D5F693.

Dear Mr. Earley:

Below please find comments on the proposed Aquifer Exemption for a portion of the Lower Lisbon Valley, San Juan County, Utah. Comments are responsive to the December 8, 2021, Division of Water Quality (DWQ), Department of Environmental Quality, Public Notice of Intent to Issue Permit, Underground Injection Control Class III Area Permit, In Situ Copper Recovery.[1]

Comments are submitted on behalf of Uranium Watch, the Utah Chapter of the Sierra Club, and the Information Network for Responsible Mining (INFORM).

Uranium Watch is a public interest 501c(3) non-profit that addresses uranium mining and milling, other hardrock mining projects, and nuclear projects that impact Utah.

Utah Sierra Club is a non-profit organization that is a powerful collective of thousands of grassroots change-makers working together across the state to advance climate solutions, act for justice, get outdoors, and protect lands, water, air, and wildlife. Established in 1969, the Utah Chapter strives to protect and enjoy Utah's outdoors and natural landscapes; educate and advocate for the responsible preservation of clean air, water, and

[1] https://deq.utah.gov/public-notices-archive/water-quality-public-notices

habitats; support the development of clean energy to benefit present and future generations; and advance principles of equity, inclusion, and justice throughout our organization and community.

The Information Network for Responsible Mining monitors the hardrock mining industry in Colorado and nearby states and educates the public about irresponsible mining practices that impact communities and the environment.

1. Introduction

We write to oppose the Aquifer Exemption requested by the Lisbon Valley Mining Co. LLC (LVMC) in conjunction with the proposed Class III Underground Injection Control (UIC) Permit for an in situ leach (ISL) copper recovery operation.

The DWQ should deny the LVMC Aquifer Exemption Request and not submit the DWQ Aquifer Exemption Request to the EPA Region 8, based on the following:

a. There is an inherent risk of irreparable harm from the proposed ISL copper recovery project.

b. The Burro Canyon Aquifer in the Lower Lisbon Valley is a current and future source of drinking water.

c. The proposed Aquifer Exemption area is geologically and hydrologically connected to a nearby source of drinking water.

d. The DWQ's review of the Class III UIC Permit and Aquifer Exemption Requests does not meet U.S. Environmental Protection Agency (EPA) requirements.

e. The November 4, 2020, and December 8, 2021, Fact Sheet and Statement of Basis (FSSOB) do not meet the EPA 40 C.F.R. Section 124.8 requirements for a UIC Permit fact sheet.[2]

f. The DWQ has not established a Bonding Estimate and factual basis for a Bonding Estimate.

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[2] https://www.law.cornell.edu/cfr/text/40/124.8

g. The proposed Aquifer Exemption does not meet EPA requirements for an Aquifer Exemption.

h. The proposed Aquifer Exemption violates Utah Rule R317-7-5. Prohibition of Unauthorized Injection.

i. The draft DWQ Aquifer Exemption Request to be submitted is incomplete and misleading and does not provide a sufficient basis for EPA approval of the proposed Aquifer Exemption.

j. The LVMC is not a financially stable and responsible entity.

k. The DWQ does not have the information necessary to determine the long-term consequences of the proposed ISL Project.

l. The non-exempt aquifers adjacent to the proposed Aquifer Exemption area is entitled to protection under the Safe Drinking Water Act (SDWA).

m. The DWQ has not shown that there will not be horizontal and vertical migration of contaminants from exempted aquifer into the adjacent non-exempt underground sources of drinking water (USDWs).

2. Fact Sheet and Statement of Basis

2.1. Purpose of the Fact Sheet and Statement of Basis

The December 8, 2021, DWQ Draft Fact Sheet and Statement of Basis, Underground Injection Control (UIC) Class III Area Permit for LVMC. UTU-37-AP-5D5F693 Financial Assurance and Aquifer Exemption for a Portion of the BC Aquifer in Lower Lisbon Valley does not meet the EPA requirements for a Fact Sheet and Statement of Basis (FSSOB).

The December 2021 FSSOB is supposed to provide information related to the new additions to the Class III Area Permit: (1) the proposed Aquifer Exemption Request to be submitted to the EPA (Permit Attachment M) and (2) the proposed financial assurance mechanism (Permit Attachment J). The FSSOB is not adequate and does not meet EPA requirements, as will be discussed below.

The FSSOB states that the the purpose of the "FSSOB is to briefly describe the principal facts and the significant factual, legal, methodological and policy questions considered in modification of the Permit." The 3-page FSSOB provides little information about the

Aquifer Exemption and does not provide any evaluation of the proposed financial assurance mechanism. The FSSOB fails to describe the significant legal, methodological, and policy questions considered in the adoption of Permit Attachments J and M. The FSSOB does not meet the EPA requirements for a UIC Permit fact sheet at 40 C.F.R. Part 124.

2.2. EPA Regulations

EPA regulation applicable to UIC Permits and State Programs, such as the DWQ regulation of UIC Permits, are found at 40 C.F.R. Part 124. Section 124.8 provides the requirements for a UIC Permit fact sheet:

> (b) The fact sheet shall include, when applicable:
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> (1) A brief description of the type of facility or activity which is the subject of the draft permit;
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> (2) The type and quantity of wastes, fluids, or pollutants which are proposed to be or are being treated, stored, disposed of, injected, emitted, or discharged.
> ***
>
> (4) A brief summary of the basis for the draft permit conditions including references to applicable statutory or regulatory provisions and appropriate supporting references to the administrative record required by §124.9 (for EPA-issued permits);
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> (5) Reasons why any requested variances or alternatives to required standards do or do not appear justified;
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> (6) A description of the procedures for reaching a final decision on the draft permit including:
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> (i) The beginning and ending dates of the comment period under §124.10 and the address where comments will be received;
>
> (ii) Procedures for requesting a hearing and the nature of that hearing; and
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> (iii) Any other procedures by which the public may participate in the final decision.
>
> (7) Name and telephone number of a person to contact for additional information.

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The October 2021 DWQ Fact Sheet does not meet these EPA requirements, just as the November 4, 2020, FSSOB for the Class III UIC Permit did not meet the federal requirements for a UIC Permit FSSOB. The EPA regulations do not state that a State Program can substitute other documents to full fill the FSSOB requirements.

2.3. December 2021 FSSOB and EPA Requirements

2.3.1. The FSSOB is supposed to provide a brief description of the type of facility or activity which is the subject of the draft permit. However, this information is missing.

2.3.2. A FSSOB should include a description of "the type and quantity of wastes, fluids, or pollutants which are proposed to be or are being treated, stored, disposed of, injected, emitted, or discharged." The 2021 FSSOB does not meet this requirement.

2.3.3. The FSSOB is supposed to contain a "brief summary of the basis for the draft permit conditions including references to applicable statutory or regulatory provisions and appropriate supporting references to the administrative record." The October 2021 FSSOB does not contain any information about the Aquifer Exemption, the Aquifer Exemption Request to the EPA (Permit Attachment M), or the Financial Assurance Estimate (Permit Attachment J), with supporting references to the administrative record. There is no discussion in the FSSOB of how, exactly, the proposed Aquifer Exemption meets the applicable technical criteria and standards.

2.3.4. Attachment J to the October 2020 Draft Class III Area Permit, Underground Injection Control (UIC) Program, UIC Permit Number: UTU-37-AP-5D5F693, is the "Financial Responsibility. The Standby Trust Agreement along with Schedule A and the Associated Financial Guarantee Bond will be approved and delivered to the DEQ's Office of Support Services prior to Director Authorization to Inject." However, the Attachment J issued for public comment in December 2021 is not a Standby Trust Agreement or a Financial Guarantee Bond. It is only an **I**ndependent Financial Assurance Bonding Estimate. There is no reference to an Attachment J that would be a Standby Trust Agreement or a Financial Guarantee Bond, which would have legal force and effect.

Attachment M to the October 2020 Draft CLASS III Area Permit is supposed to be an Aquifer Exemption Request. However, as an attachment to the Permit, the DEQ Aquifer Exemption Request to be submitted to the EPA has no legal force an effect, so it is hard to understand why it would be part of the UIC Permit. Only an Aquifer Exemption, approved by the DWQ and the EPA Region 8, would have legal force and effect and be included in the Class III UIC Permit.

2.4. Duration of Permit

The FSSOB states: "Recommended Duration of Permit - December 31, 2026." However, there is no information explaining the duration of the Permit. The whole proposed ISL operation will last for 20 years or more. According to the Clear Creek Associates, LLC, Third Party Closure Costs Review, Phase 1 of the ISL operation—the GTO deposit—will last 10 years.

The process for the Permit renewal is not discussed in the FSSOB. Additionally, since the permits from the Bureau of Land Management (BLM) and Utah Division of Oil, Gas & Mining (DOGM) that are necessary to commence the development of the ISL copper recovery operation have not been applied for and the required authorizations will probably not be approved before 2025, the Duration of the Permit is very short. This short Duration of Permit has not been explained.

3. Independent Financial Assurance Bonding Estimate — Permit Attachment J

3.1. The new Attachment J to the Permit is an August 20, 2021, "Independent Financial Assurance Bonding Estimate," developed by Clear Creek Associates, LLC (Clear Creek). This document is confusing. Attachment J is supposed to be part of the UIC Permit, but the DWQ does not provide any basis for incorporating the 2021 "Independent Financial Assurance Bonding Estimate" into the UIC Permit. Rather, the Bonding Estimate appears to be part of the LVMC Application.

The FSSOB does not contain any evaluation of the Bonding Estimate or a statement regarding whether or not the DWQ accepts this estimate as the basis for the bonding of the project. So, the meaning of the Bonding Estimate is unclear.

3.2. According to the October 2020 Draft Permit, "The Standby Trust Agreement along with Schedule A and the Associated Financial Guarantee Bond will be approved and delivered to the DEQ's Office of Support Services prior to Director Authorization to Inject." However the DWQ has not provided any evaluation of the LVMC's bonding estimates.

3.3. The October 2020 Lisbon Valley Mining Company LLC, Lower Lisbon Valley ISR Technical Report, Attachment J, starting at the page after page 166 to page 168, includes a discussion of Financial Responsibility. The Technical Report states that the LVMC's preliminarily estimates its ISL-specific bonding requirement to be approximately $4.5 million for the first three years" of the ISL Copper Recovery Project. The 2021 Independent Financial Assurance Bonding Estimate is $6,183,349—a substantial difference. The FSSOB does not evaluate the new bonding estimate or indicate how

much the Division will require as a bonding requirement for the ISL-specific aspects of the Project. If the DWQ does not provide an analysis of the bonding estimates or state how much the financial assurance will be required by the DWQ, there is really no basis for public comments on the Bonding Estimate.

3.4. Project Timetable

The Independent Financial Assurance Bonding Estimate includes a description of the Project Timetable for Phase I of the ISL Project—the GTO deposit (page 5). There is another Project Timetable, which is included in the DWQ Aquifer Exemption Request as Figure 8 (page 27). Figure 8. Lisbon Valley Mining Company's timetable for project development is produced from Figure 11.9 of the Lisbon Valley Mining Company Technical Report (LVMC, 2020; 141). The Project Timetable in the DWQ Aquifer Exemption Request is significantly different from the timetable used by Clear Creek to develop there Bonding Estimate. See Table 1, below.

Neither timetable takes into consideration the length of time to obtain the necessary authorizations from the BLM, DOGM, Utah Division of Air Quality, and possibly the Utah Division of Waste Management and Radiation Control. If the LVMC intends to dispose of liquid wastes via deep well injection, that, too, will require another UIC Permit. Those permitting processes will take 2 years or more. The Bonding Estimate is only for the first 3 years of the ISL Project. Therefore, the timetable that is the basis for the Bonding Estimate is incomplete, conflicting, and does not take into consideration the full extent of Phase I of the ISL Project.

TABLE I - PROJECT TIMETABLE — GTO DEPOSIT

Financial Assurance Bonding Estimate			DWQ Aquifer Exemption Request	
Year		Activity	Year	Activity
1st	2022	Construction	1st	Permitting & Licensing
2nd	2023	Leaching	2nd	5-Spot Test, Exploration/ Development Drilling, Copper Production, & Wellfield Stability Monitoring
3rd	2024	Leaching	3rd	Injection Wellfield Construction, Production Wellfield Construction, Copper Production. & Wellfield Stability Monitoring

TABLE I - PROJECT TIMETABLE — GTO DEPOSIT				
Financial Assurance Bonding Estimate			**DWQ Aquifer Exemption Request**	
Year		**Activity**	**Year**	**Activity**
4th	2025	Wellfield Restoration Rinsing	4th	Injection Wellfield Construction, Production Wellfield Construction, Copper Production, & Wellfield Stability Monitoring
5th	2026	Wellfield Restoration Rinsing	5th	Injection Wellfield Construction, Production Wellfield Construction, Copper Production, & & Wellfield Stability Monitoring
6th	2027	Wellfield Abandonment	6th	Injection Wellfield Construction & Production Wellfield Construction, Copper Production, Wellfield Stability Monitoring, Regulatory Approval of Restoration, Wellfield Restoration Rinsing
7th	2028		7th	Injection Wellfield Construction & Production Wellfield Construction, & Copper Production, Wellfield Stability Monitoring, Wellfield Restoration Rinsing, Regulatory Approval of Restoration, Wellfield Plugging & Abandonment, & Wellfield Decommissioning
8th	2029		8th	Injection Wellfield Construction & Production Wellfield Construction, Copper Production, Wellfield Stability Monitoring, Wellfield Restoration Rinsing, Regulatory Approval of Restoration, Wellfield Plugging & Abandonment, & Wellfield Decommissioning
9th	2030		9th	Injection Wellfield Construction & Production Wellfield Construction, & Copper Production, Wellfield Stability Monitoring, Wellfield Restoration Rinsing, Regulatory Approval of Restoration, Wellfield Plugging & Abandonment, & Wellfield Decommissioning

TABLE I - PROJECT TIMETABLE — GTO DEPOSIT				
Financial Assurance Bonding Estimate			**DWQ Aquifer Exemption Request**	
Year		**Activity**	**Year**	**Activity**
10th	2031	Monitoring Well Abandonment	10th	Injection Wellfield Construction & Production Wellfield Construction, Copper Production, Wellfield Stability Monitoring, Wellfield Restoration Rinsing, Regulatory Approval of Restoration, Wellfield Plugging & Abandonment, & Wellfield Decommissioning
11th			11th	Copper Production, Wellfield Stability Monitoring, Wellfield Restoration Rinsing, Regulatory Approval of Restoration, Wellfield Plugging & Abandonment, & Wellfield Decommissioning
12th			12th	Copper Production, Wellfield Stability Monitoring, Wellfield Restoration Rinsing, Regulatory Approval of Restoration, & Wellfield Decommissioning
13th			13th	Copper Production, Wellfield Stability Monitoring, Wellfield Restoration Rinsing, Regulatory Approval of Restoration, Wellfield Plugging & Abandonment, & Wellfield Decommissioning
14th			14th	Copper Production, Wellfield Stability Monitoring, Wellfield Restoration Rinsing, Regulatory Approval of Restoration, Wellfield Plugging & Abandonment, & Wellfield Decommissioning
			To Year 25	Unknown Period of Wellfield Stability Monitoring, Wellfield Restoration Rinsing, Regulatory Approval of Restoration, Wellfield Plugging & Abandonment, & Wellfield Decommissioning

3.5. There is no basis for DWQ acceptance of the "Independent Financial Assurance Bonding Estimate," because:

a. There are conflicting operational timetables in the Independent Financial Assurance Bonding Estimate and the Underground Injection Control Program Aquifer Exemption Request.

b. The DWQ did not provide an analysis of the Independent Financial Assurance Bonding Estimate or state the amount of financial assurance acceptable to the DWQ.

c. The Independent Financial Assurance Bonding Estimate Project Timetable is unrealistic because it does not consider the time required for the BLM, DOGM, and other permit and licensing application and review processes necessary for commencement of the ISL project.

3.6. The Financial Assurance Bond should be reviewed at least once a year and after any significant change in the Project that would affect the reclamation costs.

3.7. The DWQ, in responding to public comments on the LVMC Class III UIC Permit stated: "Following in situ copper recovery, groundwater will be restored in the BC Aquifer until water quality parameters have reached levels **that are technically and economically feasible** to achieve per Part III.G and Attachment H of the Draft Permit(DWQ 2020a)."[3] It is apparent from this statement that any Financial Assurance Bond might not be sufficient to assure groundwater restoration in the exempted aquifer and in nearby non-exempted aquifer.

3.8. The DWQ and the LVMC must demonstrate that the LVMC has the financial resources adequate to execute, manage, close, and remediate, in perpetuity—if necessary—the proposed ISL Project. The LVMC must be prepared for the financial consequences when things go wrong.

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[3] Lisbon Valley Mining Company LLC, Underground Injection Control (UIC) Class III Draft Area Permit No. UTU-37-AP-5D5F693. Utah Department of Environmental Quality, Division of Water Quality Public Comments and Responses, Public Hearing and Comment Period from: October 31, 2020, to January 11, 2021. Comment 4.13: Division Response, page 26.

4. Underground Injection Control Program Aquifer Exemption Request — Permit Attachment M.

4.1. Attachment M to the Class III UIC Permit is the draft State of Utah Underground Injection Control Program Aquifer Exemption Request Submitted to the EPA Region 8.

The December 8, 2021, FSSOB for the draft Underground Injection Control (UIC) Class III Area Permit (Permit) for LVMC, references the Class III Area Permit and the proposed Aquifer Exemption Request (Permit Attachment M). However, it seems that the UIC Permit should include the Final Aquifer Exemption, not the DWQ Aquifer Exemption Request submitted to the EPA Region 8, Underground Injection Control Program, or the Original 2020 LVMC Aquifer Exemption Request.

Attachment M to the original 2020 Draft UIC Permit is the LVMC Aquifer Exemption Request. The DWQ has not indicated that the Aquifer Exemption Request to EPA Region 8 replaces that document or supplements the LVMC Aquifer Exemption Request. However, neither document is a draft Aquifer Exemption that would become part of the final Class III UIC Permit.

5. Aquifer Exemption Request

The DWQ requests comments on State of Utah Underground Injection Control Program Aquifer Exemption Request Submitted to the U.S. Environmental Protection Agency Region 8, December 1, 2021.

5.1. Aquifer Exemption Request to be submitted to the EPA Region 8 is Incomplete and Misleading.

5.1.1. The DWQ Aquifer Exemption Request should contain maps of the proposed wellfields in each ISL deposits: Lone Wolf, GTO, and Flying Diamond. Instead, there is a very rough map with only a few wells indicated (Figure 2, page 6) and a diagram of typical wellfield configuration (Figure 3, page 7). This does not provide the EPA, or the public, with complete and accurate information on the placement of the wells associated with the ISL operation.

5.1.2. The Aquifer Exemption Request to the EPA states (page 8):

> The predominant land uses within the Project Area are mining and ranching. Most of the land surface serves as grazing land for cattle. Some of the land is used for recreational activities—primarily off-road motorsports and hunting. However, ISR is compatible with multiple land

> uses, and operations can be conducted with little impact on existing activities.

The DWQ provides no basis for its assumption that the ISL copper recovery operations "can be conducted with little impact on existing activities." This proposed ISL Project is a major industrial project with significant surface and subsurface impacts. The DWQ fails to describe the impacts to the area and various "multiple" uses from the project and describe how and why the ISL operations will have little impact, or impacts will be mitigated. The DWQ has not developed an environmental analysis of the proposed project. Such analyses will be developed by the Bureau of Land Management and Utah Division of Oil, Gas & Mining **after** LVMC submits applications to those agencies for authorization to conduct the ISL operation.

5.1.3. The ISL operations will, in fact, have an adverse impact on existing activities. The DWQ received numerous comments on the Class III UIC Permit for the project that document and discuss numerous adverse impacts to nearby residents and their livelihoods.[4] Such impacts include:

a. Reduction of available water due to depletion of aquifer
b. Dust
c. Industrial noise from drilling, truck traffic, and other activities
d. Degradation of the landscape
e. Radon and other radioactive emissions that will not be monitored or mitigated
f. Disturbances to domestic livestock
g. Disturbances to wildlife
h. Destruction of the view shed in a prime recreational area
i. Negative impacts on customers and potential customers of nearby year-round recreational business
j. Negative impacts to adjacent cattle operation
k. Adverse impacts to the economic, social, and individual and community health and wellbeing
l. Destruction of historic community livelihoods
m. Loss of grazing resources
n. Loss of property values
o. High potential for contamination of vulnerable and limited domestic water supply of local residents and businesses

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[4] https://uraniumwatch.org/LVMC_DWQ_UICPermit/DWQ_PublicComments_LVMC_UICPermit_2020-2021.pdf

5.1.4. The DWQ Aquifer Exemption Request ignores impacts related to radioactivity in the soils and rock, air, and water in the Project area. The Aquifer Exemption Request states, in regards to radiological contaminants (page 16):

> The concentrations of other contaminants, including uranium and radioactivity, in some groundwater samples exceeded maximum contaminant levels (MCLs).
> ***
> Some BC Aquifer groundwater has high radium and gross alpha and uranium concentrations above MC
> ***
> The concentrations of other contaminants, including uranium and radioactivity, in some groundwater samples exceeded MCLs.

The Lisbon Valley and surrounding area were a major uranium mining area, providing uranium for the U.S. atomic weapons program and commercial nuclear reactors. The DWQ Aquifer Exemption Request references two publication that identify the Lisbon Valley as Utah's Largest Uranium District.[5] There are numerous abandoned, reclaimed, and partially reclaimed uranium mines in the area.[6] There are 4 permitted, or partially permitted, uranium mines in the area (La Sal Mines Complex, Energy Queen, Rim, and Sage Mines), and a closed and partially reclaimed uranium mill (Lisbon Valley Mill).

The road building, drilling, and other surface disturbances will mobilize radioactive particulates and increase radon emissions. In addition to mobilizing copper in the Burro Canyon Aquifer, the dilute sulfuric acid lixiviant will also mobilize uranium. The uranium and other radionuclides will be concentrated in the copper recovery process such that the concentrated materials (solids or liquids) may require a source material license issued by the Utah Division of Waste Management and Radiation Control. There was no mention of this in the UIC Permit Application.

The mobilized uranium, and other contaminants, will also remain in the aquifer and are likely to spread to surrounding areas outside the wellfields. The flushing process can concentrate uranium in evaporation ponds. Also, ISL wellfields are subject to excursions, spills, pipe leaks, and other accidents. There is abundant evidence that ISL uranium recover operations have never been able to restore wellfield aquifers to

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[5] https://archives.datapages.com/data/uga/data/078/078001/534_ugs780534.htm

[6] https://www.energy.gov/lm/defense-related-uranium-mines-report-congress

pre-mining conditions. Further discussion of the hazards and historic impacts of ISL uranium recovery operations in Section 5.1.7 and Section 6, below.

5.1.5. Incomplete Identification of Area Municipal Water Supplies

The discussion of Private and Public Wells Outside the Permit Area / Aquifer Exemption Boundary (page 21) discusses possible impacts to water for the City of Monticello and the towns of La Sal, Utah, and Egnar, Colorado. However, there is no mention of potential impacts to the municipal well and aquifer that supplies water to the community of Eastland, Utah, 20 to 30 miles south Lisbon Valley.

5.1.6. Incomplete Data and Information

A major concern in the proposed ISL project is the migration of injected lixiviant and mobilized copper, uranium, and other minerals outside the Exempted Aquifer and ore zones into nearby Underground Sources of Drinking Water (USDWs). According to the DWQ Aquifer Exemption Request (page 28), "A number of factors, including Class III Area Permit requirements, led the Director to the conclusion that adjacent USDWs will not be impacted by ISR contaminants crossing the AE boundary laterally or migrating vertically." However, that DWQ determination relies on future actions, testing, and verifications to support its assertions. The DWQ's assumptions that adjacent USDWs will not be impacted by ISL contaminants to adjacent USDWs cannot be verified at this time.

The DWQ lists the following actions required by the UIC Permit:

> a. Injection interval confining zones will be evaluated during pre-ISR operation wellfield pump tests for their capacity to contain injection interval fluid vertically within the approved injection interval per Permit conditions in Part III, Section E, and cited attachments (DWQ, 2020).
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> b. LVMC must demonstrate the ability of the confining zones to contain injection interval fluids before the Director will issue an authorization to commence injection per Permit conditions in Part III, Section E, and cited attachments (DWQ, 2020).
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> c. LVMC must demonstrate the ability of the monitoring network to detect any movement of injection interval fluids out of the approved injection interval before the Director will issue an authorization to commence injection per Permit conditions in Part III, Section G, and cited attachments (DWQ, 2020).

> d. The requirements to demonstrate initial mechanical integrity for all injection, production, and monitoring wells and ongoing mechanical integrity tests for injection wells will prevent vertical migration of injection interval fluids through confining zones per Permit conditions in Part III, Sections G and I, and cited attachments (DWQ, 2020).
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> e. Part III, Sections E, G, and J (and cited attachments), of the Permit requires LVMC to develop a groundwater restoration plan for each wellfield that includes monitoring to evaluate the long-term stability of restored ISR contaminant concentrations to ensure that no ISR contaminants cross the AE boundary (DWQ, 2020).

Additionally, the DWQ assumes that:

> The extensive monitoring well network will verify both lateral and vertical containment of injection interval fluids. If any injection interval fluids begin to migrate out of the approved injection interval, the water level measurements in the monitoring well network will provide early detection to allow LVMC to implement timely corrective response actions to reverse the migration per Permit conditions in Part III, Sections C, G, and H, and cited attachments (DWQ, 2020).

These are actions, demonstrations, and monitoring will occur after the Aquifer Exemption has been approved, not before. The DWQ and EPA should not base their approval of an Aquifer Exemption on significant data and information that is not available at the time of the Aquifer Exemption Review.

At this time the DWQ does not have the data and information necessary for the DWQ and EPA to determine:

a. Whether the injection interval confining zones have the capacity to contain injection interval fluid vertically within the approved injection interval;

b. Whether the confining zones will be able to contain injection interval fluids;

c. The ability of the monitoring network to detect any movement of injection interval fluids out of the approved injection interval;

d. Whether the LVMC will be able to demonstrate initial mechanical integrity for all injection, production, and monitoring wells and ongoing mechanical integrity tests for injection wells will prevent vertical migration of injection interval fluids through confining zones;

e. Whether there is an adequate groundwater restoration plan for each wellfield;

f. Whether any injection interval fluids will to migrate out of the approved injection interval;

g. Whether the wellfield aquifer and adjacent aquifers can be returned to pre-mining baseline conditions; and

h. Whether the nearby Underground Sources of Drinking Water will be contaminated by the ISL operation.

Therefore, the DWQ and EPA do not have the necessary data and information to support an Aquifer Exemption.

5.1.7. The ISL uranium recovery industry and the Nuclear Regulatory Commission (NRC), which has regulated many of ISL uranium recovery operations over several decades, has long recognized that the uncontrolled movement of lixiviant beyond the ore zone—called an excursion—is an ongoing and significant problem. In 1986, NRC issued a report, "An Analysis of Excursions at Selected In Situ Uranium Mines in Wyoming and Texas."[7] Commenters incorporate this study into these comments, by reference. This 1986 report summarized the history of excursions at selected in situ mines in the United States and discussed methodologies for excursion identification and control. The study found that "vertical excursions of lixiviant migrating into an overlying aquifer through poorly plugged exploration holes continue to plague the industry." The study also framed the problems and purpose of the study:

> One of the major problems associated with the in situ mining method is the uncontrolled migration of lixiviant and dissolved constituents such as radionuclides, arsenic, selenium, chromium and lead outside of the production zone. These undesirable lixiviant migrations are known as excursions. Horizontal and/or vertical excursions have occurred at many of the in situ uranium mine sites in the western United States, and are recognized by mining companies as events that should be prevented.
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> Excursions are a result of both natural and man-made causes. However, the absence of critical data often prevents the complete understanding of the causes. In these cases, excursion clean-up can be very expensive and sometimes impossible. The development of a sound data base on the hydraulic properties of the aquifer and confining layers, hydrogeologic

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[7] "An Analysis of Excursions at Selected In Situ Uranium Mines In Wyoming and Texas;" NUREG/CR-3967 ORNL/TM-9956. Prepared by W. P. Staub, et al., Oak Ridge National Lab. Division of Waste Management, Office of Nuclear Material Safety and Safeguards, U.S.Nuclear Regulatory Commission; July 1986. https://www.nrc.gov/docs/ML1422/ML14224A351.pdf

> characteristics of faults, and the condition of abandoned drill holes prior to mining is essential to excursion prevention and control. This study is being conducted to obtain a better understanding of the hydrogeologic factors that control excursions and to develop proper methods of hydro-geologic evaluation of uranium in situ mine sites located in the United States. (Page 1.)
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> PURPOSE AND OBJECTIVES
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> The purpose of this study is to obtain a better understanding of excursions at in situ uranium mines. The general objectives are to evaluate the hydrogeologic factors that control excursions, to develop hydro-geologic evaluation guidelines that should be followed in order to achieve a thorough understanding of the hydrogeologic characteristics at potential or existing in situ uranium mine sites. Proper understanding of the hydro-geology prior to mining a given area is essential to prevent excursions from the production zone during mining. (Page 2.)

A discussed above, at this time the LVMC and the DWQ do not have the information, data, and analyses necessary to fully evaluate the impacts of the proposed ISL project in, and adjacent to, the exempted aquifer. The LVMC and DWQ have not gained a proper understanding of the hydro-geology prior to mining a given area, which is essential to prevent excursions from the production zone during mining.

5.1.8. Handling of Wastes

The DWQ does not discuss the liquid and solid waste streams from the ISL operation, the volume and constituents of those wastes, and how they will be managed during mine operation, and the ultimate disposition of those waste streams. The waste streams from the proposed ISL operation will contain radionuclides. There is no evaluation of possible surface contamination by radionuclides and other minerals and how those contaminants will impact wild and domestic animals and the native and domesticated plants and animals they feed on.

5.1.9. The Aquifer Exemption boundary has been arbitrarily redrawn to satisfy regulatory criteria. LVMC has modified spatial aquifer exemption boundaries by effectively redrawing lines on paper to avoid private wells, without regard to aquifer geology and without adequate changes to operational parameters to actually prevent contamination of the water supplies. LVMC and the DWQ ignore basic hydrogeology and contaminant transport mechanisms.

5.2. DWQ Oversight of Lower Lisbon Valley ISL Project

The LVMC has no experience operating a ISL copper recovery project. In addition, the DWQ has no experience regulating such a large and complex ISL operation. The lack of experience by both the LVMC and the DWQ is of great concern.

The LVMC will be required to submit monitoring data, wellfield installation information and data, notices related to unforeseen events, reclamation plans, and other information to the DWQ. This information will be important to nearby residents and other state and federal agencies that permit the mining operation. However, the DWQ does not an electronic reading room that will make sure these monitoring reports, data, inspection reports, notices of violation, and other information relevant to the operation of the wellfields are made readily available to the public in a timely manner. In addition, the DWQ does not require an interim management plan that commits the LVMC to certain protective actions if the ISL operation goes on standby.

The DWQ must require an interim management plan and assure that relevant documents pertinent to the ISL copper recovery operation are readily available to the public in a timely manner.

6. Impacts from ISL Mineral Recovery Operations

There is abundant evidence of surface and underground contamination, some of which is irreversible, resulting from ISL uranium recovery operations. Uranium is the most common element removed from underground by ISL operations.

6.1. Sources of Aquifer Contamination[8]

6.1.1. While in situ leaching technology has certain advantages, it has significant disadvantages:

a. The risk of spreading of leaching liquid outside of the uranium deposit, involving subsequent groundwater contamination,

b. The unpredictable impact of the leaching liquid on the rock of the deposit, and

c. The impossibility of restoring natural groundwater conditions after completion of the leaching operations.

There are a number of possible Failure Modes:

a. Injection well failure

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[8] https://www.wise-uranium.org/uisl.html

b. Pipe failure
c. Spill after pipe failure
d. Evaporation pond liner failure
e. Spill of leaching fluids
f. Spread of leaching liquids outside the leaching zone
g. Mobilization of uranium and other contaminants
h. Aquifer restoration failures

Even with treatment schemes, various problems remain unresolved:

a. Contaminants, which are mobile under chemically reducing conditions, such as radium, cannot be controlled,

b. If the chemically reducing conditions are later disturbed for any reasons, the the precipitated contaminants are re-mobilized,

c. If precipitated contaminants are re-mobilized, the restoration process takes very long periods of time, and

d. Not all parameters can be lowered appropriately.

Most restoration experiments reported refer to the alkaline leaching scheme, since this scheme is the only one used in Western world commercial in-situ operations. Therefore, nearly no experience exists with groundwater restoration after acid in- situ leaching, the scheme that was applied in most instances in Eastern Europe. The only Western in-situ leaching site restored after sulfuric acid leaching so far, is the small pilot scale facility Nine Mile Lake near Casper, Wyoming (USA). The results can therefore not simply be transferred to production scale facilities. The restoration scheme applied included the first two steps mentioned above.[9] It turned out that a water volume of more than 20 times the pore volume of the leaching zone had to be pumped, and still several parameters did not reach background levels. Moreover, the restoration required about the

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[9] The best results have been obtained with the following treatment scheme, consisting of a series of different steps [Schmidt1989], [Catchpole1995]:

- Phase 1: Pumping of contaminated water: the injection of the leaching solution is stopped and the contaminated liquid is pumped from the leaching zone. Subsequently, clean groundwater flows in from outside of the leaching zone.
- Phase 2: as 1, but with treatment of the pumped liquid (by reverse osmosis) and re-injection into the former leaching zone. This scheme results in circulation of the liquid. https://www.wise-uranium.org/uisl.html

same time as used for the leaching period [Nigbor1982] [Engelmann1982].[10]

6.1.2. The March 2012 study,[11] "Environmental Damage and Public Health Risks From Uranium Mining in the American West: Nuclear Fuel's Dirty Beginnings" provides extensive data and information regarding ISL impacts. This report is incorporated into these comments, by reference. The study discusses some important aspects of ISL mineral recovery operations and documents the ways that:

a. In-Situ Leach Mining Alters Groundwater Chemistry
b. In-Situ Leach Mining Causes Repeated "Spills, Leaks, and Excursions" of Contaminants
c. In-Situ Leach Mining Uses Scarce Groundwater
d. In-Situ Leach Mining Creates Waste
e. In-Situ Leach Mining Contaminates Aquifers

6.1.3. There is additional information documenting operational failures at NRC-licensed ISL uranium recovery operations included as Exhibit A. Exhibit B contains excerpts from the March 2016 "Citizen Petition to Repeal or Amend the EPA's Aquifer Exemption Regulations to Protect Underground Sources of Drinking Water."[12]

6.2. Wellfield Restoration

6.2.1. A major challenge for any ISL mineral recovery operation is wellfield restoration. ISL mining of an aquifer changes the chemistry of the groundwater, with dramatic increases in the concentrations of copper, uranium, other naturally occurring radioactive elements and heavy metals. The DWQ and the LVMC do not have the information necessary to assure the restoration of the wellfield or that nearby aquifers and a domestic water supply will not be contaminated during the wellfield operation and subsequent to that operation. There is no information that would support a finding that any offsite contamination can be rectified. It would not take much to destroy the water quality of the

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[10] https://www.wise-uranium.org/uisl.html

[11] "Environmental Damage and Public Health Risks From Uranium Mining in the American West: Nuclear Fuel's Dirty Beginnings," Geoffrey H. Fettus and Matthew G. McKinzie; Natural Resources Defense Council, https://www.nrdc.org/sites/default/files/uranium-mining-report.pdf

[12] "Citizen Petition to Repeal or Amend the EPA's Aquifer Exemption Regulations to Protect Underground Sources of Drinking Water." Natural Resources Defense Council, et al., March 23, 2016. https://www.epa.gov/sites/default/files/2016-09/documents/sdwa._petition16-000-6065_mall_nrdc_aquifer_exemption_003.pdf

nearby domestic, livestock, and irrigation water supplies and destroy the livelihoods that depend on those water supplies.

6.2.2. The DWQ and LVMC have not established reclamation goals or the methodology for establishing those goals. Even those goals might not be attained. The DWQ, in responding to public comments on the LVMC Class III UIC Permit stated: "Following in situ copper recovery, groundwater will be restored in the BC Aquifer until water quality parameters have reached levels **that are technically and economically feasible** to achieve per Part III.G and Attachment H of the Draft Permit (DWQ 2020a)."[13] It is apparent from this statement that the DEQ will allow the LVMC to modify the reclamation goals, based on technical infeasibility and/or financial considerations. Therefore, reclamation goals will be more like a wish list, than achievable goals for the exempted aquifer and nearby non-exempted aquifer.

7. Regulatory Criteria and Guidance

7.1. Environmental Protection Agency Regulations — 40 C.F.R. 144.7 and 40 C.F.R. 146.4.

The EPA regulations at 40 C..R. § 146.4 Criteria for exempted aquifers, applicable to Class III wells:

> § 146.4 Criteria for exempted aquifers.
> An aquifer or a portion thereof which meets the criteria for an "underground source of drinking water" in § 146.3 may be determined under § 144.7 of this chapter to be an "exempted aquifer" for Class I-V wells if it meets the criteria in paragraphs (a) through (c) of this section. Class VI wells must meet the criteria under paragraph (d) of this section:
>
> (a) It does not currently serve as a source of drinking water; and
>
> (b) It cannot now and will not in the future serve as a source of drinking water because:
>
> (1) It is mineral, hydrocarbon or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or III operation to contain minerals or hydrocarbons that

[13] Lisbon Valley Mining Company LLC, Underground Injection Control (UIC) Class III Draft Area Permit No. UTU-37-AP-5D5F693. Utah Department of Environmental Quality, Division of Water Quality Public Comments and Responses, Public Hearing and Comment Period from: October 31, 2020, to January 11, 2021. Comment 4.13: Division Response, page 26.

> considering their quantity and location are expected to be commercially producible.
>
> (2) It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical;
>
> (3) It is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption; or
>
> (4) It is located over a Class III well mining area subject to subsidence or catastrophic collapse; or
>
> (c) The total dissolved solids content of the ground water is more than 3,000 and less than 10,000 mg/l and it is not reasonably expected to supply a public water system.
>
> (3) It is not reasonably expected to supply a public water system.

The Burro Canyon Aquifer in the Lower Lisbon Valley does not meet the requirements for an exempted aquifer, because 1) it currently serves as a source of drinking water and 2) it can serve as a future source of drinking water. Just because there is mineralization in the Burro Canyon Aquifer, does not automatically eliminate it from consideration as a drinking water source, particularly since the Aquifer is an existing source of drinking water.

A recent Department of Energy Report, "Monticello Mill Tailings Site, Operable Unit III, Annual Groundwater Report May 2019–May 2020, December 2021," [14] describes the Burro Canyon Formation as "a regional water supply aquifer."

> The alluvial aquifer is underlain by the Mancos Shale, Dakota Sandstone, Burro Canyon, and Morrison Formations (Figure 3). The Mancos Shale is not shown in Figure 3 because it is completely eroded away below the aquifer within the valley except to the west of the former mill site. The Dakota Sandstone forms an aquitard beneath the alluvial aquifer until about 0.6 mile downgradient of the former mill site. There, the formation is absent due to erosion in the Montezuma Creek valley. **This exposes the permeable Burro Canyon Formation, a regional water supply aquifer,** allowing direct hydraulic communication with the alluvial aquifer.

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[14] Monticello Mill Tailings Site, Operable Unit III, Annual Groundwater Report May 2019–May 2020; U.S. Department of Energy, Legacy Management; December 2021 https://lmpublicsearch.lm.doe.gov/lmsites/s30735_mnt_gw_may19-may20_dec2021.pdf

[Emphasis added.]

The EPA regulations do not automatically exempt a section of an aquifer that is a regional water source just because a portion of the aquifer contains minerals or hydrocarbons that, considering their quantity and location, are expected to be commercially producible. Just because LVMC demonstrated that it contains minerals that are expected to be commercially producible, it does not automatically follow that the aquifer cannot in the future serve as a source of drinking water.

There is no statutory basis for the criteria in section 146.4(b)(1), which appears to elevate the potential for production of minerals, hydrocarbons, or geothermal energy above EPA's duty to protect USDW. To do so violates the Safe Drinking Water Act. Congress intended contamination of underground sources of water to be prevented "if there is any reasonable likelihood that these sources will be needed in the future to meet the public demand for water and if these sources may be used for such purpose in the future."[15] Congress did not make any exception to the rule that all potential sources of water must not be endangered.

7.2. Utah UIC Regulations - R317-7-5. Prohibition of Unauthorized Injection

7.2.1. Utah Rule R317-7. Underground Injection Control (UIC) Program, provides certain requirements for a Class III UIC Permit, which apply to area proposed for an Aquifer Exemption. Section defines Class III wells as wells that inject for extraction of minerals, including in situ production of uranium or other metals from ore bodies that have not been conventionally mined. R317-7-5 states:

> 5.1 Any underground injection is prohibited except as authorized by permit or as allowed under these rules.
>
> 5.2 No authorization by permit or by these rules for underground injection shall be construed to authorize or permit any underground injection which endangers a drinking water source.
>
> 5.3 Underground injections are prohibited which would allow movement of fluid containing any contaminant into underground sources of drinking water if the presence of that contaminant may cause a violation of any primary drinking water regulation (40 C.F.R. Part 141 and Utah Primary Drinking Water Standards R309-200-5), or which may adversely affect the health of persons. Underground injections shall not be authorized if they

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[15] H.R. Rep. No. 93-1185. supra note 6. at 32.

> may cause a violation of any ground water quality rules that may be promulgated by the Utah Water Quality Board. Any applicant for a permit shall have the burden of showing that the requirements of this paragraph are met.

7.2.2. The Division has not provided any information that demonstrates that the proposed Lower Lisbon Valley ISL copper recovery project would not endanger a drinking water source and would not would allow movement of fluid containing any contaminant into underground sources of drinking water if the presence of that contaminant may cause a violation of any primary drinking water regulation (40 C.F.R. Part 141 and Utah Primary Drinking Water Standards R309-200-5), or which may adversely affect the health of persons.

7.2.3. The Burro Canyon Aquifer is currently an underground source of drinking water. The Burro Canyon Aquifer 1) contains a sufficient quantity of ground water to supply a public water system; 2) currently supplies drinking water for human consumption; 3) contains fewer than 10,000 mg/l total dissolved solids (TDS); and 4) is not an exempted aquifer. The Burro Canyon Aquifer, as shown on the various Maps and Figures submitted by LVMC to the DWQ, supplies water for irrigation, stock watering, and domestic use in the Area of Review and within the original proposed Aquifer Exemption Boundary.

7.2.4. The LVMC has not established Baseline Water Quality in the South East area of the project.

7.2.5. The LVMC Internal Memo: Summary of the Ground Water Occurrences within the Lower Lisbon Valley Area, February 16, 2020, was "prepared in order to summarize the occurrence of ground water within the BC Aquifer of the Lower Lisbon Valley Area, and the rationale behind this conclusion." LVMC investigated the Ground Water Occurrence in the Dakota-Burro Canyon Formations, SE UIC Project Area, Lower Lisbon Valley, San Juan County, Utah. The area investigated was South East area of the original proposed Aquifer Exemption Boundary, which ends at the Utah/Colorado border and includes the Wilcox domestic/agriculture Well 05-3907/05-3575 and the State Line Deposit. This Memo established the presence of ground water and hydrological connectivity in the Burro Canyon Aquifer in this area. According to the Memo, page 5:

> Exploration Groundwater Flows
> The area from Flying Diamond to the Colorado Stateline has been extensively drilled. Figure 3 is a compilation of drilling records documenting depth at which groundwater flow was observed along with estimates of final flows at total depth using a 5-gallon bucket test. And although not monitoring wells, the number and areal extent of exploration

> holes document consistent groundwater occurrence and substantial flows over the greater than two-mile distance from Flying Diamond to Stateline.
>
> Stock well 05-3575 is located near the Stateline deposit (see Figure 2). This well is screened in the upper BC Aquifer and documents a hydraulic head 45 feet below ground surface (bgs).
>
> Groundwater flows attenuate and finally terminate on the SE end of the Stateline Deposit where geologic structure elevates the Morrison Formation above the BC Aquifer hydraulic head. Figure 3 includes an expanded vie

The Memo concludes:

> The combined information supports the occurrence of BC Aquifer groundwater along an approximate 2.5 mile transect in the SE Project Area. This information suggests the occurrence of groundwater in the BC wherever it is down-dropped below 6200 feet amsl. These observations correlate well with the greater Project Area and support a common aquifer.

7.2.6. The LVMC Internal Memo–Summary of the Exploration Activities within the Lower Lisbon Valley Area, and the subsequent delineation of mineralization found there, shows that the Flying Diamond Deposit is close to the Wilcox Well 05-3907/05-3575, which has now been arbitrarily excluded from the Aquifer Exemption Boundary.

7.2.7. The injection of the proposed lixiviant, a raffinate containing a dilute sulfuric acid solution, into the Burrow Canyon Aquifer would allow movement of fluid containing sulfuric acid, uranium, and other contaminants into an underground source of drinking water. It would allow for the movement of contaminants from the well field to the Wilcox Well 05-3907/05-3575, used for domestic, irrigation, and stock watering purposes.

The Wilcox well draws water from the same aquifer that will receive the lixiviant. There are no geologic barriers between the proposed wellfield and the Wilcox Well outside the proposed Aquifer Exemption Boundary. The LVMC has not proposed any monitoring well that would be able to determine if fluids and mobilized contaminants from the ISL project have reached the Wilcox Well.

The Aquifer Exemption Boundary in the area of the Wilcox Well does not include a buffer zone beyond the proposed monitoring well in that South East area. The monitoring well appears to be right on the edge of the Aquifer Exemption Boundary.

There is no information in the DWQ Aquifer Exemption Request or the LVMC Application regarding how far an excursion of the lixiviant and the contaminants mobilized by the lixiviant would travel before being detected and recovered. There is no information regarding the extensive history of ISL uranium recovery operation excursions, spills, leaks, mechanical failures, and other events.

There has been extensive exploratory drilling in the area. As discussed in the 1986 NRC Report, improperly constructed and plugged drill holes provide a pathway for vertical excursions. There is no information in the DWQ Aquifer Exemption Request that analyzes this possibility.

There is no data that would substantiate an assumption that any excursion would be recovered and the area would still be a clean, uncontaminated source of drinking water. Also, there is no evaluation of the long-term impacts from the ISL operation to the ground water quality in the South East Area of ISL project.

7.2.8. The regulation states: "Underground injections shall not be authorized if they may cause a violation of any ground water quality rules that may be promulgated by the Utah Water Quality Board." The regulation here says "may cause" a violation of any groundwater quality rules. Because the proposed ISL operation will impact the existing Burro Canyon Aquifer drinking water source and is extremely close to a well that is used for domestic purposes, LVMC and the Division have no basis for concluding that the underground injections associated with the ISL project will not cause a violation of any groundwater quality rules. The lack of any geological or hydrological barriers between the proposed well field and the Wilcox Well means that the proposed ISL project not only "may," but most likely "will," cause of a violation of drinking water rules, will endanger a drinking water source, and will adversely affect the health of persons.

7.2.9. The DWQ Aquifer Exemption Request and the LVMC Application do not contain an analysis of the ability of the proposed monitoring plans to limit impacts of excursions to groundwater, existing wells, and areas outside the Aquifer Exemption Boundary.

7.2.10.. The LVMC Technical Report Appendix J, is a 22-page Ground Water Resources Report, Lisbon Valley Mining Company LLC, Lower Lisbon Valley Project, Supplemental Environmental Impact Statement (SEIS), dated March 2020.

The SEIS states in regard to the scope of the proposed action: "The Company is planning to expand current conventional open pit mining operations as well as implement in-situ recovery (ISR) operations in the Lower Lisbon Valley Mining District of San Juan County, Utah." The scope of the very brief and inadequate SEIS is for both an expanded open pit/heap leach operation and the proposed ISL operation. It states in regard to the

effects on the Burro Canyon Aquifer:

> ISR activities would involve the exempting of the BC aquifer only as it exists within the LLV ground water study area. The localized and perched alluvial aquifer would not be exempted, nor would the N aquifer. As the BC aquifer is confined geologically and structurally within the study area, the **effects to the BC aquifer would be considered major, localized, and long-term.** [Emphasis added.]

7.2.11. In Sum: The proposed UIC Class III Permit and Aquifer Exemption Request must be denied because the proposed underground injections should be prohibited due to the fact that the injection would endanger a drinking water source and would allow movement of fluid containing contaminants into underground sources of drinking water. The presence of those contaminants would cause a violation of any primary drinking water regulation (40 C.F.R. Part 141 and Utah Primary Drinking Water Standards R309-200-5). The presence of those contaminants would adversely affect the health of persons who live adjacent to the proposed ISL site and to those who use nearby wells for drinking and agricultural purposes.

7.3. EPA Memorandum — Enhancing Coordination and Communication with States on Review and Approval of Aquifer Exemption Requests Under SDWA. June 24, 2014.

7.3.1. The purpose of the Memorandum "is to promote a consistent and predictable process for the review of Aquifer Exemption requests under the Safe Drinking Water Act (SDWA)." The Memo states:

> III. Recommended Steps for Facilitating the Aquifer Exemption Review and Approval Process
>
> As indicated above, most aquifer exemption requests have clearly met the regulatory criteria in 40 CFR 146.4, and reviews have been completed in a timely manner. **There are some aquifer exemption requests, however, that have proven to be considerably more complex to review. These more complex aquifer exemption requests have not been limited to substantial program revisions; in some cases, nonsubstantial aquifer exemption requests have proved quite complex as well. Typically, these have involved situations where the proposed exempted area is located adjacent to an underground source of drinking water (USDW) that is currently in use, or where the potential future use of the**

> **USDW is unclear.** [Emphasis added.]

The DWQ Aquifer Exemption Request to the EPA is a complex request. It involves a proposed exempted area that is located adjacent to an underground source of drinking water (USDW) that is currently in use for domestic, irrigation, stock watering purposes. It is the mainstay of a nearby family ranch and livestock operation. Water from the well is also used by wildlife in an area with few surface water sources. Additionally, there are local community concerns and opposition to the proposed ISL copper recovery operation. These concerns and opposition have been brought forward at two public hearings and a public comment period.

7.3.2. The Aquifer Exemption Checklist

The Checklist, under Regulatory Criteria regarding "Demonstration that the aquifer or portion thereof does not currently serve as a source of drinking water per 146.4{a)," requests the submittal of information related to wells in the vicinity of the proposed exempted Aquifer:

> Are there any public or private drinking water wells within and nearby the proposed exempted area for which the proposed exempted portion of the aquifer might be a source of drinking water Y / N
>
> If yes, list all those wells Include: pertinent map(s) visually showing the areal extent of exemption boundary, depth and thickness of the aquifer proposed for exemption, all known subsurface structures such as faults affecting the aquifer, and each of the inventoried water well locations by well # or owner name.
>
> Include: Table of all inventoried water wells showing: Well Name/#, Owner, (Private/Public), Contact information, Purpose of well (Domestic, Irrigation, Livestock, etc.), depth of source water, name of aquifer, well completion data, age of well (if known), and the primary source of well data (Applicant/State/Tribe/EPA).
>
> Include: Map showing the areal extent of exemption boundary, all domestic water wells considered potentially down gradient of the exemption and hydraulically connected to the exemption. If wells are deemed horizontally and/or vertically isolated from the exemption, this should be foot noted on the Table as well. Use arrow (s) to indicate the direction and speed of GW in the aquifer.

> Are there any public or private drinking water wells or springs capturing (or that will be capturing) or producing drinking water from the aquifer or portion thereof within the proposed exemption area? Y /N
>
> Evaluate the capture zone of the well (s) in the area near the proposed project (i.e., the volume of the aquifer(s) or portion(s) thereof from within which groundwater is expected to be captured by that well). A drinking water well's current source of water is the volume (or portion) of an aquifer which contains water that will be produced by a well in its lifetime. What parameters were considered to determine the lifetime of the well?

There is a well nearby the proposed exempted area for which the proposed exempted portion of the aquifer might be a source of drinking water. This is the Wilcox Well 05-3907. The Aquifer Exemption Checklist then lists several pieces of information that should be included in the Request, as quoted above. However, this information was not included in the DWQ Aquifer Exemption Request. The DWQ has not included "Well Owner, Contact information, Purpose of well (Domestic, Irrigation, Livestock, etc.), depth of source water, name of aquifer, well completion data, age of well (if known), and the primary source of well data." The DWQ has not indicated the direction and speed of Ground Water in the aquifer. The DWQ did not evaluate the capture zone of the well (s) in the area near the proposed project.

Therefore, the DWQ has not provided some of the necessary information in support of the Aquifer Exemption Request.

8. Class III UIC Permit

8.1. There are a number of issues related to the UIC Permit. One is the nature of the LVMC Class III UIC Permit and Aquifer Exemption Application. In the DWQ's response to pubic comments[16] that questioned some of the factual statements made in the LVMC Technical Report, the DWQ stated (page 26):

> The Technical Report(LVMC 2020) is not the permit or part of the permit (DWQ 2020a). The Division required LVMC to include the Technical Report as part of its application for the permit to provide information relevant to the Division's review of the application and to use when writing the Draft Permit.The Technical Report was provided to the public in response to a request from the public, but it is not part of this public notice package because the Technical Report itself is not part of the Draft

[16] https://uraniumwatch.org/lisbonvalleymine/DWQ_LVMC_UICpermit_commentresponses_110821.pdf

> Permit (DWQ 2020a). Moreover, LVMC revised and updated the Technical Report during the permit review process in response to requests from the Division for more information and for modifications to the proposed plan. The Draft Permit (DWQ 2020a) is the legal regulatory document that defines all permit conditions. The objective of the Division's review of LVMC's application and Technical Report is not to edit and finalize them, but rather to use those documents to prepare the Draft Permit document, which is the subject of this public notice and request for public comment.

The DWQ's way of handling an application for a permit is very different from other agencies, both state and federal, that receive permit or license applications for review. The permitting relies on an Application, including technical information, environmental analyses, and updated versions of the Application or information contained in the Application. It is the responsibility of the agency to make the full application readily available to the public for their review long before there is a notice of opportunity for public comment. It is the permitting agency's responsibility to see that the Application is complete and that the information and data in the Application are factual. It is the responsibility of the permitting agency to ask questions about the Application, request additional information, and request corrections if there is confusing, conflicting, or incomplete information. If new versions of the Application or supporting data are submitted, the versions should be identified as such and be made publicly available. This is a long process. This is how a regulatory that has responsibility for public health and safety and the environment should engage the applicant and the public.

A permitting agency should expect and encourage public comments on the Application itself, especially where there may be conflicting information, data, and opinions. An example of such a permitting process is the recent NRC review of the NuScale Power LLC Design Certification Application for a Small Modular Reactor. The various chapters of the Application and any revisions were made publicly available through out a lengthy review process.[17] Most of the NRC meeting with the applicant were open to the public via a phone line, and the public had an opportunity to ask questions of NRC staff and make written or verbal comments.

9. Conclusion

The DWQ must deny the LVMC request for an Aquifer Exemption for the proposed ISL copper recovery operation in the Lower Lisbon Valley, San Juan County, Utah.

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[17] Application Documents for the NuScale Design.
https://www.nrc.gov/reactors/new-reactors/smr/nuscale/documents.html

As documented in the above comments, because the requirements for a permit under state law and EPA delegation have not and cannot be met. The aquifer exemption does not remotely meet the EPA standards and requirements for UIC programs to protect underground sources of drinking water (USDW) from endangerment by subsurface emplacement of fluids into UIC wells.

The DWQ and the EPA have an obligation to protect any aquifers which are still of good enough quality that they have any potential to serve as a drinking water source, now or in the future. The DWQ an EPA cannot allow for contamination of an aquifer, both within and adjacent to the proposed Aquifer Exemption area that could reasonably have been expected to supply a public water system in the future.

Thank you for providing this opportunity to comment.

Sincerely,

Sarah Fields
Uranium Watch

Bekah Ashley
Utah Chapter Sierra Club
Salt Lake City, Utah

Jennifer Thurston
INFORM
Paradox, Colorado

EXHIBIT A

URANIUM RECOVERY IN-SITU LEACH OPERATIONS
LICENSE VIOLATIONS AND REPORTABLE EVENTS

Crow Butte, Highland, Lost Creek, Nichols Ranch, Ross, Smith Ranch, and Willow Creek In-Situ Leach Uranium Recovery Sites

Note: In 2018 Wyoming became a Nuclear Regulatory Commission (NRC) Agreement State for uranium recovery operations (11e.(2) byproduct material).
Since that time the Public must submit a Wyoming Records Act Request for UIC Permit Documents: http://deq.wyoming.gov/wqd/underground-injection-control/resources/gem-database/

Nebraska and Earlier Wyoming ISL records are available on the NRC electronic document database (ADAMS): https://www.nrc.gov/reading-rm/adams.html

CROW BUTTE ISL - NEBRASKA
NRC Docket No. 40-8943 (enter 04008943 on ADAMS)

License Violations and reportable events at Crow Butte ISL Site

http://www.wise-uranium.org/umopusa.html#CROWBVIOL

Details on post-Nov.1,1999, events available through ADAMS , Docket No. 04008943)

Sep. 22, 2020: Injection well fails 5-year mechanical integrity test
May 29, 2020: Monitor well excursion
May 21, 2020: Monitor well excursion
Mar. 3, 2020: Production well fails 5-year mechanical integrity test
Jan. 31, 2020: Production well fails 5-year mechanical integrity test
Jan. 2, 2020: Evaporation Pond 1 liner leak
Aug. 22, 2019: Monitor well excursion
July 11, 2019: Production well fails 5-year mechanical integrity test
June 24, 2019: Production well fails 5-year mechanical integrity test
June 5, 2019: Monitor well excursion
May 29, 2019: Evaporation Pond 1 liner leak
May 2, 2019: Monitor well excursion
Apr. 18, 2019: Monitor well excursion

Apr. 9, 2019: Monitor well excursion
Mar. 27, 2019: Monitor well excursion
Mar. 25, 2019: Monitor well excursion
Nov. 28, 2018: Monitor well excursion
June 1, 2018: Monitor well excursion
Sep. 12, 2017: 27,287 gallon spill of injection solution
Aug. 29, 2017: Monitor well excursion
July 27, 2017: Production well fails 5-year mechanical integrity test
Mar. 14, 2017: Injection well fails 5-year mechanical integrity test
June 8, 2016: Evaporation Pond 1 liner leak
May 5, 2016: two Monitor well excursions
Apr. 21, 2016: Monitor well excursion
Apr. 20, 2016: Injection well fails 5-year mechanical integrity test
Nov. 19, 2015: Monitor well excursion
Oct. 27, 2015: Monitor well excursion
Aug. 17, 2015: Injection well fails 5-year mechanical integrity test
Aug. 13,2015: Monitor well excursion
July 9, 2015: Monitor well excursion
July 2, 2015: Injection well fails 5-year mechanical integrity test
June 3, 2015: Monitor well excursion
May 28, 2015: Monitor well excursion
May 27, 2015: Monitor well excursion
May 21, 2015: Monitor well excursions
May 19, 2015: Monitor well excursion
Apr. 14, 2015: Monitor well excursion
Feb. 11, 2015: Monitor well excursion
July 22, 2014: Monitor well excursion
July 2, 2014: Failure to sample the underdrains of a leaking pond and to submit a corrective action plan
May 20, 2014: Monitor well excursion
May 8, 2014: Monitor well excursion
May 7, 2014: Evaporation Pond 1 liner leak
Dec. 10, 2013: Monitor well excursion
Sep. 11, 2013: Monitor well excursion
Aug. 22, 2013: Well fails 5-year mechanical integrity test
Aug. 6, 2013: Well fails 15-year mechanical integrity test
Jun. 5, 2013: Radiation dose in unrestricted area exceeds 0.02 mSv/h standard
Mar. 14, 2013: Evaporation Pond 1 liner leak
Jan. 18, 2013: Well fails mechanical integrity test
Oct. 24, 2012: Well fails 20-year mechanical integrity test

Aug. 20, 2012: Well fails 5-year mechanical integrity test
June 4, 2012: Well fails 5-year mechanical integrity test
May 25, 2012: Monitor well fails 15-year mechanical integrity test
Oct. 7, 2011: Monitor well excursion
Aug. 9, 2011: Exceedance of Well Head Manifold Pressure Limitations
July 18, 2011: two wells fail 5-year mechanical integrity test
June 1, 2011: Evaporation Pond 1 liner leak
May 27, 2011: two Monitor well excursions
May 24, 2011: Monitor well excursion
Mar. 16, 2011: Monitor well excursion
Jan. 13, 2011: Monitor well excursion
July 8, 2010: Monitor well excursion
July 6, 2010: Well fails 5-year mechanical integrity test
June 22, 2010: Excursions at two monitor wells "due to increased groundwater levels"
June 22, 2010: Monitor well excursion
June 16, 2010: Excursions at three monitor wells "due to increased groundwater levels"
June 11, 2010: Evaporation Pond 3 liner leak detected
May 10, 2010: Well fails 5-year mechanical integrity test
Apr. 13, 2010: Excursion at monitor well due to "natural conditions"
Dec. 31, 2009: Evaporation Pond 4 Liner Leak
Nov. 19, 2009: Well fails 15-year mechanical integrity test
Oct. 15, 2009: Mechanical integrity test missed for two wells
June 18, 2009: Evaporation Pond 4 liner leak detected
June 11, 2009: Monitor well excursion
June 5, 2009: Evaporation Pond 1 liner leak detected
April 27, 2009: Monitor well placed on excursion status
April 17, 2009: Production well fails 5-year mechanical integrity test
June 4, 2008: Exceedance of Well Head Manifold Pressure Limitations
May 31, 2008: Monitor well placed on excursion status
May 23, 2008: $50,000 penalty imposed for violations
May 19, 2008: Monitor well placed on excursion status
April 29, 2008: Five-year mechanical integrity test missed for 42 wells
September 26, 2006: Monitor well placed on excursion status
May 5, 2006: leak detected at Pond 4
January 19, 2006: Monitor well placed on excursion status
October 27, 2005: Injection well leak detected
August 4, 2005: Monitor well placed on excursion status
June 28, 2005: Monitor well placed on excursion status

June 17, 2005: Monitor well placed on excursion status
May 2, 2005: Monitor well placed on excursion status
May 14, 2004: leak detected at Pond 1
December 23, 2003: Monitor well placed on excursion status
December 26, 2002: Monitor well placed on excursion status
September 10, 2002: Monitor well placed on excursion status
April 4, 2002: Monitor well placed on excursion status
December 4, 2001: Monitor well placed on excursion status
March 2, 2001: Monitor well placed on excursion status
September 10, 2000: Monitor well placed on excursion status
May 26, 2000: Monitor well placed on excursion status
April 27, 2000: Monitor well placed on excursion status
March 6, 2000: Monitor well placed on excursion status
July 2, 1999: Monitor well placed on excursion status
August 7, 1998: Spill of 10,260 gallons of injection fluid
March 21, 1998: Monitor well placed on excursion status
August 12, 1997: Discovery of Pinhole Leaks in Upper Liner of Process Water Evaporation Pond

HIGHLAND ISL - WYOMING
NRC Docket No. 40-8857 (enter 04008857 on ADAMS search)

License violations and reportable events at Power Resources, Inc. Highland Uranium Project, Wyoming, USA

Post Sep. 30, 2018: withheld (after Wyoming became an NRC agreement state)
Mar. 16, 2014: 8,916 gallon spill of injection fluid (1 ppm U)
Dec. 11, 2013: Monitor well placed on excursion status
Dec. 5, 2013: 891 gallon spill of permitted waste water (0.7 ppm U)
Aug. 6, 2013: Monitor well placed on excursion status
Jul. 31, 2013: 1,048 gallon spill of production fluid (10 ppm U)
May 5, 2013: 85,000 gallon spill of injection fluid (2 ppm U)
Mar. 11, 2013: Monitor well placed on excursion status
Feb. 17, 2013: 105 gallon spill of production fluid (5.7 ppm U)
Dec. 20, 2012: 1,141 gallon spill of production fluid (23.1 ppm U)
Aug. 8, 2012: Monitor well placed on excursion status
Aug. 1, 2012: Monitor well placed on excursion status
Mar. 10, 2012: 344 gallon spill of production fluid (4.1 ppm U)
Mar. 9, 2012: 1,202 gallon spill of injection fluid
Mar. 7, 2012: 774 gallon spill of injection fluid
Feb. 29, 2012: Monitor well placed on excursion status

Jan. 12, 2012: Monitor well placed on excursion status
Jun. 16, 2011: Monitor well placed on excursion status
Jun. 7, 2011: Monitor well placed on excursion status
Mar. 8, 2011: Sampling missed for seven monitoring wells
Mar. 8, 2011: Monitor well placed on excursion status
Sep. 10, 2010: Monitor well placed on excursion status
Jun. 8, 2010: Monitor well placed on excursion status
Jan. 29, 2010: 224 gallon spill of injection solutions (1.3 ppm U_3O_8)
Jan. 13, 2010: Monitor well placed on excursion status
Nov. 23, 2009: Monitor well placed on excursion status
Sep. 24, 2009: Release of 90,600 gallons of treated process water
July 31, 2009: Monitor well placed on excursion status
July 7, 2009: Monitor well failure
May 26, 2009: 5,050 gallon spill of injection fluid (3 ppm U_3O_8)
May 21, 2009: Monitor well placed on excursion status
May 11, 2009: 6,500 gallon spill of production solutions (19.8 ppm U_3O_8)
Apr. 16, 2009: Monitor well placed on excursion status
Mar. 30, 2009: Monitor well placed on excursion status
Feb. 13, 2009: Monitor well placed on excursion status
Jan. 10, 2009: 1,820 gallon spill of injection/production water containing 15 ppm uranium
Nov. 18, 2008: Monitor well placed on excursion status
Nov. 12, 2008: Monitor well placed on excursion status
July 10, 2007: Monitor well placed on excursion status
June 28, 2007: 900 gallon spill of injection fluid (1.1 ppm U)
June 25, 2007: 3,747 gallon spill of production fluid (21 ppm U)
June 22, 2007: 198,500 gallon [751 cubic meters] spill of injection fluid (8.1 ppm U) (view details)
June 19, 2007: 900 gallon spill of production fluid (41.2 ppm U)
May 21, 2007: 700 gallon spill of injection fluid (1.2 ppm U)
May 1, 2007: monitor well on excursion status
Dec. 30, 2005: 1,000 gallon spill of restoration injection fluid, containing approx. 0.7 mg/L uranium
Aug. 30, 2005: 1,000 gallon spill of production fluid (15.4 mg/L U)
May 17, 2005: 20,700 gallon spill of injection fluid, containing approx. 1.1 mg/L uranium
Feb. 26, 2005: 3,000 gallon spill of production fluid, containing 11.5 mg/L uranium
Jan. 10, 2005: 300 gallon spill of injection fluid, containing 1 mg/L uranium
Sep. 12, 2004: 1,000 gallon spill of production fluid (10.5 mg/L uranium)

May 3, 2004: 800-1,000 gallon spill of production fluid, containing about 11 mg/L uranium
Feb. 11, 2004: 400-600 gallon spill of injection fluid (1.3 mg/L U308)
Feb. 8, 2004: 500-1,000 gallon spill of injection fluid (1.1 mg/L U308)
December 20, 2003: Spill of 600 gallons of injection fluid containing approx. 1.5 mg/L of uranium
October 20, 2003: Spill of 2,800 gallons of injection fluid containing approx. 1.5 mg/L of uranium
September 29, 2003: Spill of 5,000 gallons of injection/recirculation fluid containing approx. 2.0 mg/L of uranium
March 13, 2003: Spill of approx. 1,100 gallons of wellfield injection fluid
November 7, 2002: Monitor well placed on excursion status
July 1, 2002: Monitor well placed on excursion status
March 21, 2002: Monitor well placed on excursion status
July 7, 1999: Spillage of 3-5 Gallons of Water Containing LSA of Uranium Byproduct Material
June 1, 1999: Spillage of 4,000 Gallons of waste fluid
Feb. 5, 1999: Monitor well placed on excursion status
Feb. 5, 1998: Monitor well placed on excursion status

The Nuclear Regulatory Commission has issued a Notice of Violation to Power Resources, Inc., of Denver, Colorado, for violations of NRC requirements at the Highland Uranium Project in Converse County, Wyoming.

> View Notice of Violation EA 97-218

LOST CREEK ISL - WYOMING
NRC Docket No. 40-9068 (enter 04009068 on ADAMS search)
https://www.nrc.gov/info-finder/materials/uranium/licensed-facilities/lost-creek.html

License violations and reportable events at Lost Creek ISL site

http://www.wise-uranium.org/umopuswy.html#LOSTCREEKVIOL

Post Sep. 30, 2018: withheld (after Wyoming became an NRC agreement state)
Aug. 16, 2018: monitor well on excursion
Jul. 28, 2018: 1,625 gallon spill of production fluid (84 mg/L U_3O_8)
Jun. 21, 2018: monitor well on excursion
Apr. 5-7, 2018: bleed rate lower than 0.5% requirement
Oct. 9, 2017: monitor well on excursion
Sep. 5, 2017: 10,000 gallon spill of injection fluid (1.1 ppm U)

Aug. 19, 2017: 188,000 gallon [712 m^3] spill of injection fluid (1.2 mg/L U) (view details) http://www.wise-uranium.org/umopuswy.html#LOSTCREEKSPILL17
May 22, 2017: 1,100 gallon spill of injection fluid (1.5 mg/L U)
Feb. 6, 2017: 3,360 gallon spill of injection fluid (0.5 ppm U)
Jan. 9, 2017: 3,654 gallon spill of injection fluid (1.3 ppm U)
Dec. 22, 2016: 582 gallon spill of injection fluid (1.5 ppm U)
Sep. 29, 2016: vertical excursion at monitor well
July 20, 2016: 13,650 gallon spill of production fluid (89.1 ppm U)
Oct. 18, 2015: 367 gallon spill of production fluid (59.4 mg/L U)
Sep. 11, 2015: NRC Notice of Violation (failure to issue Radiation Work Permits)
Aug. 20, 2015: monitor well on excursion
July 15, 2015: monitor well on excursion
May 27, 2015: monitor well on excursion
Apr. 8, 2015: 960 gallon spill of injection fluid (2.6 mg/L U)
Mar. 11, 2015: 915 gallon spill of injection fluid (1.2 mg/L U)
Mar. 6, 2015: 13,395 gallon spill of waste water (24.9 mg/L U)
Jan. 13, 2015: 6,128 gallon spill of injection fluid (2.3 mg/L U)
Dec. 16, 2014: 900 gallon spill of production fluid (146 mg/L U)
Dec. 12, 2014: 2,835 gallon spill of injection fluid (3.8 mg/L U)
Dec. 12, 2014: 5,520 gallon spill of production fluid (64.6 mg/L U)
Lost Creek Spill Map (excerpt) , Annual Report 2014
Nov. 20, 2014: 700 gallon spill of injection fluid (3.1 mg/L U)
Nov. 14, 2014: NRC Notice of Violations (3 violations, see above)
Sep. 15, 2014: 370 gallon spill of injection fluid (5 mg/L U)
Jul. 13, 2014: 1,260 gallon spill of "raw groundwater" (2.3 mg/L U?)
Jun. 3, 2014: 57,000 gallon spill of production fluid (132 mg/L U)
May 30, 2014: 900 gallon spill of waste water
Mar. 29, 2014: 15,513 gallon spill of waste water
Mar. 25, 2014: 6,000 gallon spill of production fluid (194 mg/L U)
Mar. 20, 2014: 1,854 gallon spill of waste water
Feb. 25, 2014: 1,400 gallon spill of injection fluid (50.3 mg/L U)
Feb. 9 - Mar. 28, 2014: freeboard exceedance at two holding ponds (see above)
Jan. 18, 2014: 680 gallon spill of injection fluid
Jan. 18, 2014: 475 gallon spill of injection fluid (8.67 mg/L U)
Dec. 13, 2013: State orders halt of operation at Lost Creek uranium in situ leach mine for failure to maintain bleed (see above)
Nov. 23, 2013: 840 gallon spill of injection fluid (12 mg/L U)
Nov. 12, 2013: 3,360 gallon spill of injection fluid (0.08 mg/L U)
Aug. 4, 2013: 24,458 gallon spill of injection fluid (< 1 ppm U)
Aug. 3, 2013: 2,200 gallon spill of injection fluid (< 1 ppm U)

NICHOLS RANCH ISL - WYOMING
NRC Docket No. 40-9067 (enter 04009067 on ADAMS search)
https://www.nrc.gov/info-finder/materials/uranium/licensed-facilities/nichols-ranch.html
License Violations and reportable events at Nichols Ranch ISL site

http://www.wise-uranium.org/umopuswy.html#NICHOLSRANCHVIOL

Post Sep. 30, 2018: withheld (after Wyoming became an NRC agreement state)
Jun. 12, 2017: 4,500 gallon spill of injection fluid (< 1 mg/L U)
Dec. 7, 2016: 2,800 gallon spill of injection fluid (< 1 mg/L U)
Nov. 15, 2016: 55 gallon spill of production solution (27.4 mg/L U)
Aug. 11, 2016: 670 gallon spill of injection fluid
Nov. 5, 2015: 700 gallon spill of injection fluid
Dec. 2, 2014: 606 gallon release of injection solution (0.5 ppm U)
Nov. 2, 2014: 1,745 gallon release of injection fluid (0.201 ppm U)
Sep. 8, 2014: 12,975 gallon release of production solution (21.6 ppm U; the release flowed outside the permit boundary)
July 17, 2014: 20,219 gallon release of production fluid (33 ppm U_3O_8; the release "appears" to have flown outside the permit boundary)
June 5, 2014: 2,500 gallon release of injection fluid (0.04 ppm U)
Apr. 28, 2014: injection well found to be still in use after failing mechanical integrity test in February
Feb. 12, 2014: injection well fails mechanical integrity test
Aug. 14, 2013: 500 gallon spill of "grey water"

ROSS ISL - WYOMING
NRC Docket No. 40-9091 (enter 04009091 on ADAMS search)
https://www.nrc.gov/info-finder/materials/uranium/licensed-facilities/ross.html

License violations and reportable events at Ross ISL site

http://www.wise-uranium.org/umopuswy.html#ROSSVIOL

post Sep. 30, 2018: withheld (after Wyoming became an NRC agreement state)
Aug. 9, 2017: 4,316 gallon spill of injection fluid
July 27, 2017: 10,008 gallon spill of injection fluid
May 25, 2017: 800 gallon spill of injection fluid
Feb. 28, 2017: Samples taken from Pond 1 Monitor Well in exceedance of limits

Oct. 11, 2016: 1000 gallon spill of injection solution (1.46 mg/L U)
July 19, 2016: 1620 gallon spill of retention pond water (2 mg/L U)
June 1, 2016: 500 - 600 gallon spill of recovery solution (22.6 ppm U)
April 27, 2016: Pond monitor well indicates release from Pond 1 (however, Strata Energy believes that the exceedance is likely a result of natural variation in shallow groundwater quality)
March 3, 2016: 1200 gallon spill of waste water (0.7 mg/L U)

SMITH RANCH ISL - WYOMING
NRC Docket No. 40-8964 (enter 04008964 on ADAMS search)
https://www.nrc.gov/info-finder/materials/uranium/licensed-facilities/smith-ranch.html

License violations and reportable events at Smith Ranch in-situ leaching site
http://www.wise-uranium.org/umopussr.html#SMITHRVIOL

post Sep. 30, 2018: withheld (after Wyoming became an NRC agreement state)
Oct. 19, 2017: 533 gallon spill of restoration recovery fluid (4.2 ppm U)
Feb. 20, 2016: 4,264 gallon spill of production fluid (11.5 ppm U)
Dec. 4, 2015: Monitor well placed on excursion status
Oct. 23, 2015: 41 gallon spill of production fluid (24 ppm U)
May 21, 2015: 480 gallon spill of discharge fluid (7 ppm U)
Jan. 16, 2015: 3,520 gallon spill of injection fluid (1.8 ppm U)
Oct. 30, 2014: 15 gallon spill of injection fluid (2.1 ppm U)
Aug. 19, 2014: 9,074 gallon spill of injection fluid (2.7 ppm U)
Mar. 12, 2013: Monitor well placed on excursion status
Feb. 19, 2013: Monitor well placed on excursion status
Oct. 20, 2012: 100 gallon spill of production fluid (31.1 ppm U)
Oct. 16, 2012: 50 gallon spill of injection fluid
Aug. 20, 2012: Monitor well placed on excursion status
Dec. 6, 2011: 1,779 gallon spill of injection fluid (0.7 ppm U3O8)
Nov. 7, 2011: Leak in East Evaporation Pond
Sep. 12, 2011: Monitor well placed on excursion status
Aug. 19, 2011: 85 gallon spill of injection fluid
Aug. 15, 2011: Leak in East Evaporation Pond (158 mg/L U)
July 22, 2011: 53 gallon spill of injection fluid
July 8, 2011: 1,190 gallon spill of restoration recovery fluid containing 2.4 ppm U3O8
June 13, 2011: Leak in East Evaporation Pond (248 mg/L U)
May 19, 2011: 790 gallon spill of solution containing 17 ppm U-nat, spill length 2,112 feet (644 m), width 3 feet (0.9 m)

May 3, 2011: 1,500 gallon spill of production fluid, impacting 12,077 square feet (1,122 m^2)
Sep. 10, 2010: 960 gallon spill of solution containing 1.5 ppm U3O8
Jul. 20, 2010: leak in East Storage Pond
Jul. 8, 2010: 1,440 gallon spill of injection fluid containing 1 ppm U3O8
Nov. 19, 2009: 560 gallon spill of injection solutions containing 1.4 ppm U3O8
Aug. 26, 2009: 1,500 gallon spill of injection solutions containing 1.1 ppm U3O8
Jun. 11, 2009: 190 gallon spill of injection solutions containing 0.7 ppm U3O8
Apr. 23, 2009: leak in East Storage Pond (510 ppm U3O8)
Feb. 27, 2009: leak in East Storage Pond (263 ppm U3O8)
Feb. 9, 2009: 14,600 gallon spill of production solutions containing 7 ppm U3O8
Jan. 9, 2009: 2,169 gallon spill of production solutions containing 11 ppm U3O8
Dec. 29, 2008: 1,144 gallon spill of injection fluid containing 0.2 ppm uranium
Oct. 30, 2008: 5,500 gallon spill of injection fluid containing 2 ppm uranium
Sep. 17, 2008: 16,774 gallon spill of injection fluid
Aug. 17, 2008: 7,965 gallon spill of injection fluid containing 1.4 ppm uranium
July 24, 2008: 2,887 gallon spill of production water and 12,770 gallon spill of solution
Aug. 23, 2007: 11,600 gallon spill of deep disposal well fluid
June 27, 2007: 900 gallon spill of injection fluid containing 1.1 ppm uranium
June 19, 2007: 900 gallon spill of fluid containing 41.2 ppm uranium
Feb. 19, 2007: 6,000 gallon spill of production fluid (32.5 ppm uranium)
Jan. 14, 2007: 5,000 gallon spill of injection fluid (2 ppm uranium)
Dec. 13, 2006: 560 gallon spill of injection fluid (2 ppm uranium)
Dec. 5, 2006: 10,000 gallon spill of mixed monitor well, restoration and waste fluids (1 ppm uranium)
Nov. 22, 2006: 2,100 gallon spill of mine waste water
Feb. 10, 2006: 1,000 gallon spill of production fluid, containing approx. 21 mg/L uranium
Jan. 9, 2006: 6,240 gallon spill of injection fluid, containing approx. 1.7 mg/L uranium
Oct. 21, 2005: 7,041 gallon spill of deep disposal well fluid
Oct. 21, 2005: Leak detected in evaporation pond
Sep. 2, 2005: 4,500 gallon spill of production fluid, containing approx. 8.6 mg/L uranium
Aug. 16, 2005: 1,050 gallon spill of production fluid, containing approx. 2.1 mg/L uranium
May 31, 2005: 4,700 gallon spill of injection fluid, containing approx. 1.1 mg/L uranium

Oct. 9, 2004: 5,000 gallon spill of ground water sweep fluids containing 7 mg/L uranium
Sep. 29, 2004: 2,000 gallon spill of injection fluid, containing 1.6 mg/L uranium
Sep. 8, 2004: wellfield excursion at Mine Unit 4 monitoring well
Sep. 6, 2004: 1,600 gallon spill of injection fluid
July 22, 2004: 2,700-5000 gallon spill of production fluid
Oct. 15, 2003: 5,000 gallon spill of injection fluid containing about 47 mg/L of U3O8
Sep. 29, 2003: 5,000 gallon spill of injection fluid containing about 2 mg/L of U3O8
Sep. 6, 2003: 20,800 gallon spill of injection fluid containing about 1.1 mg/L of uranium
Feb. 9, 2003: 500 gallon spill of production fluid containing about 2 mg/L of uranium
Jul. 30, 2002: 1,480 gallon spill of injection fluid
Apr. 25, 2002: 3,500 gallon spill of injection fluid
Apr. 24, 2002: 18,000 gallon spill of injection fluid
Jan. 4, 2002: 1,800 gallon spill of production fluid containing about 18 ppm U308
Dec. 5, 2001: 3,600 gallon spill of injection fluid
Oct. 22, 2001: 62,400 gallon spill of injection fluid
Jun. 18, 2001: 1,100 gallon spill of deep well disposal fluid
Nov. 22, 2000: 1,870 gallon spill of injection fluid
Oct. 22, 2000: 11,100 gallon spill of injection fluid
Aug. 7, 2000: 780 gallon spill of production fluid
Feb. 26, 2000: 3,780 gallon spill of production fluid
Jan. 17, 2000: 6,900 gallon spill of production fluid
Dec. 31, 1999: 3,000 gallon spill of injection fluid

(details available through ADAMS , Docket No. 04008964)

WILLOW CREEK - WYOMING
NRC Docket No. 40-8502
https://www.nrc.gov/info-finder/materials/uranium/licensed-facilities/christensen-ranch.html

License violations and reportable events at Willow Creek (ex Christensen Ranch / Irigaray) in-situ leaching site

http://www.wise-uranium.org/umopuswy.html#CHRISVIOL

See also: Lists of Spills and Excursions for COMIN, Dec. 17, 2009 (ADAMS Acc. No. ML093640215) https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML093640215

According to Cogema's "Quarterly Progress Report of Monitor Wells on Excursion Status" of Oct. 2, 2000 (available through ADAMS), 7 monitor wells at Irigaray remained on excursion status during the third quarter of 2000. The wells have been on excursion status for more than one year and up to 11 years. One other monitor well has been removed from excursion status.

Latest NRC Event Reports referring to Uranium One's Willow Creek (ex Christensen Ranch / Irigaray) ISL site in Wyoming:

Post Sep. 30, 2018: withheld (after Wyoming became an NRC agreement state)

Aug. 6, 2018: 4,130 gallon spill of recovery fluid (9.6 ppm U_3O_8)
June 29, 2018: Monitor well placed on excursion status
Aug. 9, 2017: 7,400 gallon spill of production fluid (8.9 ppm U)
Jul. 25, 2017: 5,000 gallon spill of injection fluid (1.1 ppm U) and production fluid (9.7 ppm U)
May 24, 2017: 3,600 gallon spill of injection fluid (0.41 - 0.81 ppm U)
Nov. 29, 2016: 3,300 gallon spill of injection fluid (0.67 ppm U)
Oct. 17, 2016: 3,500 gallon spill of injection fluid (0.5 ppm U)
Oct. 11, 2016: 1,405 gallon spill of injection fluid
June 1, 2016: Monitor well placed on excursion status
Apr. 30, 2016: Monitor well placed on excursion status
Dec. 7, 2015: 2,100 gallon spill of production fluid (3.3 ppm U)
June 30, 2015: Monitor well placed on excursion status
Mar. 10, 2015: 830 gallon spill of injection fluid (1.7 ppm U)
Dec. 29, 2014: Monitor well placed on excursion status
Aug. 15, 2014: 492 gallon spill of recovery fluid (11.2 ppm U)
Aug. 13, 2014: 535 gallon spill of injection fluid (0.8 ppm U)
Jul. 25, 2014: 946 gallon spill of injection fluid (0.92 ppm U)
Jul. 7, 2014: Disposal well shut in due to apparent leaking of tubing in the well
June 19, 2014: Deep disposal well fails mechanical integrity test
May 15, 2014: "potential leak" at evaporation pond
Apr. 19, 2014: 616 gallon spill of injection fluid (0.32 ppm U)
Mar. 3, 2014: 665 gallon spill of injection fluid (0.6 ppm U)
Jan. 15, 2014: 77,700 gallon spill of production fluid (12.7 ppm U)
Nov. 26, 2013: 1,060 gallon spill of injection fluid (0.32 ppm U)
Oct. 31, 2013: 740 gallon spill of injection fluid (1.2 ppm U)

Jul. 22, 2013: 2,600 gallon spill of injection fluid (1.1 ppm U)
Jun. 15, 2013: 1,400 gallon spill of injection fluid (0.8 ppm U)
Mar. 7, 2013: Evaporation pond leak
Mar. 5, 2013: "potential leaks" at two evaporation ponds
Feb. 11, 2013: 2,100 gallon spill of injection fluid
Dec. 23, 2012: 800 gallon spill of injection fluid (< 0.4 ppm U)
Dec. 22, 2012: 950 gallon spill of disposal well fluid (2.1 ppm U)
Dec. 9, 2012: 1,500 gallon spill of injection fluid (< 0.4 ppm U)
Oct. 12, 2012: Monitor well placed on excursion status
Sep. 10, 2012: spill of injection fluid from unplugged historic drillhole located near injection well
Sep. 7, 2012: 1,000 gallon spill of injection fluid
Jun. 30, 2012: 1,500 gallon spill of injection fluid (0.9 ppm U)
Jun. 18, 2012: 1,200 gallon spill of recovery fluid (7.5 ppm U)
Jun. 18, 2012: 300 gallon spill of injection fluid (1.0 ppm U)
Jun. 17, 2012: 500-700 gallon spill of injection fluid (1.4 ppm U)
Apr. 20, 2012: 1,020 gallon spill of injection fluid (1.0 ppm U)
Apr. 12, 2012: Monitor well placed on excursion status
Apr. 3, 2012: Two monitor wells placed on excursion status
Mar. 29, 2012: Two monitor wells placed on excursion status
Jan. 5, 2012: Monitor well placed on excursion status
Dec. 14, 2011: 1,500 gallon spill of RO brine fluid (3.8 mg/L U)
Oct. 2, 2011: Aerial release of yellowcake powder
Sep. 23, 2011: 4,000 gallon spill of injection fluid (0.87 mg/L U)
Aug. 24, 2011: Monitor well placed on excursion status
"around August 4 or 5, 2011": approx. 7,000-10,000 gallon spill of NaCl brine solution
Jun. 21, 2011: 1,500 gallon spill of injection solution (3.5 ppm U)
Apr. 19, 2011: Monitor well placed on excursion status
Apr. 12, 2011: Sampling missed for months at 24 monitoring wells, at least
Mar. 29, 2011: 1,000 gallon spill of barren injection fluid
Mar. 23, 2011: Monitor well placed on excursion status
Mar. 8, 2011: Monitor well placed on excursion status
Jun 10, 2010: Monitor well placed on excursion status
Jun 8, 2010: 1,200 gallon spill of permeate water
Jun 3, 2010: Evaporation pond leak
Dec 16, 2009: Monitor well placed on excursion status
Sep 15, 2009: Monitor well placed on excursion status
Mar 12, 2009: Monitor well placed on excursion status
Apr 17, 2008: Monitor well placed on excursion status

Mar 11, 2008: Two monitor wells placed on excursion status
Sep 5, 2007: Monitor well placed on excursion status
Apr 25, 2007: Monitor well placed on excursion status
Jul 22, 2004: Monitor well placed on excursion status
Apr 28, 2004: Two leaks detected in evaporation ponds
May 31, 2001: Monitor well placed on excursion status
Jan 23, 2001: 13,392 Gallon spill of restoration water
Aug 10, 2000: Monitor well placed on excursion status
Oct 28, 1999: Monitor well placed on excursion status
Oct 5, 1999: Monitor well placed on excursion status
Jul 8, 1999: Monitor well placed on excursion status
May 8, 1999: 15,000 Gallon Mining Injection Solution Spill
Apr 12, 1999: 32,400 Gallon Injection Solution Spill
Apr 3, 1999: 13,000 Gallon Spill of Restoration Water
Mar 29, 1999: 23,520 Gallon Mining Injection Solution Spill
Mar 26, 1999: 60,918 Gallon Mining Injection Solution Spill
Feb 17, 1999: Monitor well placed on excursion status
Dec 22, 1998: Monitor well placed on excursion status
Nov 19, 1998: Monitor well placed in excursion status
Sep 2, 1998: Shallow monitor well is in an excursion status
Aug 6, 1998: Ground water monitor well placed in excursion status
Jul 22, 1998: Minor leakage of byproduct solution from the evaporation pond
Jul 8, 1998: 28,000 Gallons of water containing low level of U3O8 spilled onto ground
Mar 5, 1998: Perimeter monitor well in excursion status
Oct 3, 1997: Monitor well in excursion status
Sep 16, 1997: Spilled 2,440 gallons of waste water containing 78.5 ppm natural uranium
Sep 12, 1997: Well in excursion
May 16, 1997: Two perimeter monitoring wells in excursion status
Mar 12, 1997: Perimeter well in excursion status
Dec 31, 1996: Perimeter well in excursion status

(details on post-November 1, 1999, events available through ADAMS , Docket No. 04008502)

Compiled by
Sarah Fields
Uranium Watch
December 16, 2020

EXHIBIT B

Citizen Petition to Repeal or Amend the EPA's Aquifer Exemption Regulations to Protect Underground Sources of Drinking Water

Natural Resources Defense Council, et al.
March 23, 2016

This petition requests the repeal or amendment of the EPA's regulations allowing for the designation of aquifers as exempt from the protections of the Safe Drinking Water Act, the criteria for such exemptions, and associated provisions.

EXCERPTS
Pages 33 - 35

i) Contamination of USDWs due to aquifer exemptions is a recurring problem

Existing rules have allowed horizontal and vertical migration of contaminants from exempted aquifers into non-exempt USDWs. For example, under the existing rules, the EPA makes arbitrary assumptions about the possible 'depth' of excursions when the latest science would provide a much better assessment of the potential for contamination of nearby or adjacent non-exempt aquifers. More detailed information about confining units, geological units thinning and aquitard inconsistencies, historical well locations, and improved mechanical integrity testing must be required as part of the aquifer exemption application process to improve the potential to prevent vertical fluid migration and contamination of non-exempt aquifers.

Horizontal migration of contaminants beyond aquifer exemption boundaries has also occurred. For example, the Kingsville Dome in-situ leaching (ISL) site in Texas, which was granted an aquifer exemption, is surrounded by a ring of monitoring wells that are approximately 400 feet from uranium mining production wells. Water sampling data from the monitoring wells has shown a significant increase in uranium concentrations over time, demonstrating that uranium has migrated from the production area and beyond the monitoring well ring in a relatively short time frame (approximately a decade).[18] 163 While the data at the monitoring wells does not, by itself, indicate that contaminants have traveled beyond the exemption boundary, there is data from two private water wells (known as the Garcia wells) located approximately 300 meters down gradient of the Kingsville Dome uranium mine that demonstrates that ISL operations have impacted a

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[18] George Rice. *Excursions of Mining Solution at the Kingsville Dome In-situ Leach Uranium Mine*. Volume 9. Austin Geological Society Bulletin 18. 26. Fig. 7 (2013). Available at https://static1.squarespace.com/static/56e481e827d4bdfdac7fbe0f/t/56f87d067c65e4881ffb85ba/1459125537657/2013_AGS_Bulletin_v9.pdf

USDW.[19] 164 A groundwater sample taken from one of those private water wells in 2007 had a uranium concentration of 0.979 mg!L-orders of magnitude higher than values measured prior to mining activities, and approximately 33 times higher than EPA's drinking water standard.[20] 165 After researching the geochemical trends, geology, and hydrology, an independent hydrologist concluded that "[t]he available data indicate that the likely source of the increased uranium concentrations in the Garcia well is [Production Area 3 of the ISL site]."[21] 166

In Nebraska, the Nuclear Regulatory Commission (NRC) determined that a groundwater uranium plume from Crow Butte ISL mine unit 1 extended beyond the exempted aquifer boundary into a USDW.[22] 167 The NRC also stated that "[p]ost-operational ISL mining caused [uranium concentrations] to be orders of magnitude larger in monitoring groundwater wells."[23] 168 Nevertheless, despite documentation of uranium increases in monitoring wells and a uranium plume beyond the boundary of the exemption, we are not aware of any regulatory action taken by either EPA or the NRC. Further, and clearly contradicted by the existence of the uranium plume, the NRC webpage providing water quality data for the Crow Butte ISL facility states that "no excursions" - i.e., movements of contaminants beyond the mining zone - have occurred at mine unit I.[24] 169 This situation clearly demonstrates that the existing aquifer exemption rules are inadequate to prevent lateral migration into USDWs.

The existing EPA rules do not consider scientific uncertainties with respect to vertical migration of contamination into a USDW when considering an aquifer exemption, which has allowed contamination of overlying aquifers. At the Smith Ranch Highland ISL site in Wyoming, which has been granted an aquifer exemption, samples from dozens of water wells in shallow aquifers (less than 200 feet deep) have exceeded the safe drinking water limits for uranium and selenium, sometimes by an order of magnitude or more.[25]

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[19] Garcia Well Data Documents (NRC ADAMS Accession Number ML 14237 A649). https://www.nrc.gov/docs/ML1423/ML14237A649.pdf

[20] Id. (2007 data); id. at 2 (showing a measured uranium concentration of only 0.011 mg/L in April 1988); Rice supra note 163. at 30-31.

[21] George Rice. supra note 163. at 31.

[22] Nuclear Regulatory Commission. Office of Nuclear Regulatory Research. Historical Case Analysis of Uranium Plume Attenuation, Publication# NUREG/CR-6705. at 24 (Feb. 2001). https//www.nrc.gov/docs/ML0104/ML010460162.pdf

[23] Id. at 20. Tbl. 5.

[24] Nuclear Regulatory Commission. Crow Butte Resources ISR Wellfield Excursion Ground Water Quality Data.

[25] Wright Environmental Services. 2012 Status Update. Casing Leak Investigation, C. E. and F Wellfields. Smith Ranch-Highland Operations (NRC ADAMS Accession Number: ML13109A315) at 51-55 (Feb. 20. 2013) (showing well depths).

170 Investigations of other ISL sites suggest that the contamination is likely associated with vertical migration via failed or malfunctioning ISL uranium production wells, abandoned boreholes, thin or discontinuous confining units, or seepage from surface ISL operations.[26] 171 These pathways are not considered when granting aquifer exemptions.

Regardless of the fluid migration pathway, it is clear that contamination has moved both vertically and horizontally into non-exempt aquifers and new rules are required to fulfill the mandates of the SDWA.

https://www.epa.gov/sites/default/files/2016-09/documents/sdwa._petition16-000-6065_mall_nrdc_aquifer_exemption_003.pdf

[26] W.P. Staub et al., An Analysis of Excursions at Selected In Situ Uranium Mines in Wyoming and Texas. Publication # NUREG/CR-3967 (NRC ADAMS Accession Number: ML14237 A635). at 47-49 (1986). https://www.nrc.gov/docs/ML1423/ML14237A635.pdf