Written Testimony of John W. Cash to the House Committee on Oversight and Government Reform, Subcommittee on the Interior, June 23, 2016

Chairman Lummis, Ranking Member Lawrence and distinguished Members of the Subcommittee, I appreciate the opportunity to participate in today's hearing on EPA's Part 192 rulemaking.

Ur-Energy has numerous substantial concerns regarding EPA's part 192 rulemaking that we articulated during the public comment period. Those concerns include, but are not limited to:

1. lack of authority,
2. lack of evidence to justify the rulemaking,
3. insufficient economic analysis,
4. failure to follow the advice of the Science Advisory Board,
5. insufficient environmental analysis of the impact of the rule,
6. invalid technical assessment of hydrology, and
7. failure to properly engage stakeholders including federal and state agencies

Ur-Energy's complete public comments are attached to this testimony for your review and I request they be included in the hearing record. However, today, for the sake of brevity I will only discuss the first three concerns.

With Regard to a Lack of Authority

While purportedly promulgating these rules under its authority provided by the Uranium Mill Tailings Radiation Control Act ("UMTRCA"), EPA exceeds such authority -- which extends only to promulgate standards of general application pertaining to "byproduct material." First, byproduct material is statutorily defined to include tailings and waste. However, EPA ignores the fact that ISR operations do not generate tailings and neither mining lixiviant nor restoration fluids satisfy the RCRA definition of waste. As such, EPA is blatantly attempting to regulate fluids over which it has no authority under UMTRCA.

Second, UMTRCA limits EPA to promulgation of "general" standards while providing the Nuclear Regulatory Commission ("NRC") the responsibility to implement those standards. The proposed rule's attempt to establish specific groundwater monitoring requirements exceeds EPA's standard setting authority thereby usurping the authority granted to the NRC. The NRC shares our concern as expressed in a June 28, 2015 letter from the NRC's General Counsel to EPA's General Counsel stating, "the EPA's proposed rule may encroach upon the Nuclear Regulatory Commission's (NRC) authority."[1]

With Regard to a Lack of Evidence to Justify the Rulemaking

The EPA's stated goal is to protect groundwater from potential future contamination due to groundwater's increasing importance. Yet the proposed rule provides no evidence of contamination from current or historic ISR operations, a fact confirmed by a senior EPA official at a Feb. 2016 public forum hosted by the Small Business Administration who **acknowledged the agency has no evidence that an ISR**

---

[1] Letter from Margaret M. Doane, Gen. Counsel, Nuclear Regulatory Commission, to Avi S. Garbow, Gen. Counsel, Environmental Protection Agency (July 28, 2015).

uranium project has ever caused groundwater contamination. As such, the EPA is unable to quantify the net benefits of the proposed rule other than stating it may provide "possible protection of surface water quality" and "potentially reduce human health impacts." Data from a 2009 NRC report demonstrates the lack of evidence of contamination. That report found that no migration of recovery solutions to adjacent, non-exempt aquifers has occurred based on 40 plus years of ISR operations. The Texas Commission on Environmental Quality ("TCEQ") has come to the same conclusion based on data it has collected. Despite these facts and without providing sound geochemical evidence or actual examples to the contrary, the EPA claims that current groundwater stability monitoring is inadequate to ensure protection of groundwater surrounding wellfields. To respond to and alleviate this concern, the TCEQ volunteered to sample monitor wells in the vicinity of historic in situ uranium mines in Texas to test the stability of restored aquifers. To date, the EPA has not responded to this offer. Despite the lack of known problems after 52 years of in situ mining and despite the offer by Texas to verify through sampling that no problem exists, the EPA has continued to move forward with the rulemaking.

With Regard to the Insufficient Economic Analysis

While the economic analysis contains numerous flaws and erroneous assumptions, the most serious error is the failure to adequately account for typical costs during stability monitoring. For example, it appears the EPA failed to include the cost of surety, land holding, site staff, NRC fees, taxes, insurance and so on. Table D-2 in the EPA's economic analysis estimates that the cost resulting from compliance with the rule will be between $1.30 and $1.70 per pound assuming modeling can be used to shorten the duration of stability to ten years (Table 3-3). Our own internal analysis indicates that the actual cost for this scenario will be on the order of $9.21/pound or about 34% of the current market price. We estimate that if the full 30 year stability period is required that the cost per pound will be approximately $27.62, which is equivalent to the current market price.

In conclusion, the proposed rule will devastate the already distressed domestic uranium industry making our nation completely reliant on imports. Mines will be shuttered and jobs will be lost while achieving no environmental benefit.

Thank you for your time and consideration today. I would welcome the opportunity to answer any questions.

COLORADO OFFICE
10758 W. CENTENNIAL RD., STE. 200
LITTLETON, CO 80127
TEL: (866) 981-4588
FAX: (720) 981-5643

WYOMING OFFICE
5880 ENTERPRISE DR., STE. 200
CASPER, WY 82609
TEL: (307) 265-2373
FAX: (307) 265-2801

May 27, 2016

Ms. Ingrid Rosencrantz
Office of Radiation and Indoor Air
Mailcode 6608T
US Environmental Protection Agency
1200 Pennsylvania Ave NW
Washington, DC 20460
Submitted via Email to rosencrantz.ingrid@epa.gov

Re: Clarification of Comments on EPA Proposed Part 192 Rulemaking, Docket # EPA-HQ-OAR-2012-0788

Dear Ms. Rosencrantz,

On April 29, 2016 you sought clarification on a number of comments we provided EPA on May 27, 2015, with regard to the EPA's proposed Part 192 Rulemaking. Please find below the questions posed by EPA as well as our responses on behalf of Ur-Energy USA Inc. and its affiliates and subsidiaries:

EPA Comment 1: Please provide estimated annual cost of maintaining surety.

Ur-Energy Response 1: Our current environmental liability at Lost Creek (including groundwater restoration of the first mine unit and surface decommissioning of the entire facility) is $14,977,000. The actual surety cost is 25% collateral plus a 2.5% premium on the full bond amount per year. Assuming a 30-year surety would be available, and assuming a discount rate of 8%, the collateral would lose $1.2 million of its value over the additional 30 years and the bond premium would cost an additional $374,425 per year for the 30 years. Additionally, by tying up the collateral for an additional 30 years, the Company would incur a lost opportunity cost because it would not be able to recover and reinvest those funds in other profit-generating activities. When summed, we conservatively estimate that the annual surety and lost opportunity cost would easily exceed $0.5 million per year on a discounted basis. Assuming a 30-year stability monitoring period, the total discounted cost would exceed $18 million. We expect to recover approximately 2.6M pounds of U_3O_8 from the first mine unit. Therefore, the surety cost over a 30-year stability monitoring period equates to over $7 per pound. Keeping in mind that this estimate is based on the existing surety, which includes only the plant and the first mine unit, one can easily assume the annual and total cost will be considerably more as the

Company mines and reclaims the currently planned 12 mine units for the project (see EPA Comment 3).

Current regulatory practices prevent site reclamation until groundwater stability is approved by the NRC. Therefore, virtually no reclamation could occur during long-term stability monitoring.

Further, it is unlikely that a surety company would provide coverage for a mining company if they had no source of income, as would be the case if the mine unit in long-term stability monitoring was the last mine unit at a project. In such a case, the mining company would likely be forced to pay 100% collateral. This is a very important consideration for small mining companies that may have only one mine.

EPA Comment 2: Please provide annual cost of land payments.

Ur-Energy Response 2: In order to provide an accurate response to this question, the Company identified the BLM claims and state lands the Company would have to maintain during long-term stability monitoring. These claims include the area of Mine Unit 1, wellfield monitor wells, access roads to Mine Unit 1, the processing and disposal facilities, laydown areas and other areas of disturbance that couldn't be reclaimed until after the agencies approve stability of the groundwater. Each of these areas would have to be maintained in case active groundwater restoration must be resumed due to water quality instability. The annual land holding cost of this area in 2017 is projected to be $17,602. Based on historic cost increases set by the BLM, we estimate that by 2046 the annual land holding costs to maintain the land will be $26,250.

In addition to the mineral claim fees, the Company would have to dedicate personnel time to ensure the claims are maintained in compliance with regulations found in 43 C.F.R. §§ 3800 thru 3834. The cost for carrying out these duties is mostly captured in the labor line item in response to EPA Comment 5.

EPA Comment 3: Please state which mine units you are considering in making these estimates.

Ur-Energy Response 3: Since we only have one mine unit in production at this time, it is the only mine unit we are considering in our responses. Please note that the current economic assessment for the project anticipates that we will mine a total of 12 mine units. We therefore expect that the cost estimates included here would increase as we advance our operations beyond the first mine unit.

EPA Comment 4: Please verify that all these costs would be incurred during long-term stability monitoring.

Ur-Energy Response 4: We have reviewed our original comments and confirm that each of the itemized costs would be incurred during long-term stability monitoring. At this time we have no reason to expect any regulatory relief from these costs. In addition to the costs itemized in our original comments to EPA, we have attempted to provide a more thorough cost accounting in response to Question 5 below.

EPA Comment 5: Please explain how non-monitoring costs during mining operations and restoration would differ from the costs estimated for the long-term stability monitoring period.

Ur-Energy Response 5: Ur-Energy has not accounted for inflation in the following response. Each line item below was also included in our original comments to the EPA; so for the sake of continuity, we are discussing the same items in this response.

- **Surety:** As noted above, the cost of maintaining the surety would not change during long-term stability monitoring since the environmental liability could not be reduced through reclamation.
- **Land Maintenance:** As noted above, the Company would attempt to decrease land holdings as much as possible to reduce costs. Only lands necessary for long-term stability monitoring and groundwater restoration would be maintained, resulting in an annual cost of $17,602. For the sake of comparison, current land holding costs are approximately $35,000 per year. Since we operate on BLM-managed lands, we could drop extraneous parcels during long-term stability monitoring. However, if our mine was on private lands, we likely wouldn't be able to drop these lands during long-term stability monitoring.
- **Labor:** The number of employees would be reduced from 55 during operations to 7 during long-term stability monitoring (1 – Site Manager, 1- Radiation Safety Officer, 1 - Sampler, 1 - Maintenance Tech, and 3 – Site Security). The labor costs during long-term stability monitoring, including benefits but excluding inflation, would be approximately $611,309 per year (this amount represents current actual labor costs for similar positions).
- **NRC Fees:** The routine annual cost of NRC fees would not be expected to change much during long-term stability monitoring since annual fees, inspection costs, and Project Manager fees would continue. We estimate the annual cost for routine NRC activities during long-term stability monitoring would be on the order of $51,500. This assumes that no amendments or other licensing actions would take place during long-term stability monitoring. During normal operations, NRC annual costs typically range from $300,000 to well over $1,000,000 depending on the level of site activity and license amendments.
- **Utilities:** The amount of propane and electricity used would be reduced during long-term stability monitoring since there would be minimal water pumping and no drying of product. However, the office and plant would still need to be heated for systems maintenance and functionality as well as to keep resins and piping from freezing. We estimate the cost for propane and electricity would be on the order of $79,200 per year during long-term stability monitoring. For comparison, during operations we expect to spend about $678,000 dollars per year on electricity and propane.
- **Property Tax:** The property tax rate is based on the value of the buildings and their contents. Therefore, the rate will not change once the wellfield goes into long-term stability monitoring. We currently pay approximately $250,000 per year in property tax.
- **Insurance:** Since the value of the buildings and equipment will not change once the facility goes into long-term stability monitoring, the insurance rate will not change either. We currently pay approximately $300,000 per year for insurance.

- **Mobile Equipment:** The cost of maintaining mobile equipment would decrease during long-term stability monitoring to around $30,000 per year since fewer vehicles and pieces of equipment would be used. This cost does not include gas or diesel.
- **UIC Class III MIT:** The cost of performing required Class III MITs would not change since each well would need to be tested every five years to maintain compliance with EPA and WDEQ regulations. Mine Unit 1 has 914 Class III UIC wells. Each MIT costs about $208. Assuming each well is MIT'd once every five years the average annual cost would be approximately $38,000.
- **UIC Class I Testing:** Just like UIC Class III wells, the cost of testing UIC Class I wells would not change since we must comply with EPA and WDEQ regulations. The annual cost for testing is $15,000 per well or $45,000 per year for the facility's three wells. Additionally, each of the three wells must be MIT'd every five years at a cost of about $30,000 per well. The total cost for all testing and MITs over 30 years would be approximately $1,890,000.
- **Dust Suppression:** Compliance with the Air Quality Permit has to be maintained during long-term stability monitoring. The annual cost would be about $41,000 per year based on a recent quote.
- **Roadway Maintenance:** The cost of roadway maintenance would likely not change much during long-term stability monitoring since the road would still have to be graded and snow would have to be removed. We estimate the annual cost to be around $50,000 per year.
- **Wildlife Surveys:** Wildlife surveys would have to continue during long-term monitoring at a cost of approximately $55,000 per year (based on 2015 actual cost). Much of this cost is related to monitoring sage grouse leks in the region.
- **Laboratory:** Environmental monitoring requirements would not change during long-term stability monitoring. We estimate the costs to be approximately $13,000 per year. This monitoring would include regional groundwater monitoring, radiometrics at five established stations, surface water, etc. This cost estimate does not include groundwater monitoring of wellfield monitor wells subject to long-term stability monitoring.
- **Health Physics:** The cost of health physics monitoring would be significantly reduced during long-term stability monitoring simply because there would be a reduction in force. The annual cost during long-term stability monitoring would be approximately $3,000, excluding labor, which is accounted for above.
- **Water Well Pump Repair:** Since only monitor wells would be running during long-term stability monitoring, the cost of pump repairs would be less than during production. Nonetheless, the annual cost would still be on the order of $4,000, excluding labor.
- **Safety:** Although we would have fewer employees, the facility would still be required to purchase and maintain safety equipment and programs. We estimate the cost of maintaining the program, exclusive of manpower, to be on the order of $800 per year (hard hats, respirators, respirator cartridges, fit testing, gloves, boots, oxygen sensors, signage, etc.).
- **Erosion Control:** The cost for maintaining erosion control would not change since no areas would be reclaimed. We estimate the cost to be on the order of $5,000 per year exclusive of labor (silt fence, hay bales, fuel, rip-rap, etc.). Determining the exact cost of erosion control is difficult since it largely depends on the weather.

In addition to the above items that were discussed in the original Ur-Energy comments, we wish to add the following annual line-item costs to provide a more reliable cost estimate for long-term stability monitoring. With the exception of the line item General Building and Powerline Maintenance, the cost of each line item would be lower during long-term stability monitoring than during production since there would be fewer employees and activities. The annual costs presented represent our estimates for long-term stability monitoring. While these costs are somewhat difficult to accurately predict, they are real costs that must be considered in the economic analysis:

- Legal/Regulatory Professionals - $20,000;
- Engineering Consultants - $25,000
- Office supplies (computers, printers/copiers, paper, pens, etc.) – $2,000;
- Fuel (employee travel to/from site) - $42,000;
- Internet/Communications - $28,800;
- Replacement of failed wells – Replace 2 wells/year at $14,000/well including rig mob/demob;
- General building and powerline maintenance - $20,000;
- Computer program licenses - $700 for Microsoft Office;
- Small tools - $1,000;
- Trash removal - $5,000;
- Employee training/conferences/publications - $4,000;
- Off-site travel (airfare, hotels, meals) - $4,000; and
- Janitorial supplies - $500

Therefore, the annual facility expenditure during long-term stability monitoring will be at least $2,393,000. The table below presents the cost, in total dollars per pound of uranium recovered from mine unit 1 at Lost Creek, of long-term stability monitoring as proposed by EPA. As the rule is currently drafted, we believe the <u>shortest</u> realistic time frame is three years of stability monitoring plus one year of regulatory review prior to approval being granted ($3.68/pound from table below).

This cost estimate is conservative since it does not account for inflation, corporate overhead or new costs introduced by the proposed rule, such as geochemical modeling or additional monitor well sampling and analysis. While it would be appropriate to include a contingency factor, for the sake of simplicity, none was added.

Years of Stability Monitoring	Cost in $/Pound U_3O_8
3	2.76
4	3.68
5	4.60
10	9.21
15	13.81
20	18.41
25	23.01
30	27.62

Based on this analysis of one small uranium mine, it is clear that the proposed regulation will have a significant impact on project economics (on the order of $9.5 million under the optimistic 4 year scenario and up to $71.8 million under the worst-case, 30-year scenario). If this cost is applied to several other larger mines, we believe it is likely that the total cost impact will exceed $100 million thereby making the proposed rule a "Significant Regulatory Action."

It should also be noted that sufficient time has passed to illustrate that EPA's uranium price predictions in the Rulemaking's Economic Analysis were incorrect. For example, page ES-4 of the Rulemaking Economic Analysis indicates that the U.S. price of uranium will be $57 per pound in 2015. We are now in late May of 2016 and the actual spot broker average price per pound, as published by UxC, is only $27.94 (roughly equivalent to the total cost per pound of U_3O_8 of a 30-year, long-term stability monitoring period). The EPA should revise the price projections in the economic model to reflect current pricing and the predictions made by UxC or another reliable source. Further, since the price of uranium, like all commodities, experiences swings, EPA's model should consider the economic impact of the rulemaking at a variety of realistic uranium prices instead of only at average predicted prices. A credible sensitivity analysis is important in determining the economic impact of the proposed regulation across a spectrum of pricing. While Appendix D of EPA's Economic Assessment includes a sensitivity analysis on several monitoring scenarios, no effort was made to perform a sensitivity analysis on the price of uranium. Clearly, the economic impact of these regulations at today's market price is dramatically worse than when the price of U_3O_8 was $130/pound a few years ago. We believe the sensitivity analysis should include the range of pricing over the past ten years.

Thank you for the opportunity to provide this additional information. If you have any questions regarding this submittal, please feel free to contact me at our Casper office.

Regards,

John W Cash

John W. Cash
Vice President Regulatory Affairs

Colorado Office
10758 W. Centennial Rd., Ste. 200
Littleton, CO 80127
Tel: (866) 981-4588
Fax: (720) 981-5643

Wyoming Office
5880 Enterprise Dr., Ste. 200
Casper, WY 82609
Tel: (307) 265-2373
Fax: (307) 265-2801

Ur-Energy USA
Your Uranium Powerhouse

I. Introduction

These comments are submitted on behalf of Ur-Energy USA, Inc. for itself and in behalf of its subsidiaries and affiliates, in response to the Environmental Protection Agency's (EPA) proposed revisions to 40 C.F.R. Part 192 (the "Proposed Rule"). 80 Fed. Reg.4156 (Jan. 26, 2015). Ur-Energy appreciates this opportunity to provide input on the Proposed Rule, and hopes that EPA finds these comments helpful.

Ur-Energy is concerned with several aspects of the Proposed Rule. As an initial matter, it appears that EPA has exceeded its regulatory authority under the Uranium Mill Tailings Radiation Control Act, 42 U.S.C. §§ 7901, *et seq*., because EPA is authorized to promulgate standards of general application for hazards associated with the processing and with the possession, transfer, and disposal of "byproduct material" at active in situ uranium recovery (ISR) (also known as in situ leaching (ISL)) facilities. UMTRCA § 206(b)(1). Byproduct material is defined to include tailings and waste. However, ISR operations do not generate tailings, and the Proposed Rule attempts to regulate industrial process solutions (lixiviant and restoration fluids) as waste, despite the lack of any disposal of lixiviant or restoration fluids during ISR uranium extraction and groundwater restoration operations. Therefore, EPA's analogy between RCRA Subtitle C hazardous waste impoundments and sub-surface ISR operations is inappropriate.

In addition, the Proposed Rule's technical analysis is flawed in that it: (i) misapprehends the typical timeframe for post-restoration groundwater monitoring at ISR sites; (ii) fails to adequately evaluate the purported risk to human health and the environment the Proposed Rule seeks to mitigate; (iii) underestimates the costs associated with the Proposed Rule; (iv) fails to adequately evaluate the Proposed Rule's regulatory and environmental impacts; and (v) underestimates the Proposed Rule's adverse impacts on small businesses. In addition, many of the asserted factual bases of the Proposed Rule do not reflect the real-world circumstances in which ISR facilities operate. Finally, the Proposed Rule's economic analysis is based on faulty assumptions, which results in an erroneous conclusion about the financial consequences of the Proposed Rule.

Ur-Energy requests that EPA withdraw and reevaluate the Proposed Rule in light of the deficiencies in the draft rule identified above and below.

II. EPA's Proposed Revisions to 40 C.F.R. Part 192 Exceed EPA's Regulatory Authority Under UMTRCA § 206

EPA's proposed revisions to 40 C.F.R. Part 192, addressing groundwater standards for ISR operations exceed EPA's regulatory authority under UMTRCA § 206(b)(1), 42 U.S.C. § 2022(b)(1), to "promulgate standards of general application" addressing hazards associated with the processing, possession, transfer, and disposal of "byproduct material" at active uranium processing and disposal sites. The Proposed Rule attempts to regulate "excursions" of both radiological and non-radiological elements from the ore body subjected to in situ leaching and non-radiological constituents of the leaching solution and restoration fluids.

However, "byproduct material" is defined to include only "tailings" and "wastes" associated with ISR operations. ISR operations do not generate tailings. Moreover, a uranium ore body subjected to in situ leaching expressly is excluded from regulation by either EPA or NRC under UMTRCA and RCRA. Therefore, by definition, any radiological constituents that may migrate from an underground ore body cannot be regulated as byproduct material under UMTRCA or as a solid waste under RCRA.

EPA's attempt to regulate excursions of lixiviant or restoration fluids also is unavailing because they are not wastes. Injecting lixiviant and restoration fluids into an ore body as part of an industrial mineral extraction operation does not constitute an act of disposal or reflect any intent to dispose. Therefore, under well-established principles interpreting the concept of "waste," these process solutions injected into a subsurface ore body cannot be regulated as byproduct material because they are neither tailings nor a waste.

A. EPA's Regulatory Authority under UMTRCA § 206 Is Limited to Tailings and Waste.

UMTRCA was directed primarily to hazards associated with mill tailings from conventional uranium mining and milling operations. *See generally* Elisa J. Grammer, "The Uranium Mill Tailings Radiation Control Act of 1978 and NRC's Agreement State Program," 13 Nat. Resources Law. 469, 489 (1981). Based on UMTRCA's legislative history and the language of the statute, "'tailings or wastes" are terms of art in the industry referring to discrete materials capable of controlled disposal. *Id.* Therefore, NRC concluded that UMTRCA does not require regulation of underground ore bodies depleted by ISR operations. However, surface wastes are sufficiently like tailings and wastes from conventional milling operations to warrant regulation under UMTRCA Title II. *Id.* (citing Memo. to NRC from Howard K. Shapar, Executive Legal Director, NRC, "How the Uranium Mill Tailings Radiation Control Act of 1978 Affects Solution Extraction of Uranium (May 7, 1979)). Therefore, UMTRCA was intended to regulate only impoundments of surface wastes from ISR operations that are sufficiently like "tailings or wastes," not process fluids used in ISR operations.

For active processing or disposal sites, UMTRCA § 206(b)(1) authorizes EPA to promulgate "standards of general application for the protection of the public health, safety, and the environment from radiological and nonradiological hazards associated with the processing and with the possession, transfer, and disposal *of byproduct material*, as defined in section 2014(e)(2) of this title, at sites at which ores are processed primarily for their source material content or which are used for the disposal of such byproduct material." (emphasis added). It is noteworthy that this provision addresses only hazards associated with the processing, possession, transfer and disposal of "byproduct material," which includes only tailings and wastes. It does not include leaching or extraction of uranium from an underground ore body. Under UMTRCA § 206(b)(1), such generally applicable standards for non-radiological hazards "shall provide for the protection of human health and the environment consistent with the standards required under subtitle C of the Solid Waste Disposal Act, as amended [42 U.S.C.A. § 6921 et seq.], which are applicable to such hazards."

The term "tailings" means "the remaining portion of a metal-bearing ore after some or all of such metal, such as uranium, has been extracted." 42 U.S.C. § 7911(8). It is undisputed that ISR operations do not generate tailings. The only remaining portion of ore after uranium has been extracted in an ISR operation is the uranium ore body subjected to in situ leaching, which expressly is excluded from regulation under UMTRCA and RCRA. *See* 10 C.F.R. § 40.4; 80 Fed. Reg. 4156, 4161 (Jan. 26, 2015); 40 C.F.R. § 261.4(a)(5). Thus, EPA's regulatory authority under UMTRCA § 206 is limited to tailings and waste.

B. Uranium Byproduct Material Includes Only Tailings and Waste, Not Radiological Constituents that Leach from Underground Ore Bodies.

The primary concern of EPA's proposed regulations is an "excursion" of uranium byproduct material, which it defines as follows:

> The movement of fluids *containing uranium byproduct material* from an ISR production zone into surrounding groundwater. An excursion is considered to have occurred when, during operational or restoration phase monitoring, any two indicator parameters (*e.g.,* chloride, conductivity, total alkalinity) exceed their respective upper control limits in any overlying, underlying, or perimeter monitoring well. Horizontal excursions refer to the lateral movement of the water, while vertical excursions indicate movement of water through aquitards above or below the production zone aquifer.

80 Fed. Reg. at 4160. (emphasis added).

UMTRCA, 42 U.S.C. § 7922(a)(2), adopts the definition of "byproduct material" in the Atomic Energy Act, the relevant definition of which is "the *tailings or wastes* produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content." UMTRCA § 11(e)(2), 42 U.S.C. § 2014 (e)(2) (emphasis added). Significantly, in 1979, as part of its regulations implementing UMTRCA, NRC expanded the definition of "byproduct material" to mean:

> the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, *including discrete surface wastes* resulting from uranium solution extraction processes. *Underground ore bodies depleted by such solution extraction operations do not constitute 'byproduct material' within this definition.* 44 Fed. Reg. 50012, 50013 (Aug. 24, 1979 (codified at 10 C.F.R. § 40.4) (emphasis added).

The preamble to the 1979 regulations states that the NRC "determined that the definition of section 11e.(2) byproduct material includes the *above-ground wastes* from in situ extraction operations." *Id.* at 50012 (emphasis added). EPA also recognized the limit of NRC jurisdiction to above-ground wastes associated with ISR operations in its Technical Resource Document, Extraction and Beneficiation of Ores and Minerals, Vol. 5, Uranium (EPA 530-R-94-032, NTIS PBG94-2008987 Jan. 1995), in which it stated that "[a]lthough the NRC has promulgated radiation protection standards that regulate active and inactive uranium milling sites, the NRC has no regulatory authority over uranium mines, *except the aboveground activities of solution mines*." (emphasis added).

EPA has adopted a similar definition of "uranium byproduct material" in the Proposed Rule. However, EPA's proposed definition includes only "waste," not tailings:

> *Waste* produced by the *extraction or concentration* of uranium from any ore *processed* primarily for its source material content. *Ore bodies depleted by uranium ISR operations and which remain underground do not constitute ''uranium byproduct material.''*

80 Fed. Reg. 4156, 4161 (Jan. 26, 2015) (emphasis added); *see also* 40 C.F.R. § 261.4(a)(5) (excluding from definition of "solid waste" "materials subjected to in-situ mining techniques which are not removed from the ground as part of the extraction process.").

Given that the uranium ore bodies depleted by ISR operations are excluded from the definition of "uranium byproduct material," any uranium or thorium that may leach out of the depleted ore body after ISR operations are complete is not "uranium byproduct material." Other non-radiological substances (such as pockets of unreduced lixiviant) are subject to the proposed regulations only if they are "waste."

C. NRC Has Determined that Byproduct Material Includes Only Waste Materials Generated by ISR Operations.

On July 26, 2000, the NRC issued its ruling on Decision Item SECY-99-013: Recommendations on Ways to Improve the Efficiency of NRC Regulation at In Situ Leach Uranium Recovery Facilities. The NRC concluded that "11e.(2) byproduct material should be interpreted to encompass the various *liquid effluents and associated sludges* arising from in situ leach (ISL) uranium recovery facilities." (emphasis added). The determination noted that "Congress clearly intended that the NRC exercise comprehensive regulatory authority *over wastes* derived from uranium and thorium extraction activities." (emphasis added). The "waste waters" NRC specifically identified as arising from ISR operations include "production bleed, process effluents, and waters generated during groundwater cleanup."

The NRC stated that "no one disputes that the process bleed must properly be characterized as 11e.(2) byproduct material" because it "clearly is a waste stream arising from the extraction of uranium from ore."[1] The determination reasoned that "both the production bleed and the restoration waters in some circumstances are typically processed through an ion-exchange column to remove uranium, thus showing that even in the direct sense *they are wastes arising from the extraction of uranium*." (emphasis added). Therefore, the NRC concluded that "the various *liquid effluents and resulting sludges* arising from ISL production and groundwater restoration should properly be viewed as 11e.(2) byproduct material."

In SECY-99-013, the NRC approved Option 2 presented by NRC staff. Under this option, *any waste water generated* during or after the uranium extraction phase and *all evaporation pond sludges derived from such waste waters*, would be classified as 11e.(2) byproduct material. (emphasis added). NRC Staff noted that under Option 2, which subsequently was adopted by the

[1] Ur-Energy disputes the characterization of process bleed fluids as "byproduct material" unless they have been disposed of as a waste.

commission, "the NRC would take the broad view that *any waste water* generated during or after the uranium extraction phase of site operations, *and all evaporation pond sludges derived from such waste waters,* would be classified as 11e.(2) byproduct material."[2] (emphasis added).

Thus, in clarifying the application of UMTRCA to ISR operations, the NRC determined that "byproduct material" included only material that qualifies as "waste." This is consistent with the regulatory definition of "byproduct material." However, EPA exceeds its regulatory authority by attempting to regulate lixiviant and restoration fluids, both industrial process solutions, as uranium byproduct material.

D. RCRA's Hazardous Waste Framework Is Inappropriate for Regulating ISR Operations.

The preamble to the Proposed Rule observes that, although standards at 40 C.F.R. Part 192, Subpart D apply to ISR facilities, ISR was not the predominant uranium extraction method at the time the standards were promulgated. 80 Fed. Reg. at 4163. Moreover, EPA also notes that Subpart D addresses "contamination of aquifers resulting from releases of contaminants from uranium mill tailings impoundments, which are surface structures (engineered units) designed to contain uranium byproduct material (e.g., conventional tailings impoundments, evaporation or holding ponds)." 80 Fed. Reg. at 4164. *See also id.* (recognizing that a basic RCRA hazardous waste management unit is an engineered unit, designed, constructed, and installed "to prevent any migration of wastes" out of the unit.). However, EPA then jumps to the conclusion that "[t]he RCRA hazardous waste framework, which is intended to prevent, detect, and mitigate contamination of groundwater resulting from releases of hazardous waste being held in an engineered unit, is directly applicable to this situation." *Id*. This is not correct for a variety of reasons.

As an initial matter, given that traditional mining and milling was the predominant method of extracting and processing uranium ore when UMTRCA was passed, drawing an analogy between engineered, above-ground tailings impoundments and RCRA Subtitle C hazardous waste impoundments was appropriate. Both are above-ground, engineered units designed to contain waste material and to prevent the release of such material to the environment.

EPA's analogy between engineered surface impoundments and ISR operations is based on its assertion that, in essence, the ''management unit'' that is the potential source of contamination is "the natural setting itself, though extraction of the uranium from the deposit alters the geochemistry of the ore-bearing formation and may increase the concentration of radionuclides and other metals in the water." *Id.* However, ISR operations are not even remotely similar to engineered surface impoundments. As discussed below, ISR operations are in situ commercial mineral extraction operations, which do not involve any act of disposal that results in the subsurface generation of waste.

---

[2] Ur-Energy disputes the characterization of "restoration fluids" as "byproduct material" unless they have been disposed of as a waste. Thus, references to "restoration fluids" in this document refer to restoration fluids that have not yet become a "waste."

1. ISR Process Solutions Are Not "Waste."

UMTRCA § 206, 42 U.S.C. § 2022, directs EPA to set general standards that are consistent with the requirements of RCRA to the maximum extent practicable. A key concept under RCRA is that a material is not a "waste" unless it is "discarded." *See American Mining Congress v. EPA*, 824 F.2d 1177, 1193 (D.C. Cir. 1987) (holding that solid waste under RCRA is "limited to materials that are 'discarded' by virtue of being disposed of, abandoned, or thrown away."). RCRA defines "solid waste" is "any discarded material." 40 C.F.R. § 261.2(a)(1); *see also* 42 U.S.C. § 6903(27). A "discarded material" is any material that is abandoned, recycled, considered inherently waste-like, or a military munition identified as a solid waste. 40 C.F.R. § 261.2(a)(2)(i). A material is "abandoned" if it is disposed of, burned or incinerated, or if it is accumulated, stored, or treated prior to or in lieu of being burned, disposed of, or incinerated. *Id.* § 261.2(b). Use constituting disposal occurs when a material is placed directly on land or is used to produce products that are applied to or placed on land. All materials that are used in a manner constituting disposal, *except commercial chemical products that are normally applied to land* (e.g., fertilizers and pesticides), are solid wastes. *Id.* § 261.2(c)(1) (emphasis added).

EPA is inconsistent in its use of the terms "uranium byproduct material" and "byproduct material" in the Proposed Rule. EPA identifies byproduct material as "tailings or wastes produced by the extraction or concentration of uranium from any ore processed primarily for its source material content." 80 Fed. Reg. at 4161 n. 3 (citing Atomic Energy Act § 11e.(2), 42 U.S.C. § 2014(e)(2)) (emphasis added). In describing the ISR process, the preamble to the Proposed Rule states as follows:

> The extracted liquid (groundwater mixed with lixiviant) goes through the recovery process to extract uranium. The processed water may be either recharged with lixiviant and re-injected to continue the recovery process or used to flush out the remaining lixiviant and mobilized uranium during the restoration process. Any *waste water not reused may be injected into a deep well for disposal* or be sent to an impoundment on site (often called an evaporation pond or a holding pond). The *waste water* generated during and after operations at an ISR facility, as well as all *evaporation pond sludges* derived from such waste waters, have been determined to be uranium byproduct material by the NRC, bringing them under the jurisdiction of UMTRCA."

Id. at 4162-63. (emphasis added). Thus, in this section of the preamble, EPA recognizes that the NRC has concluded that "waste water" sent to an impoundment or "injected into a deep well for disposal" – not recharged as lixiviant or treated as restoration fluid and injected into the ore body – and "evaporation pond sludges" are byproduct material.

However, EPA goes well beyond the scope of NRC's determination and its own proposed definition of "excursion," by attempting to regulate ISR process solutions (i.e., lixiviant and restoration fluids) as a waste. In its discussion of excursions, EPA concludes that, during the operational and restoration phases at an ISR wellfield, "it is possible that lixiviant or byproduct fluids can escape the capture zones of the extraction wells and move toward the monitoring well ring surrounding the production zone." *Id*. at 4175. (emphasis added). However, EPA's proposed definition of "excursion" does not include lixiviant or restoration fluids; it addresses only the movement of "fluids containing uranium byproduct material from an ISR production zone into surrounding groundwater." *Id*. at 4160, 4184. Even if EPA expressly had included lixiviant or restoration fluids in the definition of uranium byproduct material, this would exceed EPA's regulatory authority. Lixiviant and restoration fluids are process solutions that are an integral part of an underground commercial mineral extraction operation. They are not and cannot be byproduct material because they are neither tailings nor a waste.

EPA contends that in ISR operations, "the 'milling' of uranium ore is performed within the ore zone aquifer by injection of lixiviants." 80 Fed. Reg. at 4171. However, even at conventional uranium milling operations, EPA authority is limited to regulating byproduct material (e.g., tailings and wastes) generated by such operations, not the beneficiation and milling operations themselves, or process solutions, which are not wastes. *See* UMTRCA 206(b)(1), 42 U.S.C. § 2022 (b)(1) (granting EPA authority to promulgate regulatory standards of general application for hazards "*associated with* the processing and with the possession, transfer, and disposal of *byproduct material*.") (emphasis added).

"Beneficiation" operations are defined to include "in situ leaching." 40 C.F.R. § 261.4(b)(7)(i). *Wastes* from beneficiation operations are subject to regulation as RCRA Subtitle D solid wastes because, even if such wastes display hazardous characteristics, they are excluded from regulation as RCRA Subtitle C hazardous wastes under the Bevill exclusion. 42 U.S.C. § 6921(b)(3)(A)(ii). However, beneficiation process solutions that are not disposed of, such as heap leaching raffinate are not regulated as wastes. In fact, the Proposed Rule expressly defines "Uranium Recovery Facility" as follows:

> A facility licensed to process uranium ores for the purpose of recovering uranium and *to manage uranium byproduct materials that result from processing of ores*. Common names for these facilities include, but are not limited to, the following: a conventional uranium mill, an in-situ recovery (or leach) facility, and a heap leach facility or pile.

80 Fed. Reg. at 4161. (emphasis added). Thus, this definition draws a clear distinction between "processing" of uranium ores and the management of uranium byproduct material generated by such processing.

As noted above, the Proposed Rule recognizes that "*waste water generated during and after operations* at an ISR facility, as well as *all evaporation pond sludges* derived from *such waste waters*, have been determined to be uranium byproduct material by the NRC, bringing them under the jurisdiction of UMTRCA." *Id.* at 4162-63. (emphasis added). Thus, *wastes* from mineral extraction and beneficiation operations, whether generated by traditional milling or ISR operations, may be subject to regulation under UMTRCA. However, process solutions are not wastes unless they are disposed.

The Proposed Rule expressly recognizes that, in 1983, when EPA promulgated its regulations at 40 C.F.R. Part 192, uranium recovery was done almost exclusively by conventional milling processes, and that "*wastes* from the milling process (the tailings and raffinates, *i.e.,* uranium byproduct materials) *were disposed of* in large piles on the surface at mill sites, posing contamination risks to surface water, groundwater, and soils, both on and off site. By now attempting to regulate materials that are neither wastes nor disposed, EPA is exceeding its UMTRCA regulatory authority.

2. Lixiviant and Restoration Fluids Are Analogous to Heap Leaching Raffinate and a Commercial Chemical Product Injected into the Ground for Its Intended Purpose.

EPA's assertion that RCRA's hazardous waste framework is "directly applicable to this situation," 80 Fed. Reg. at 4164, is fundamentally flawed. The process of injecting lixiviant and restoration fluids into an ore body is an in situ industrial mineral recovery process; it does not involve an act of disposal. Therefore, neither lixiviant nor restoration fluids are wastes until they are "disposed," which means they are not "uranium byproduct material" until such disposal.

Taking EPA's rationale that ISR operations are subsurface "milling" operations to its logical conclusion, *see* 80 Fed. Reg. at 4171, a much closer analogy is that lixiviant and restoration fluids are more like raffinate used in conventional non-uranium heap-leaching operations than hazardous waste stored in an engineered surface impoundment. Lixiviant is manufactured from extracted groundwater to which oxidizing agents and other constituents are added to create a leaching solution that is chemically tailored to a specific ore body. Restoration fluids are re-injected to continue the recovery process and to flush out the remaining lixiviant and mobilized uranium during the restoration process. 80 Fed. Reg. at 4162. Heap leach solutions typically are acidic solutions used to oxidize metals in the ore subjected to leaching. In ISR operations, the mineral extraction process begins when lixiviant is injected into the in situ ore body. In heap leaching operations, the process begins when acidic raffinate solution is added to the heap, typically through a drip or sprinkler system. In ISR operations, the pregnant leach solution and restoration fluids are pumped to the surface where the uranium is extracted. The barren leach solution is then recharged with oxidizing agents (and restoration fluids are treated to remove uranium and impurities) and reinjected into the ore body. In heap leaching operations, the valuable metals are removed from pregnant leaching solution, which may be re-acidified and pumped back to the heap leach pad, or it may be treated and discharged under a Clean Water Act NPDES permit. In neither ISR operations nor heap leaching operations is the circulation of leaching fluids or restoration fluids an act of disposal that would result in them being considered a "waste." In fact, EPA expressly has concluded that heap leach operations are extraction/beneficiation activities. *See* EPA Faxback 14499 (Nov. 14, 2000).

Lixiviant and restoration fluids are industrial process solutions analogous to commercial chemical products excluded from RCRA regulation, which are injected into the ground for the intended purpose of extracting uranium and restoring the pre-mining hydrologic regime. Commercial chemical products become wastes only if they are "thrown away." RCRA Online (RO) 13490 (9441.1991(14), Aug. 1991). Thus, when a chemical is released into the environment as a result of its use, it is not discarded. RO 11182 (944.1986(20), Sept. 29, 1986). *See also* RO 11147 (9441.1986(34), April 28, 1986) ("[W]hen a commercial chemical product (or a mixture of commercial chemical products) is reclaimed or used from its originally intended purpose, it is not a solid waste and, therefore, cannot be a hazardous waste."); RO 13431 (9441.1990(32), Nov. 28, 1990) ("EPA views commercial chemical products as non-wastes until a decision is made to discard them.").

Applying these concepts leads to another analogy much more appropriate for ISR operations than a RCRA Subtitle C hazardous waste impoundment – pesticides sprayed on crops. Pesticides become subject to RCRA regulation only when discarded or intended to be discarded. However, EPA has explained that a chemical released into the environment as a result of its use is not discarded. Unless EPA took such a position, "one could argue that the pesticide that is sprayed that does not fall directly on the crop (but falls on the ground next to the crop) would be disposal of an unused commercial chemical product; such an interpretation is a distortion of the commercial chemical product rule." RO 11096 (9443.1985(05), July 22, 1985).

EPA's position that lixiviant or restoration fluids that migrate out of the ore body are "uranium byproduct material" and hence wastes, cannot be reconciled with its position on pesticides that fall to the ground during crop spraying. Pesticide is sprayed on the ground, and lixiviant and restoration fluids are injected into the ground, all for their intended purpose. Any lixiviant or restoration fluids that migrate beyond the ore body are no different than pesticide that falls to the ground. In either case, there is no disposal because they are commercial chemical products that are sprayed on or injected into the ground for their intended purpose. As a result, they are not wastes. Therefore, any lixiviant or restoration fluids that migrate beyond the ore body are not uranium byproduct material.[3]

III. EPA's Technical Analysis Supporting Its Proposed Rule Is Flawed

Even if the Proposed Rule were fully within EPA's UMTRCA regulatory authority, the factual basis on which EPA seeks to support the Proposed Rule, and the analysis of these presumed facts, is flawed.

A. EPA's Assumption Concerning the Standard Timeframe Post-Restoration Groundwater Monitoring Is Incorrect.

EPA states that it "assumes" the typical current timeframe for post-restoration groundwater monitoring is six months. 80 Fed. Reg. at 4157. This "assumption" is incorrect. The NRC and states generally require post-restoration (stability) monitoring of at least 12 months. The following list identifies the length of time required for post-restoration groundwater monitoring at the referenced ISR operations.

- Crow Butte License Condition 10.6 requires a minimum of four consecutive quarters of monitoring.
- Dewey Burdock License Condition 10.6 requires a minimum of four consecutive quarters of monitoring.
- Lost Creek NRC Technical Report Section 6.2.4 requires a minimum of four quarters of monitoring.

[3] Because lixiviant and restoration fluids are injected into the ground as an integral part of their intended purpose, and there is no intent to "dispose" of either one, any lixiviant or restoration fluid that remains in the subsurface after completion ISR operations is not "abandoned" because they are not "disposed of, burned or incinerated, or if it is accumulated, stored, or treated prior to or in lieu of being burned, disposed of, or incinerated." 40 C.F.R. § 261.2(b).

- Moore Ranch Safety and Environmental Report Section 6.1.3.7 requires a minimum of 1 year of monitoring.
- Nichols Ranch Safety and Environmental Report Section 6.1.3.7 requires four consecutive quarters of monitoring.
- Ross Project Safety and Environmental Report Section 6.1.3.8 requires a minimum of 1 year of monitoring.
- Willow Creek Safety and Environmental Report Section 6.1.3.2 requires a minimum of 1 year of monitoring.

EPA should not rely on assumptions to justify rulemaking, especially when information contrary to the assumption is so readily available from public sources. If EPA has evidence concerning actual stability time periods at ISR facilities that supports its assertion concerning the typical timeframe for post-restoration monitoring, especially under current regulations, EPA should provide that information.

The extended stability monitoring periods the NRC and/or states require pursuant to current regulations and license conditions already address the concerns raised by the Proposed Rule. Since protective regulatory mechanisms already are in place and since EPA cannot cite examples of where these mechanisms have failed to protect USDWs post-mining[4], there is no justification for promulgating additional costly regulations.

B. EPA's Failure to Quantify the Risk the Proposed Rule Purports to Mitigate Is Undermines the Fundamental Goal of the Proposed Rule.

EPA claims that it was unable to ascertain the number of cancer deaths that would be averted by the Proposed Rule. 80 Fed. Reg. at 4157. In addition, EPA fails to provide any epidemiological or other technical basis for assuming any cancer deaths will occur. This failure undermines EPA's assertion that the Proposed Rule is needed.

Commercial in situ mining began in the United States in 1964 (51 years ago). Tremendous volumes of water-quality data, within both the license areas and the immediately surrounding areas are available. In fact, NRC Reg. Guide 4.14 requires monitoring the water quality of domestic wells in the vicinity of in situ mines. These data are available from the NRC, Agreement States and/or facility licensees, which could be used to determine the risk. It is inappropriate to base a rulemaking on an undetermined risk, especially when relevant data are available.

The Science Advisory Board's (SAB) letter to EPA, dated February 17, 2012, encouraged EPA to *"[s]urvey the extensive monitoring data available for ISL uranium mines to identify data sets suitable for building an evidence base that could inform EPA's regulations."* The SAB acknowledged that a substantial amount of data is available to EPA and encouraged the agency to review the data. However, there is no evidence EPA reviewed any meaningful data to determine if a hazard exists

[4] EPA may be able to cite examples of experimental groundwater restoration techniques that failed to generate a stable geochemical environment; but these cases are irrelevant since they are experimental. In support of the rulemaking, EPA should cite cases, if any, where the geochemical environment was found to be unstable after the agency determined the site to be stable and allowed the operator to cease active restoration and stability monitoring.

and, if so, how it could be mitigated. In fact, listed in their entirety below are the six recommendations SAB made to EPA in their February 17, 2012 letter.

- Survey the extensive monitoring data available for ISL uranium mines to identify data sets suitable for building an evidence base that could inform EPA's regulations.
- Compile and systematically analyze these data sets to define the geology and hydrology of the site and support modeling of the interactions between pertinent groundwater constituents and associated geologic media.
- Apply environmental models to provide realistic predictions of the rates at which groundwater constituents approach stable conditions following the cessation of mining operations, for a range of realistic bounding conditions.
- Describe systematic approaches for determining the optimal number, location, and sampling frequency of monitoring wells.
- Specify criteria for selecting groundwater analytes of primary and secondary importance for monitoring by emphasizing the linkages between analytes and monitoring objectives.
- Consider some alternative approaches to the described statistical treatment of differences between pre- and post-mining groundwater quality, and recognize that other factors may have more influence than statistical uncertainty on the reliability of these differences.

However, it appears that EPA did not seriously follow up on any of the six recommendations, with the possible exception of environmental models. EPA should implement all of SAB's recommendations and then re-evaluate the need for the Proposed Rule.

C. EPA Failed to Conduct an Adequate Assessment of the Environmental Impacts Associated with the Proposed Rule

1. *The* Proposed Rule Fails to Adequately Evaluate The Proposed Rule's Regulatory and Environmental Impacts

The following environmental and regulatory impacts should be included in EPA's risk/benefit assessment:

- Significant consumption of clean water during aquifer restoration to affect potentially small changes in groundwater quality to reach a higher confidence level.
- Significant consumption of groundwater during baseline and post-restoration sampling to reach a higher confidence level. Based on the sampling schedules and well counts provided in the Economics Attachment Tables 3-2, 3-3 and 3-4, it appears that the additional number of wells required for sampling will double and the number of sample periods could increase by 30 times. Assuming three casing volumes of water are purged before a sample is collected and the casing volume is 300 gallons, the total amount of water dumped on the ground over thirty years would be 10,044,000 gallons along with the release of associated naturally occurring radon. EPA should also note that Tables 3-2, 3-3 and 3-4 in the Economics analysis incorrectly estimate the number of monitor wells currently used at in situ mines. We

encourage EPA to discuss this matter with the NRC and/or states to properly determine the number of monitor wells currently used and apply that number in the models.

93 wells x 30 years x 3 casing vol./sampling event x 300 gallons/casing vol x 4 sample events/year = **10,044,000 gallons**

- The excessive groundwater sampling required by the extended long-term stability monitoring requirement, and the need to reach the 95% confidence level, will result in the release of greater amounts of radon to the atmosphere. The native concentration of radon in the groundwater ranges from hundreds of thousands to millions of picocuries/liter.
- The additional travel to the site by employees, regulators, contractors and others, as well as the additional monitoring and maintenance of the site, will result in significantly greater carbon emissions to the environment, which will contribute to global warming. For the Lost Creek Facility we estimate that an additional 30 years of monitoring will result in the addition of 8.4 million kilograms of carbon dioxide to the atmosphere

  240 miles/round trip x 38 round trips/wk x 30 years x 52 wk/year x 1gallon/15 miles = 948,480 gallons of gasoline.
- EPA states on its website at http://www.epa.gov/cleanenergy/energy-resources/refs.html that a gallon of gas generates 8,887 grams of carbon dioxide when the fuel is burned. Multiplying the gallons of fuel by 8,887 grams yields 8,429,142 kilograms of carbon dioxide. This is a conservative estimate since it does not include the greenhouse gas emissions resulting from heating facility buildings and other monitoring and maintenance activities multiplied over 30 years. Causing these unwarranted and avoidable impacts is contrary to EPA policy. *See Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites,* EPA Pub. No. 542-R-08-002 (April 2008).
- Other state and federal agencies will be required to maintain permits on the facility for many additional years, which will result in significant costs to the agencies. In Wyoming, the new Part 192 would have an impact the Wyoming Department of Environmental Quality-Land Quality Division, Water Quality Division, and Air Quality Division, U.S. Nuclear Regulatory Agency, and U.S. Bureau of Land Management.
- Inability to reclaim the site during long-term stability monitoring so it can be returned to pre-mining use, generally grazing and wildlife. These beneficial uses may be displaced for decades.
- Additional stability time will result in additional vehicle traffic to the site. The additional traffic will result in more deaths to wildlife and will also increase the likelihood of injuries and fatalities to people. If the stability monitoring at Lost Creek is extended by 30 years an additional 12,729,600 miles would be driven by the following combination of people:

  -1 Night watchman every night = 7 trips per week

  -1 Watchman each weekend day = 2 trips per week

  -1 Radiation Safety Officer = 5 trips per week

  -1 Maintenance Tech = 5 trips per week

-1 Environmental Sampler = 5 trips per week

-1 Mine Manager = 5 trips per week

-1 Vendor per day = 5 trips per week

This results in a total of thirty-four round trips per week. Each round trip is 240 miles. It is likely that several vehicle crashes would result from this increase in miles driven. According to the U.S. DOT National Highway Traffic Safety Administration, "Traffic Safety Facts, 2012 Data, published September 2014, there were over 1.3 million injuries in the U.S. in 2012 from passenger car crashes. The number of miles driven in 2012 could not be found, but the DOT website at http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/pocket_guide_to_transportation/2014/2_Moving_People/table2_3 states that in 2011 3,644,971 million miles were driven by light vehicles. This yields a ratio of 1 injury per 2.8 million miles driven. When this ratio is compared to the number of additional miles required to be driven by the proposed regulation, 12.73 million, approximately five additional injuries will result from the commute as a direct result of the proposed regulation with potential for fatalities.

- The radiologic dose to employees maintaining the processing plant and wellfields, which could not be decommissioned until stability is completed in up to 30 years, would continue for an extended period of time. Since there is no demonstrated benefit to the proposed regulation, the increased dose to employees is inconsistent with NRC ALARA (As Low As Reasonably Achievable) regulations found in 10 C.F.R. Part 20.
- The increased cost caused by the rulemaking will, in some cases, cause companies to use conventional mining techniques instead of in situ recovery operations. Conventional mining techniques have potentially significantly greater environmental consequences than in situ recovery operations, including significant consumptive water use if the workings have to be dewatered.
- The increased cost caused by the regulation will likely force many companies to scrap projects in the U.S. This will further reduce U.S. uranium production and cause further reliance on other countries to supply this valuable metal, which provides nearly 20% of our electricity.

D. *Definitions*

The definition of "Exceedance" refers to groundwater protection standards. 80 Fed. Reg. at 4159. This is an open-ended definition since there is no attempt to identify the groundwater protection standards. Please add a definition of groundwater protection standards or expand the definition of exceedance to clarify which standards apply.

The definition of "In-Situ Recovery (ISR)" states that a "solvent solution" is used. 80 Fed. Reg. at 4160. The term solvent solution is misleading since it can easily be confused with solvent extraction. Organic solvent solutions commonly are used in uranium recovery processing plants but not within the aquifers. Please refine this definition by simply excluding the term solvent.

The definition of "Restoration Goal" inappropriately refers to secondary drinking water MCLs. *See* 80 Fed. Reg. at 4160. The secondary MCLs are based on aesthetics instead of human health effects or environmental impact. It is inappropriate to require a large expenditure of natural resources and capital to reduce the level of secondary constituents in an exempted aquifer. If EPA decides to leave secondary MCL standard in place, it will be necessary for EPA to perform a cost-benefit analysis to demonstrate there is merit to spending potentially hundreds of thousands or millions of dollars to prevent issues such as iron staining in household plumbing fixtures if domestic water was produced from an exempted aquifer. The cost-benefit analysis should assume that water within the exempted aquifer will not be used since it is associated with a naturally occurring uranium ore body and the aquifer is contaminated with radionuclides and associated metals.

The definition of "Upper Control Limit (UCL)" is being confused with the definition of baseline. 80 Fed. Reg. at 4161. UCLs are calculated by adding the baseline concentration and a reasonable safety margin. For example, the UCL for chloride is commonly determined by taking the average concentration, which typically is around 5 mg/L, and adding 15 mg/L. This yields a UCL of 20 mg/L. If the UCL was left at 5 mg/L the monitor wells would continually be on excursion since the UCL is equivalent to the natural background. Please revise the definition so that the UCL isn't equivalent to natural background. Also, please remove the reference to the license since UCLs typically are not included in the license.

IV. Comments Referenced by Page Number

80 Fed. Reg. at 4162: Footnote 8 suggests that acidic lixiviants are not used because they induce precipitation of calcium sulfate, which clogs well screens. While calcium sulfate plugging has been noted as an operational issue, it is not the reason acidic solutions are not used. In fact, acidic lixiviants are commonly more effective than alkaline leaches, which is why acidic lixiviants are used in most other countries of the world. Acidic lixiviants are not used in the U.S. Therefore, any reference to such lixiviants should be removed so the public isn't misled about in situ mining practices.

80 Fed. Reg. at 4163: EPA suggests that an excursion could impact surface waters where groundwater discharges to the surface. However, EPA cites no evidence that such a problem has occurred in over 5 decades of in situ mining. Nor does EPA provide credible evidence as to how such an event could occur. Numerous natural hydrologic and geologic features associated with in situ mining, as well as operational controls and monitoring, preclude surface excursions as a credible scenario. We request that EPA either provide evidence on how such an event could overcome the natural and manmade protections or remove this reference from the document. It is inappropriate to base a rulemaking on a phenomenon that has never been observed and for which there is no evidence to support the conclusion that it might occur.

80 Fed. Reg. at 4164: EPA begins a discussion on why the agency believes the standards are necessary by stating that *"current industry practices for restoration and monitoring of the affected aquifers may not be adequate to prevent either the further degradation of water quality or the more widespread contamination of groundwater that is suitable for human consumption."* It is improper to attempt to justify new regulations, especially those that will have far-reaching economic and environmental impacts, with assumptions and unsubstantiated allegations. According to section 4.3.3 of NRC NUREG-6733 *"there were no reports of extraction fluid excursions being detected in off-site water supplies in any of the documentation for U.S. uranium ISL sites reviewed for this report."* Is EPA aware of evidence contrary to the NRC's report? EPA must provide credible evidence that a hazard exists before proposing standards to mitigate the hazard.

To support these regulations EPA should either cite examples of post-stabilization excursions into USDWs or at least provide a realistic model (accounting for hydrology, natural attenuation, chemical kinetics, dispersion, geology, etc.) that demonstrates a significant hazard exists, which needs to be controlled through regulation. The excursion hazard model presented by the NRC in NUREG-6733 is not directly applicable because it considers only excursions during operations, but it would provide EPA a starting point for a realistic modeling exercise. A model would also have to consider that the water quality was shown to be stable for at least a year and provide a basis for kinetic calculations necessary to establish why it would become unstable. If the water quality is unstable, EPA would have to determine how much of each constituent of concern would come back into solution and how far would it migrate while maintaining a hazardous or non-compliant concentration. For example, will the concentration of uranium in the restored and stable groundwater increase from 0.08 mg/l to 0.1mg/l, and if so, what will be the concentration when the plume reaches the surrounding USDW when all hydrologic and geochemical forces are considered?

80 Fed. Reg. at 4165: EPA contends that flow patterns are altered due to the deposition of uranium. Please cite evidence to support this claim. Given that most roll front deposits contain grades of less than 0.25 weight percent, it is unlikely that flow patterns are altered by uranium deposition to a measureable degree.

EPA also claims that the porosity and permeability of the host rock are affected by in situ mining. Please cite evidence to support this claim. While near-well bore impacts to permeability have been experienced, we are unaware of measureable impacts to host rock hydrologic properties. If EPA cannot provide evidence that the hydrologic properties of the host rock are being altered by in situ mining, the claims regarding the impact on restoration should be removed from this document.

EPA also contends that there is an absence of explicit regulatory language addressing ISR facilities. This is incorrect. Please see EPA regulations at 40 C.F.R. Parts 144 and 146, NRC regulations at 10 C.F.R. Part 40, and numerous other state regulations, such as Chapter 11 of the Wyoming Department of Environmental Quality – Land Quality Division regulations.

80 Fed. Reg. at 4170, Item 6: EPA discusses the establishment of corrective actions. For the sake of clarity, please include a statement that an excursion is not a violation of 40 C.F.R. Part 192. Excursions have long been misunderstood by the public and such a statement will clarify that excursions require corrective action but are not violations.

There also is a reference to long-term stability compliance wells. There is no definition of this class of wells. Please provide a definition of this class of wells. Currently, the wells used to determine stability are within the active wellfield where an excursion or exceedance of groundwater standards could not occur because this is where mining takes place.

80 Fed. Reg. at 4171: EPA expresses its concern that groundwater, which is unsuitable for human consumption, should not be further degraded. This goal is impractical and inconsistent with the provisions of the UIC program, which allows for injection into exempted aquifers. Extending EPA's logic to other classes of UIC wells would require that most UIC Class I, II, and VI activities be halted since there is no associated groundwater restoration. Such an interpretation would have a chilling effect on countless industries that rely on the UIC Program, including but not limited to: oil and gas operations, industries that generate salt water including food processors, and carbon sequestration.

80 Fed. Reg. at 4172, 4176: EPA is requiring that reducing conditions be re-established within the affected aquifer. If the chemical parameters of concern are demonstrated to be stable, why is it necessary to re-reduce the affected aquifer? Introducing reducing chemicals will likely bring some redox sensitive metals back into solution thereby requiring additional restoration efforts. Also, a significant portion of a native roll front deposit occurs in oxidized host rock, so introducing reductant will generate a non-native environment that will likely be less stable than leaving it in its natural oxidized state. The upgradient aquifer already is naturally oxidized and will be introducing oxidant to the ore zone over time. In many cases, it would be better to leave the ore zone oxidized since this is ultimately the state it will return to – the pre-mining state.

80 Fed. Reg. at 4172: In footnote 53, EPA sites a paper written by the Natural Resources Defense Council (NRDC). EPA also cites other papers written by individuals opposed to uranium mining or written by individuals paid by anti-mining organizations. It is inappropriate to cite or rely on papers written by authors who have strongly held predetermined beliefs on a matter. Instead, EPA should rely solely on papers written by disinterested technical and legal experts. In other words, rulemaking should be supported by original science, not editorials or biased interpretations of other's work. We are concerned that that many of the references provided in the support documents, as well as many of the statistics and facts presented, do not comply with Section 515 of the Consolidated Appropriations Act of 2001, commonly referred to as the Data Quality Act. Please remove all references to such papers and reconsider the draft rule using only reputable original science. The EPA should take note that the NRDC paper referenced in the rulemaking was also utilized by interveners attempting to prevent the licensure of the Ross In Situ Project in Wyoming. In that case, the judges rejected the arguments presented by the interveners and supported by the NRDC paper.

In furtherance of this point, President Obama's Executive Order 13563, issued on January 1, 2011 states, *"Consistent with the President's Memorandum for the Heads of Executive Departments and Agencies, ''Scientific Integrity'' (March 9, 2009), and its implementing guidance, each agency shall ensure the objectivity of any scientific and technological information and processes used to support the agency's regulatory actions."* Please ensure all references cited as a basis for the regulation and supporting documents comply with this Executive Order.

EPA also states that the new rule would apply to all operating wellfields, new wellfields and expansions of wellfields. As previously discussed, implementation of this rule will fundamentally change the economic basis of in situ operations. In situ companies have spent years and tens to hundreds of millions of dollars to explore for uranium deposits, license and permit facilities, and construct and operate mines based on the relatively well understood costs associated with the current regulatory scheme. It is unreasonable to retroactively and fundamentally alter the economic criteria mining companies relied upon to make decisions. If promulgated, the regulations should apply only to in situ facilities for which a legitimate letter of intent has not been submitted to the NRC or agreement state at the time the associated NRC regulation is promulgated.

Also, EPA has stated that the revised Part 192 should be implemented 60 days after it is promulgated. Since EPA only writes general standards implemented by the NRC, it is unclear how the standards will be implemented if there are no NRC regulations. The standards should not be implemented until after the NRC promulgates regulations.

80 Fed. Reg. at 4174: EPA raises the concern that *"the preoperational groundwater monitoring program must account for the effects of well installation and development on groundwater characteristics."* EPA goes on to state that *"[i]t is important that the operator allow a sufficient interval of time between well installation and sampling to allow localized disturbances to dissipate and ensure that background conditions are accurately characterized."* Please clarify the basis for this last statement since current EPA guidance doesn't acknowledge or address this issue. *See* Douglas Yeskis and Bernard Zavala, "Groundwater Sampling Guidelines for Superfund and RCRA Project Managers," EPA 542-S-02-001 (May 2002). This guidance provides for purging of wells to ensure true formation water is collected in the sample. If EPA has discovered evidence that its own guidance is insufficient, please make that evidence available. If not, please provide details as to why a new regulation is needed to address this issue.

80 Fed. Reg. at 4175: EPA raises concerns about the close proximity of aquifer exemption boundaries to the monitor well ring and speculates that the close proximity is due to operators attempting to limit the amount of land dedicated to the ISR facility. In some cases, the aquifer exemption boundary must be close to the monitor well ring because of land constraints. In addition, UIC staff in EPA's Region 8 office are forcing operators, including Lost Creek ISR, LLC, to place the aquifer exemption boundary as close to the monitor well ring as possible to "preserve" more of the USDW. The comments in the rulemaking are contrary to the positon held by UIC staff in the Region 8 office. The aquifer exemption boundary would be better suited at least several hundred feet away from the monitor well ring for the reasons EPA identifies in the rulemaking. It is important that all EPA staff be on the same page on this matter since it will be impossible to comply with the new regulation and the directives of EPA's Region 8 UIC staff. Please come to a consensus with Region 8 and then revise and republish the draft rule.

EPA also states that *"chloride is often incorporated into the lixiviant as a tracer; similarly, because the lixiviant mobilizes uranium by increasing the alkalinity . . . ."* Chloride is not introduced into the lixiviant as a tracer. Chloride is released into the lixiviant from the ion exchange of chloride for uranyl bicarbonate on the resin. Please correct this statement. Also, uranium is not mobilized by increasing the alkalinity. In fact alkalinity has nothing to do with mining uranium. The addition of complexing agents such as sodium bicarbonate may have the effect of increasing alkalinity, especially if low concentrations of carbon dioxide are used, but increasing alkalinity does not provide the chemical mechanism for mobilizing uranium. Please remove or correct this statement.

80 Fed. Reg. at 4176: EPA states that it has *"heard some concerns that upper control limits have in some cases been established at levels that would be unlikely to be exceeded under any conditions . . . ."* Please provide the evidence to support this claim. From whom did EPA receive this information? Where and when were these alleged limits established? Anecdotal speculation is insufficient to support a rulemaking that will have a significant impact on an entire industry.

EPA states that upper control limits for UCLs should be set at a value of five standard deviations above the mean of the measured background concentrations. Please clarify if this standard is to be applied on a well-by-well basis or an average of all wells of a specific type.

EPA proposes an initial three-year stability period, plus an additional long-term stability monitoring period of 30 years. Please clarify what will be required of operators if, at the end of both stability periods, the agency determines certain chemical constituents are not stable. After making this clarification, please reissue the draft rule for public review and comment.

80 Fed. Reg. at 4179: EPA encourages the NRC and agreement States to place institutional controls in licenses. It is unclear why post-stability institutional controls are needed if, through the adherence to EPA standards, the geochemistry is deemed to be equivalent to background and stable. If institutional controls are placed on restored in situ ore bodies then EPA, using the same logic, should also locate all unmined ore bodies and establish institutional controls to prevent utilization of the water (the water-quality hazards presented by a restored and stable in situ mine would be the same as those presented by a natural ore body). In situ activities typically occur within an exempted aquifer, which means that the water is not a USDW.

80 Fed. Reg. at 4182: EPA claims that promulgation of the Proposed Rule is not a *"significant energy action"* as defined in Executive Order 13211. However, the proposed action will in fact have dramatic cost implications on the U.S. in situ mining industry which provides the majority of domestically produced uranium. Implementation of the proposed regulation will have a significant adverse effect on the domestic supply of uranium if stability monitoring periods are extended for decades. LCI requests EPA revise its economic analysis using the actual costs provided by experienced operators and then reassess compliance with Executive Order 13211.

80 Fed. Reg. at 4185, 4187: EPA uses the term *"provisional alternate concentration limits."* The definitions section of the regulation provides a definition of alternate concentration limit but does not use the word provisional. Is a provisional ACL different then an ACL as defined and routinely used in the draft rule? If there is no difference, please remove the word provisional so the language is consistent throughout the regulation and supporting documents.

80 Fed. Reg. at 4186: In the proposed Part 192.53(a)(3), EPA requires the collection of preoperational background monitoring data from <u>outside</u> of the exempted aquifer. Currently, operators are not required to collect water-quality data beyond the monitor well ring, with the exception that pre-existing water supply wells are sampled if the owner grants permission (NRC Reg. Guide 4.14). What density of monitor wells outside the exempted aquifer will be required and what will be the sample frequency? For existing operations, will the agency require monitor wells in the adjacent aquifer? It doesn't appear the cost of installing these wells was included in EPA's cost estimate for the proposed regulation. Please revise the cost estimate to include installation and sampling of these wells (including costs for road installation, laboratory services, manpower, G&A, etc.).

Regulations require a NEPA review prior to any major federal action. The NRC, which has environmental review regulations in 10 CFR § 51, has interpreted this to mean that only limited installation of monitor wells can occur prior to licensing. Will the additional monitor wells required by the draft regulation require the NRC to complete a NEPA action prior to the installation of the monitor wells? If so, assuming the NEPA review of the baseline monitor wells takes two years to complete, followed by two years of well installation and baseline data collection, a second NEPA review of the licensing action, which normally takes five years, will be required. After completion of the final NEPA review, it will take a year to construct the facility. That means it will take two NEPA actions and at least ten years before a facility could begin producing and attempting to recover its initial investment. This time frame creates a substantial barrier to market entry, which will force companies to focus only on large uranium deposits with sufficient resources to recoup the substantial start-up costs. Investment in uranium production will shift toward conventional mining and to projects in other countries. This shift is inconsistent with the Energy Policy Act of 2005.

V. General Comments

The draft rulemaking states in numerous places that the UIC Program is insufficient for the regulation of in situ mining. However, as discussed above in Section II, merely because EPA may perceive the UIC Program as inadequate, it does not have regulatory authority under UMTRCA to regulate in situ industrial process fluids as "uranium byproduct material" because those fluids are neither tailings nor waste.

Moreover, the UIC Program has been relied upon for decades, especially by states, to regulate the industry. EPA's promulgation of the Proposed Rule would result in dual regulation of the industry (existing UIC regulations commonly implemented by states and EPA standards implemented by the NRC). Dual regulation of an industry commonly results in conflicting requirements. Please identify which program will have priority when regulating the in situ industry. For example, will EPA standards on aquifer exemption boundaries be followed or will the UIC program requirements be followed? We are concerned that the failure to coordinate this rulemaking with other federal and state agencies as well as with various EPA Programs, is inconsistent with Section 3 of President Obama's Executive Order 13563 issued on January 18, 2011, which states in part, *"[i]n developing regulatory actions . . . each agency shall attempt to promote such coordination, simplification, and harmonization."*

Exploration and development of locatable federal minerals by private industry is part of the Bureau of Land Management's minerals program under the authority of 43 C.F.R. Part 3800, the General Mining Laws, the Mining and Minerals Policy Act of 1970, the Federal Land Policy and Management Act of 1976 (FLPMA), and the National Materials and Minerals Policy, Research, and Development Act of 1980. Given the BLM's responsibilities for uranium mining on lands managed by the BLM, please confirm whether EPA involved the BLM in the development of the draft Part 192 regulation. The extended long-term stability monitoring being proposed by EPA will have an impact on BLM's management of in situ uranium mines.

Please clarify what will be required if the agency determines the water quality is not stable after thirty years of monitoring. Will the permit be closed out since thirty years of monitoring will have occurred or will the company be required to continue stability monitoring and/or resume restoration activities? If the latter, then EPA should remove all references to thirty years of stability monitoring since it is not a metric that will be used to determine when no further action is required and the permit can be terminated. It is misleading to continually refer to the thirty-year stability period if it has no meaningful bearing on the process.

The extensive stability monitoring periods proposed by EPA will create a substantial burden on mining companies. To lessen that time and cost burden, the draft regulation should be expanded to include a requirement that the agency review and respond to all stability and ACL applications within 60 days of submittal. If the agency cannot complete the review within 60 days, the application should be approved as submitted.

Some of the adjacent waters at the Lost Creek site contain substantially higher concentrations of at least one listed constituent than the production zone in the exempted aquifer. In such cases, how will the agency be required to determine ACLs?

Please include language in the draft rule giving EPA authority to reduce the list of parameters on Table 1 for specific operations since some of the parameters listed do not exist within all host rock and are not introduced by the lixiviant. For example, mercury is not present in some formations and is not a component of the lixiviant. EPA should, after a careful review, have the flexibility to remove certain analytes from Table 1 for a specific project or at least reduce the required frequency of the analyses.

State and federal laws require in situ operators to maintain a site reclamation surety until all environmental liability has been satisfactorily addressed (post-demonstration of groundwater stability and surface decommissioning). Many companies, due to their size, must utilize a letter of credit as their surety instrument to satisfy agency requirements. It is unlikely a bank will issue a letter of credit to a small business if the length of time to demonstrate groundwater stability may be thirty years, especially if the small business doesn't have another mine or other property to serve as collateral. The inability to get a letter of credit will drive small to mid-size businesses out of the industry. Companies in operation when the rule takes affect may lose their ability to fund a surety and be forced to turn the project over to the state for reclamation.

If the proposed regulations are approved as written, the life span of a facility (life span includes locating minerals, collecting baseline data, applying for and receiving permits/license, constructing the facility, mining the mineral, restoring the groundwater, monitoring for groundwater stability and decommissioning the facility) could be 60 years for a small facility. The life span of a large facility could be well over 100 years. Before exploring for and mining uranium, companies must sign agreements with the land surface and mineral owners. Landowners will be less likely to sign leases if they know they won't be able to use the land again potentially for 100 years or more. The inability to sign land access agreements will significantly harm the domestic uranium recovery industry. In addition, is it unreasonable to believe that a company will be in business for over 100 years, especially if there is no income during the first ten years during exploration, permitting, and construction, and during the final 30 years during groundwater stability monitoring and decommissioning. EPA must consider the cost-benefit of the proposed regulations in light of these issues. Data EPA has provided do not acknowledge these important factors.

EPA cites a paper written by Susan Hall of USGS in 2009 entitled "Groundwater Restoration at Uranium In-Situ Recovery Mines, South Texas Coastal Plain." This paper points out the concentration of radium in groundwater typically is less after groundwater restoration than prior to mining. If EPA is attempting to establish that the increase in the concentration of uranium in groundwater as a result of mining generates a hazard that must be mitigated by rulemaking, then EPA should also consider the improvement in water quality resulting from the overall reduction of radium concentrations that result from groundwater restoration. Since the specific activity of radium is substantially higher than for uranium, it appears that groundwater restoration following in situ recovery actually improves the water quality, at least from a radiologic standpoint. In addition, radon concentrations in the formation will be greatly reduced since the radon's ultimate source, uranium, is removed by the mining process. EPA should consider this overall reduction of alpha emitters in host rock and groundwater when evaluating long-term risk. The Hall paper lists other groundwater constituents reduced to below baseline values by groundwater restoration. EPA must consider how the health benefits of these improvements in water quality are balanced by the increase in other constituents. Please reassess the risk based on these facts and consider if the remaining risk justifies the rulemaking.

VI. Comments on Alternatives

Alternative 1: EPA considered requiring thirty years of stability monitoring with no option of shortening the period based on geochemical modeling. A thirty-year stability period would not be economically feasible for the in situ industry. Please see the economic analysis provided with these comments. A thirty-year stability period is unreasonable when economic, hydrologic, geochemical, human health and environmental risk are carefully evaluated.

Alternative 2: EPA considered using narrative standards with no fixed monitoring period. This standard incorrectly assumes that in situ mining has an impact on the hydrologic characteristics of the ore body and requires that those impacts be reversed. The precise measurement of hydrologic properties is difficult. We have attempted in the past to duplicate pump tests to verify the findings of previous tests. While the results were similar, they were not exactly the same. It would be difficult, unless dozens of pump tests were performed, to demonstrate that the hydrologic properties have not changed or have been returned to pre-mining conditions, especially if a 95% confidence level is required. Each pump test would consume from 60,000 to 400,000 gallons of water and dozens of pump tests would likely be needed, resulting in a total potential consumptive use of groundwater at a mine with 15 mine units of 144,000,000 gallons (15 mine units x 12 tests per mine unit x 400,000 gallons per test x 2 sets of tests (pre-mining and post-mining)). The pump tests themselves would have an impact on the hydrologic properties of velocity and hydrologic head. Returning the hydrologic head to pre-mining conditions could take tens of years in some locations. The recovery of the first 90% of the hydrologic head would likely occur within a few months to a few years, but the recovery of the last 10% could take decades or may never occur if there is insufficient aquifer recharge or if there is a drought. States regulate the beneficial use of water, not EPA. There is no regulatory or environmental reason to require the aquifer to return to its original hydrologic head. We do not support alternative 2.

VII. EPA's Draft Economic Analysis (EA) Is Incomplete, Inaccurate, and Relies on Unreasonable Assumptions.

EPA states its assumption that 9.5 million pounds of U_3O_8 will be produced in the U.S. in 2015. 80 Fed. Reg. at 4180. Actual production of U_3O_8, based on numbers issued by the Energy Information Administration, hasn't exceeded five-million pounds for over 15 years. EPA's assumption introduces a nearly 100% error in the economic calculation. EPA should either justify what is essentially a doubling of the amount of U_3O_8 production in the economic model or correct this error and reissue the draft regulation for review and comment.

The Energy Policy Act of 2005 calls for federal agencies "to develop a national energy policy designed to help the private sector, and*, as necessary and appropriate, State and local governments, promote dependable, affordable, and environmentally sound production and distribution of energy for the future.*" Expansion of nuclear power is a key component of the Energy Policy Act of 2005.

On page ES-4, EPA states, in part, that *"[u]ranium is relatively homogeneous, so buyers do not care which mine or ISR facility produced it . . . ."* This statement is incorrect because buyers care greatly about the source of the uranium they buy. Buyers commonly insist that uranium be produced from a specific mine, stated in the contract, so the buyer can be sure they have diversity of supply. Please remove the statement from the economic assessment and account for this error in the economic model.

On page ES-5, EPA claims that 17% of the U_3O_8 delivered in 2013 was of U.S. origin. This statistic likely includes the U_3O_8 supplied by the U.S. government through the Department of Energy. According to the EPA, only 4.66 million pounds of U_3O_8 were produced by U.S. mines in 2013, while U.S. power plants purchased 57.4 million pounds. This equates to about 8% of U.S. origin. Please revise the production number and redo the economic analysis. This error alone will more than double the cost per pound that EPA calculated.

On page ES-5, EPA states in part that *"ISR facility operators would have only a limited ability to pass these costs along to their customers."* This statement is especially troubling as it demonstrates a lack of understanding of the global economy. The economic model is based on the premise that producers can absorb costs induced by regulations simply by passing the cost on to the consumer. That premise is true only if all producers throughout the world are affected equally by the regulation, and there is no alternative supply. The additional costs producers would incur under the Proposed Rule impact only U.S. in situ producers, so their cost of production will substantially increase. However, no other producers in the world will have to deal with the regulations and associated cost. The statement should be rewritten to say that *"ISR facility operators would have **no** ability to pass these costs along to their customers"* and then revise the economic model to account for this change.

Table ES-2 provides costs per pound of uranium. However, the form of uranium is not specified (yellowcake, U_3O_8, metal uranium, etc.). This distinction is important and can have a substantial impact on the cost model. Please add the proper units to the table and republish for public review and comment.

On page 2-5 EPA states, *"The discrepancy is largely due to quantities of uranium added to inventories or taken out of inventories in response to market forces."* Please revise this statement to address the processing of equivalent and alternate feeds at uranium mines.

On Page 2-5, please remove the reference to acid leaching since this practice is not used in the U.S. where these regulations will be implemented. Referring to acid leach is misleading.

On page 3-10, EPA states in part, *"[t]ypically one injection, extraction, or other ore zone well is monitored per acre of the* production *unit . . . ."* This assessment is incorrect. In accordance with NRC NUREG-1569, most mines monitor one production zone well per two to four acres of production unit. This difference creates a substantial error in the cost estimate for implementation of the rule. Please consult with the NRC to verify the current average density of production zone monitor wells and then, using the correct ratio of monitor wells/acre, recalculate the cost of the proposed regulation. The revised calculation should be made available to the public for review and comment.

Table 3-2 states in footnote 2 that *"[i]ndicator parameters are Alkalinity, Conductivity, TDS, Chloride, Uranium, and Radium 226 and Radium 228."* We are not aware of any company that includes TDS, uranium, radium 226 or radium 228 in the list of indicator parameters during monitoring of excursion parameters during any phase of mining. This flawed assumption significantly adds to the "current cost" of monitoring at an in situ operation. Please remove these parameters and associated cost from the model and then republish the Proposed Rule using the corrected cost.

Page 3-20 of the EA includes an unreasonable assumption that the stability monitoring period will be 7 years, as opposed to 30 years, and in support of this assumption, references one unspecified case study wherein geochemical modeling estimated stability would be achieved in 15 years. It is unreasonable to assume that facilities will typically be granted closure within the assumed 7 year period based on the on one unspecific, case study which demonstrated that stability would require 15 years.

Page 3-28 of the EA assumes that establishing an alternate concentration limit will save money; however, there is no evidence to support this assumption. First, there is no requirement to approve an alternate concentration limit. Second, there is no consideration of costs that would be required to obtain data and other information that may be necessary to support an alternate concentration limit.

As described on page 3-27 and beyond, the EA's process of extrapolating estimated costs of each regulatory alternative based on a hypothetical facility model introduces a major set of uncertainties. EPA should collect actual cost information from the small number of operating facilities and revise the EA and small entity analysis accordingly.

A. EPA Failed to Conduct an Adequate Assessment of the Costs and the Regulatory and Environmental Impacts Associated with the Proposed Rule.

1. EPA Grossly Underestimates the Costs Associated with the Proposed Rule

EPA identifies only two cost categories associated with implementation of the Proposed Rule. 80 Fed. Reg. at 4158, Table 2. This is woefully inadequate. An accurate cost estimate is vital for the public and industry to accurately understand the economic consequences of the regulation. The following costs, which are not all-inclusive, but which focus on some of the larger costs, should be incorporated by EPA to accurately assess the cost of the regulation:

- Cost to maintain surety of 2% to 3% of the total surety annually plus collateral of 25% to 35% of the total surety.
- Cost of land payments. BLM mineral claims cost $140 per claim per year. It is difficult to comment on the cost of private leases due to the diversity of agreements, but it would be safe to say that the costs are equivalent or greater than for BLM claims.
- Cost of all site staff, not just water samplers. Annual salary costs for all employees, including benefits, would likely be on the order of $560,000. Additionally, workers compensation costs of about $700 per employee per year.

- Fees charged by the NRC and other agencies in the annual amount of at least $51,500 but more likely to be over $150,000.
- Cost of utilities to maintain the facility since it could not be decommissioned until after long-term stability. The annual costs for propane and electricity would be approximately $79,200 for a processing plant and office.
- Cost of property taxes. The annual property tax for a small mine is on the order of $200,000 to $300,000. Larger mines would have a significantly higher annual tax burden.
- Cost of insurance, which, based on our experience, is approximately $300,000 per year for a facility with just one mine unit. Larger mines would have to endure significantly higher annual rates.
- Cost of maintaining mobile equipment, the processing plant, and mine units. Oil changes, tires, and other routine maintenance of a small fleet of trucks and heavy equipment will cost on the order of $30,000 per year.
- Cost of required UIC Class III well mechanical integrity tests at a rate of $208/well. Annual costs on a wellfield basis would range from $2,000 to $19,000, depending on the size of the unit and when MITs are required.
- Cost of required annual UIC Class I well testing at $15,000 per well plus five year MIT testing at a cost of $30,000 per well.
- Cost of roadway dust suppression, which is approximately $33,000 per year at Lost Creek
- Cost of road maintenance (blading and snow removal). This cost can vary considerably depending on the weather, but may range from $5,000 to $50,000 per year.
- Cost of annual wildlife surveys, which will be approximately $75,000.
- Laboratory analytical costs for environmental monitoring, including radiometrics, surface water, and groundwater not already covered by the extended stability monitoring proposed by EPA. This cost is on the order of $13,000 per year.
- Health physics monitoring costs including, but not limited to, dosimeters, bioassays, instrument calibration, repairs, etc., would add annual costs of $3,000. This does not account for labor costs captured above.
- Water-well pump repair and replacement will cost around $400 per well in equipment plus another $60 per well for manpower. Assuming 10 wells are repaired per year at a facility with just one mine unit, the cost would be $4,600.
- Safety equipment such as PPE would add costs on the order of several hundred dollars per year.
- Maintenance of erosion control and other items required by the Storm Water Discharge Permit would add costs on the order of hundreds to several thousand dollars per year depending on the size and location of the facility.

The Proposed Rule excludes the additional cost of maintaining financial assurance for up to 30 years because it incorrectly assumes that costs associated with maintaining financial assurance for a longer period of time would be small relative to other incremental costs. EA at 3-29. However, the Proposed Rule's extended time period for maintaining financial assurance after a company stops active mining operations, represents a significant new cost. The EA's statement that financial assurance costs will decrease proportionately with the amount of radioactive material onsite is very likely not accurate. EA 3-29. Because facility infrastructure may facilitate any potential corrective action, it is unlikely that decommissioning will begin before closure is granted and, therefore, as a practical matter financial assurance will continue to be a significant compliance cost until closure is approved. Accordingly, extended financial assurance requirements and the other above-listed costs should be factored into EPA's EA and its small entity economic impact analysis as required by the Regulatory Flexibility Act (5 U.S.C. § 601).

2. *EPA's Evaluation of the Proposed Rule's Economic Impact to small Entities Under the Regulatory Flexibility Act Is Flawed and Must Be Revised.*

i. *A substantial number of small entities will be affected by the Proposed Rule.*

The EA identified four firms operating ISR facilities; three which are small entities, defined for purposes of this Proposed Rule as entities having fewer than 500 employees. EA at 2-14. Small entities therefore comprise 75% of the operating firms and 100% of those small entities operating in the ISR industry will be impacted by the Proposed Rule. Based on the characteristics of this industry and consistent with the legislative intent of the Regulatory Flexibility Act, this constitutes a substantial number of small entities within the ISR industry and suggests that EPA's certification of no significant impact is improper. *See*, p. 21 of the Small Business Administration's *A Guide for Government Agencies How to Comply with the Regulatory Flexibility Act*, May 2012. EPA's evaluation of small entities should be revised to include this information.

ii. *The economic impact to a substantial number of small entities is significant.*

The EA compares estimated compliance costs with small entities sales to conclude no significant impact. However, profit data should have been evaluated where publicly available for the small entities evaluated. EPA's own Regulatory Flexibility Act Guidance recognizes the profit test is the most accurate type of analysis, limited only by data availability. *See,* p.20 of *EPA's Final Guidance for Rulewriters: Regulatory Flexibility Act as Amended by the Small Business Regulatory Enforcement Fairness Act,* November 2006. The small entity analysis should be revised to incorporate analysis of economic impact on small entities using the profit test where 2014 data are available.

Using the sales test approach, the EA understates the economic impact of the rule on small entities by overestimating small entity sales. For example, the Proposed Rule overestimates Ur-Energy's sales by approximately 48% to conclude that it would sell 1,000,000 pounds in 2014. However, actual gross sales in 2014 were 517,760 pounds, resulting in gross revenue of $26.5 million. Likewise, the Proposed Rule overestimates Ur-Energy's sales for 2015, again estimating it will sell 1,000,000 pounds. However, Ur-Energy estimates that it will sell 750,000 pounds in 2015. EPA also appears to have significantly overstated Uranium Energy Corp.'s sales for 2014 and 2015 as

EPA's estimates do not appear consistent with publicly available financial information. All publicly available 2014 financial information for small entities impacted by the rule should be incorporated into a revised small entity evaluation. Further, EPA provides no basis for its sales estimates of other small entities where financial information was not publicly available. There is no evidence that EPA attempted to gather accurate information for these small entities. In addition, as discussed in detail above, EPA underestimated the cost of compliance with the Proposed Rule. The small entity economic impact analysis should be revised to reflect a comparison of comprehensive compliance costs described above with the available small operator sales and profit data for 2014.

VIII. General Computer Model Comment

The hydrology model is labelled as a draft. We are concerned that a draft document is being used as the justification for a rule which will have far reaching impacts. We request that the document be finalized after careful review by experts and then republished for public comment.

This 2012 draft document uses MODFLOW and MT3D-MS computer models to evaluate doses and risks to offsite groundwater receptors. The MT3D-MS model uses a simplistic approach to simulate the geochemical behavior. A more quantitative reactive transport model is now available, PHT3D, which couples MODFLOW to PHREEQC. The PHREEQC model is an advanced thermodynamically based geochemical program that should have been used in this evaluation.

In the three surficial leak scenarios presented, the distances to the nearest receptor well(s) are unrealistically close compared to the monitor well setback required by applicable regulations or the Permit area buffer ISL facilities typically incorporate. For example, at our Lost Creek mine, the mandated ring monitor well(s) must be located no further than 500 feet from the closest production pattern. Thus, the assumed presence of a receptor well located at 328 or 656 feet from a lixiviant spill misrepresents real world conditions under which ISL facilities operate.

The same objection applies to the lixiviant excursion groundwater model setup where receptor wells, located at 528 and 856 feet from the active well fields, were assumed. Unfortunately, all modeling, water quality and health risk assessments presented in this evaluation were computed for the closest receptors (328 ft. for spills and 528 ft. for excursions), which, as explained above, is unrealistic and distorts/exaggerates the actual health risks.

Report Statement:

In the second sentence of the second paragraph on page ES-2, EPA states that "[r]eceptor wells for the leak scenarios were assumed to be located 328 ft., 656 ft., 1,640 ft. and 3,280 ft. down-gradient, while the excursion scenarios set the receptor well distances at down-gradient distances of 528 ft., 856 ft., 1,840 ft. and 3,480 ft."

Comment:

See the General Comment on receptor distance selection criteria above. Additionally, it is pointless to evaluate groundwater health risks at receptor wells located closer than approximately 1,000 ft. from an ISL well field.

Report Statement:

The third paragraph on page ES-2 states that, "[i]n all scenarios, the extraction rate was 2% greater than the injection rate during operation."

Comment:

The 2% bleed rate exceeds the industry operating standard of 0.5 to 1.5%. In situ uranium facilities typically are limited by wastewater disposal options; thus over-pumping not only generates a disposal problem, it also creates an excessive inward hydraulic gradient causing lixiviant dilution.

Report Statement:

The first paragraph on page ES-8 states that "[r]igorous monitoring of the ISR operations would minimize the potential for these failure scenarios and minimize exposures if they were to happen."

Comment:

This comment has no relevance to the model results, and reflects a lack of understanding of the regulatory oversight NRC and various state agencies provide, as well as the Permit conditions under which ISL facilities must operate.

Report Statement:

Section 2.5 – Representative ISL Facility Development and General Modeling Approach

Comment:

This section defines the model input parameters used in the various computer spill, leak and excursion scenarios. Tables 2-1 and 4-8 (pages 2-13 and 4-8) present compilations of the potential range of parameter values considered representative for in situ operations derived from literature sources, the NRC, and operating ISL facilities permit documents. Notably absent from the table is any reference to storativity, a parameter that greatly impacts the radius of influence of pumping wells. Based on a review of the text, it is unclear what storativity parameters were used in MODFLOW calculations or whether sensitivity analyses were performed for a range of likely storativity values.

Table 2-1 presents estimated regional hydraulic gradient parameters ranging from 0.001 to 0.01 ft./ft., which seems reasonable based on our project experience and on ISL facility field conditions cited in Table 4-8. However, the computer model runs presented for the spill, leak, and excursion scenarios include an option where a hydraulic gradient of 0.1 ft./ft. (528 ft./mile) was used. This is an order of magnitude greater than the likely range of values presented in Tables 2-1 or 4-8. This excessive gradient is not found at operating ISL facilities and should not have been used in this evaluation. The model runs clearly illustrate that using an overstated hydraulic gradient results in the rapid arrival of a higher peak concentration, which in some cases equates to higher dose risks.

Report Statement:

The third sentence of the last paragraph on page 2-12 states that "[l]ongitudinal dispersivity is often assigned a value of about 10% of the travel distance. The transverse dispersivity is about 10% of the longitudinal and the vertical dispersivity is about 10% of the transverse."

Comment:

Dispersion and diffusion in groundwater play a major role in lowering the peak concentration and retarding the peak's arrival. EPA assumes constant values for vertical, transverse, and longitudinal dispersivity without performing a sensitivity analysis to evaluate the potential impact on peak concentration. The assumed 3-dimensional dispersivity values were held constant for all model runs, thus inferring all ore deposits are geologically uniform, which is incorrect. Furthermore, an increase in the regional hydraulic gradient (modeled scenarios) would result in different traverse and longitudinal dispersivity values. Therefore, it is inappropriate to assign the same dispersivity parameters to all model runs. If real-world distances to groundwater receptors were modeled using field-determined dispersivity values, the peak concentrations results would be much different.

Report Statement:

The first sentence of the first paragraph on page 2-17 states that, "[i]n some cases, the contaminants may diffuse into the finer grained matrix, precipitate and/or be adsorbed. This could result in the vadose zone being a potential long-term source of contaminants that could leach into the groundwater. None of these processes are explicitly simulated in the model and flow through the unsaturated zone is assumed to be instantaneous. This assumption is made because the focus of the modeling is on cases where the unsaturated zone does not inhibit the migration of contaminants or act as a long-term contaminant sink."

Comment:

The first three sentences on page 2-17 essentially concede that modeling addresses field conditions that do not exist in nature. NRC research has demonstrated that radium and uranium are very immobile when spilled on surface soils. Other lixiviant analytes are more mobile and may over time migrate through the vadose zone reaching the water table. In the process of traversing the vadose zone, the spill contaminants will diffuse into the finer grained matrix, precipitate, adsorb and/or be diluted, all of which are conditions EPA failed to include in the model.

The last sentence states the base case, which does not represent the real world situation wherein the vadose zone plays a vital role in dispersing, adsorbing, and retarding a surficial contaminant release. To assume otherwise results in a much higher concentrated contaminant dose delivered to the saturated zone over a much shorter time frame, and ultimately, to the down-gradient receptor.

Report Statement:

The third paragraph on page 2-17 states that "[p]otential receptors are assumed to be located at 328 ft. (100 m), 656 ft. (200 m), 1,640 ft. (5oo m) and 3,280 ft. (1,000 m). In the discussion that follows, all of the relative peak arrival times and concentrations cited are for the potential receptor located at 328 ft. down-gradient for the release."

Comment:

As previously noted, the assumed presence of a receptor at 328 ft. or even 656 ft. misrepresents real-world conditions. The resulting higher peak concentration computed at the closest receptor misrepresents the subsequent exposure dose and ensuing risk. This response is applicable to all three surficial leak scenarios presented, and is not repeated after each case scenario.

Report Statement:

The fourth sentence of the first paragraph on page 2-29 states that the sensitivity analysis "was focused on those parameters that are most uncertain. These parameters include hydraulic gradient and conductivities, leak rates, and durations."

Comment:

This statement is incorrect. Typically, the hydraulic gradient and conductivity are the *most* readily known aquifer characteristics, while leak rates and durations are the least well-known conditions. This sensitivity analysis fails to include of 3-dimensional dispersivity and retardation parameters.

Report Statement:

On page 4-1 through 4-3 the document contains a discussion of the concentration of several chemicals in the lixiviant.

Comment:

The various chemical concentrations selected represent the extreme upper end of values seen at in situ mine in the U.S. These concentrations may exist in rare instances, but they are not typical. The authors also selected conservative Kd (distribution coefficients) in the next section of text. When extreme values are multiplied by other extreme values, the end result isn't credible. Please revise the calculations using chemical concentrations and distribution coefficients that more accurately reflect real-world conditions.

Report Statement:

On page 4-3, Section 4.2.2, EPA states that *"[i]t should be noted that the K_d value affects the time at which the peak dose occurs, but not its magnitude in the absence of significant radioactive decay."*

Comment:

The longer it takes a plume to travel a lateral distance, the more opportunity there is for physical and chemical processes, including but not limited to diffusion and adsorption, to dilute or reduce the concentrations of the constituents of concern. Please revise the statement to acknowledge these mechanisms and also account for them in the model.

Report Statement:

The last sentence of the Uranium K_d section discussion on page 4-5 states that "[b]ased on these considerations, we have selected a value of 0.4 ml/g (the minimum value at pH 8 in Table 4-4)".

Comment:

The selection of an ultra-conservative uranium retardation (K_d) factor of 0.4 ml/g in a pH 8 groundwater environment in not reasonable for the following reasons: (1) natural groundwater pH typically ranges between 6.5 to 7.8; (2) as a pH 8 lixiviant plume migrates down-gradient mixing with natural pH 7.5 groundwater, the retardation factor will increase several orders of magnitude according to Table 4-4, page 4-5; and (3) uranium needs an oxidizing environment to become mobile, which likely will not exist, because either the lixiviant has been neutralized, disbursed, or diluted, or the formation already has been reduced. Fundamentally, using a 0.4 ml/g K_d factor essentially assumes no uranium retardation.

Report Statement:

The last sentence of the first paragraph on page 4-9 states that "[u]nless otherwise specified, all of the remaining doses and risks discussed in this section are based on the assumption that the receptor well is located at a distance of 528 ft. down-gradient."

Comment:

As previously noted, the distance to the nearest receptor well is unrealistic and not representative of actual ISL operating conditions, and therefore, should not have been used as the showcased dose/risk evaluation point. This unrealistic distance parameter used in the model results in a distortion/exaggeration of the actual risk.

Report Statement:

The second sentence of the second paragraph on page 4-9 states that, "[i]f lixiviant has escaped from the wellfield during operations, it will not arrive at a well 528-ft away for at least 20 years, depending on the actual K_d. Thus, the peak uranium dose at the down-gradient well is likely to occur long after restoration of the wellfield has been completed, based on current practices."

Comment:

These statements reflect flawed logic on many levels. First, the model does not account for uranium's immobility in a reduced environment by using an unnaturally low K_d factor (see prior comment). In reality, uranium has a relatively high K_d factor, as demonstrated in Table 4-4 on page 4-5. Uranium is immobile in a reducing environment. To become mobile, it needs an oxidizing environment, which is why uranium concentrates in roll-fronts when uranium-rich oxidizing groundwater enters a reducing environment.

Second, groundwater sweep, which is part of the aquifer restoration process, appears to have been omitted from the modeled scenarios. The groundwater sweep operation, which removes 30 to 100 percent of the pore volume, induces a steep inward hydraulic gradient intended to recover any remaining periphery lixiviant. This inward hydraulic gradient is further enhanced by the subsequent reverse osmosis restoration pumping that typically operates at a bleed rate of 10 to 25 percent of the total withdrawal rate.

Finally, this erroneous conclusion is the natural consequence of using unrealistic model input parameters and ignoring others that more accurately represent flow through porous media. Therefore, the model should use a more realistic K_d factor.

Report Statement:

The third sentence of the first paragraph on page 4-10 states that "[a]ll of the doses shown in Figure 4-3 are for a receptor located at the nearest well, at a distance of 528 ft."

Comment:

As previously noted, the distance to the nearest receptor well is unrealistic and not representative of actual ISL operating conditions and, therefore, should not have been used as the showcased dose/risk evaluation point. Using an unrealistic distance parameter in the model results in both distortion and exaggeration of the actual exposure risk.

Report Statement:

The fourth sentence of the first paragraph on page 4-13 states that "[a]ll of the doses and risks shown are for a receptor located at the nearest well at a distance of 328 ft."

Comment:

As noted in the prior comment, the distance to the nearest receptor well is unrealistic and not representative of actual ISL operating conditions and, therefore, should not have been used as the showcased dose/risk evaluation point.

Furthermore, the model as presented does not properly simulate unsaturated flow through porous media or vadose zone movement of a surface spill or subsurface leak. The model assumes unrealistically high hydraulic gradients in the unsaturated zone, resulting in exceptionally high groundwater velocities, which in turn result in unrealistically short plume arrival times (i.e., 2 to 3 years).

Report Statement:

The last sentence of the first paragraph on page 4-17, Section 4.5 Non-Radiological Risks, states that "[t]he screening calculation consisted of comparing the well water concentrations of the potentially hazardous constituents to the Safe Drinking Water Act concentration limits for that constituent."

Comment:

This is an inappropriate comparison given that ISL mined aquifers are required to obtain EPA aquifer exemptions. Furthermore, few if any uranium-bearing ore deposits contain groundwater that initially meets all Safe Drinking Water Act (SDWA) concentration limits. Mining permits conditionally stipulate that groundwater be restored to its baseline condition and not to SDWA standards, so the comparison is incongruous.

IX. Conclusion

In light of the deficiencies in the Proposed Rule identified above, Ur-Energy requests that EPA withdraw and reevaluate its authority to promulgate, and the need for, the Proposed Rule.

Committee on Oversight and Government Reform
Witness Disclosure Requirement – "Truth in Testimony"
Required by House Rule XI, Clause 2(g)(5)

Name: John William Cash

---

1. Please list any federal grants or contracts (including subgrants or subcontracts) you have received since October 1, 2012. Include the source and amount of each grant or contract.

None

---

2. Please list any entity you are testifying on behalf of and briefly describe your relationship with these entities.

Ur-Energy Inc., Vice President Regulatory Affairs

---

3. Please list any federal grants or contracts (including subgrants or subcontracts) received since October 1, 2012, by the entity(ies) you listed above. Include the source and amount of each grant or contract.

None

I certify that the above information is true and correct.
Signature: John W. Cash

Date: June 20, 2016

Bio for John Cash

John attended the University of Missouri at Rolla where he received his Bachelor's and Master's degrees in Geology and Geophysics. John worked for BHP Minerals as an Exploration Geologist in the midcontinent of the U.S for three years before joining Rio Algom Mining at the Smith Ranch In Situ Uranium Facility. While with Rio Algom, John held positions as an Exploration Geologist and the Manager of Environment, Health, Safety and Regulatory Affairs. Upon the purchase of the Smith Ranch facility by Cameco, John transferred to the Crow Butte In Situ Uranium Facility in Nebraska where he eventually became the Operations Superintendent. In the summer of 2005 John had the privilege of participating as a Fellow at the World Nuclear University Summer Institute in Idaho Falls. John joined Ur-Energy in 2007 where he currently is the Vice President of Regulatory Affairs. Ur-Energy owns and operates the Lost Creek ISR Uranium Mine in Wyoming.