



NEW MEXICO ENVIRONMENTAL LAW CENTER

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Mail Stop TWB-05-B01
Washington, D.C.20555-0001

RE: Comments on Lost Creek SEIS, NUREG-1910, Supplement 3; Docket ID NRC 2008-0391

Dear Mr. Lesar:

On behalf of the Southwest Research and Information Center (“SRIC”), please accept the following comments on U.S. Nuclear Regulatory Commission’s (“NRC’s”) supplemental environmental impact statement (“SEIS”) to the Generic Environmental Impact Statement for *in situ leach* (“ISL”) uranium mining, NUREG-1910 (“GEIS”), for the proposed Lost Creek ISL project.

I. Introduction

On July 24, the U.S. Nuclear Regulatory Commission published a Notice of Intent to publish a Generic Environmental Impact Statement for Uranium Milling Facilities in the Federal Register. 72 Fed. Reg. 40,344 (July 24, 2007). The purported purpose of the GEIS is to assess the potential “generic” impacts of ISL milling in the “western United States” as well as the impacts of alternative methods of uranium recovery, including conventional milling. *Id.* at 40,444 – 40,345. The Draft GEIS was issued on July 28, 2008. *Notice of Availability of Draft*

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Reg. 43,795 (July 28, 2008). SRIC submitted comments on the scope of the GEIS (SRIC Scoping Comments, Nov. 30, 2007) and the Draft GEIS (SRIC Comments on Draft GEIS, Nov. 7, 2008), and incorporates those comments by reference herein. The NRC issued a notice of availability of a series of supplements to the GEIS, including the Lost Creek supplement, in December of 2009. *Notice of Availability of Draft Environmental Impact Statement for the Lost Creek In-Situ Recovery (ISR) Project in Sweetwater County, WY; Supplement to the Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities*, 74 Fed. Reg. 65,804 (Dec. 11, 2009). The following comments are intended to address both shortcomings in the Lost Creek supplement and the GEIS.¹

II. Alternatives Analysis is Inadequate

A. The Purpose and Need Statement Unreasonably Limits Alternatives Considered.

An agency's analysis of alternatives to a proposed project is at the heart of NEPA, and as such, the alternatives considered must be reasonable. An agency may not unreasonably limit the scope of alternatives considered, by unreasonably narrowing the agency's stated objective. The statement of purpose and need in the GEIS is so limiting that any subsequent statement of purpose and need in a supplemental EIS, in this case the Lost Creek supplement, will inevitably be too narrow to allow for consideration of a reasonable range of alternatives.

The GEIS's statement of purpose and need provides:

Commercial uranium recovery companies have approached NRC with plans to submit as many as 15 license applications for new uranium recovery facilities, as well as up to 9 applications for the restart or expansion of existing facilities in the next several years. The majority of these potential applications (perhaps 18 of the

¹ Additional comments on the GEIS are appropriate in this case because prior to its application to the Moore Ranch, Nichols Ranch, and Lost Creek projects, the GEIS was a purely theoretical and abstract document. The GEIS did not apply to any Federal plan or project and did not represent any final NRC regulatory or policy decision. The GEIS did not establish any specific rights or obligations and the NRC did not issue a record of decision on the GEIS. Thus, it was impossible for SRIC or any other member of the public to meaningfully comment on the GEIS in a concrete context.

24) would involve use of the ISL process. The companies have indicated that these new, restarted, and expanded ISL facilities would be located in Wyoming, South Dakota, Nebraska and New Mexico.

NRC is the regulatory authority responsible for issuing a source material license for ISL facilities in those four states. 10 CFR Part 51 regulations require evaluating the environmental impacts of the ISL facility as part of the licensing process. Recognizing that the technology for ISL uranium milling is relatively standardized, that the applications may be submitted over a relatively short period of time, and that the potential ISL facilities would be located in relatively discrete regions of the western United States, NRC decided to prepare a GEIS to avoid unnecessary duplicative efforts and to identify environmental issues of concern to focus on in site-specific environmental reviews. In this way, NRC could increase the efficiency and consistency in its site-specific environmental review of license applications for ISL facilities and so provide an option for applicants to use and licensees to continue to use the ISL process for uranium recovery.

.....

NRC has concluded that it is not appropriate to determine the purpose and need for a site-specific license application in the GEIS.

GEIS at 1-5, citations omitted.

While purporting to defer any determination for site-specific purposes and needs, the GEIS in reality frames the purpose and need for subsequent supplemental EISs. The GEIS frames its purpose and need in unreasonably narrow terms, limiting the alternatives that the NRC will consider in the context of its stated objective, i.e., licensing ISL uranium operations. The statement of purpose and need in the GEIS serves to narrow the alternatives the NRC will consider to either 1) granting an ISL operation license application as proposed or 2) no action. Indeed, the NRC Staff has interpreted the GEIS's statement of purpose and need in exactly these terms.² Moreover, in reality, limiting the purpose and need scope to these two alternatives, effectively means that only one alternative – licensing an ISL operation – is given serious consideration, since the NRC has **never** denied a materials license application in its institutional history.

² See, <http://www.nrc.gov/materials/uranium-recovery/geis/alternative-eval.html>, attached hereto as Attachment A.

As would be expected given the GEIS's narrow purpose and need scope, the NRC has defined the Lost Creek project purpose and need unreasonably narrowly. In the Lost Creek supplement, the NRC has defined the scope of the project's purpose and need as "to provide an option that allows for the applicant to use ISR technology to recover uranium and produce yellowcake slurry at the Lost Creek Project site." *Draft EIS for Lost Creek ISR Project*, NUREG 1910, Supp. 3 ("*SEIS*") § 1.3 at 1-1.

On its face, this statement of purpose and need unreasonably truncates the universe of alternatives the NRC can consider by forcing the federal action into three pigeonholes: 1) uranium recovery; 2) using ISL technology at 3) the Lost Creek site. In essence, the NRC is limiting the alternatives it will consider, as it did in the GEIS, to either licensing the proposed project or not licensing it. By limiting the scope of the major Federal action, the NRC has eliminated a range of reasonable alternatives that could - and should - be considered³. Such a truncated alternatives analysis violates both the letter and spirit of NEPA. The NRC should re-evaluate the alternatives analyses in both the GEIS and the Lost Creek SEIS.

The NRC's stated Purpose and Need, *SEIS* at xiii, lines 29-42 and §1.3, fails to satisfy the fundamental requirements of the National Environmental Policy Act. The Congressional purpose of the NEPA is, in pertinent part, "to promote efforts which will prevent or eliminate damage to the environment and biosphere...." 42 U.S.C. §4321. Instead, the NRC engages in a reductionist analysis of that responsibility, stating that its sole consideration and federal action is "to provide an option that allows the applicant to use the ISR technology to recover uranium and

³ If the NRC had articulated a reasonable and legitimate purpose and need, the range of alternatives considered would likewise have been reasonable. For example, if the NRC had articulated a purpose and need of extracting uranium as fuel for domestic and foreign nuclear power plants as a way to provide electricity, then it - and the public - could have analyzed alternatives such as using renewable resources to meet electricity demand, extracting uranium from more appropriate locations, or whether there was a market need for uranium extraction at all.

produce yellowcake slurry at the Lost Creek Project" and that the NRC's federal action is "the decision whether to issue the license to LCI." *SEIS* at xiii, lines 32-37; *see also* §1.3. Avoiding, from the outset in this SEIS, precisely the type of balancing that the NEPA is intended to force federal agencies to undertake, means that the SEIS is fundamentally flawed because the agency has not balanced the need for this project in this location against the potential impacts on the human and natural environment. 42 U.S.C. §4332(C). Thus, when the NRC considers alternatives, as NEPA requires, the initial defective purpose and need causes the agency to fail to consider any meaningful alternatives other than approval or rejection of the application. *SEIS* at xiv-xv.

B. The Alternatives Analysis Itself is Inadequate.

Notwithstanding the fact that the statement of purpose and need unreasonably limits which alternatives the NRC considered, the SEIS's alternatives analysis itself is inadequate. The NRC limited its alternatives analysis in the SEIS to three analyses: the proposed action, consisting of licensing ISL operations at the Lost Creek project (*SEIS* § 2.1.1 at 2-1 to 2-31); the nearly identical alternative of licensing ISL operations at Lost Creek to include yellowcake production facilities (*SEIS* § 2.1.3 at 2-31 to 2-32); and the "no action" alternative (*SEIS* § 2.1.2, at 2-31). The NRC eliminated from consideration the alternatives of conventional mining and milling, heap leaching, using alternative lixiviants and alternative methods of waste disposal. *SEIS* § 2.2 at 2-32.

While NEPA does not require the NRC to consider every possible alternative to the proposed action, it does require that the NRC consider all reasonable alternatives. The NRC fails to do this in its Lost Creek SEIS. For example, the NRC does not consider requiring an alternative site for the facility or extensive additional testing requirements that conclusively

demonstrate that the zone in which uranium will be mobilized for liquid extraction cannot infiltrate the crucial surface aquifer that is part of a very large surface aquifer system that provides drinking water and water for livestock. Similar considerations exist for the lack of characterization of surface water flows at the site.

Taking the latter first, there are surface water flow issues that the NRC SEIS dismisses, even though it is clear that surface water flow may be substantial. The access road building description indicates that there is surface water flow as "at least two culverts are anticipated: at the crossings of Battle Spring Draw and Stratton Draw." *SEIS* §2.1.1.2.3 at 2-8. This means that surface flow is significant enough to warrant culverts. In fact, although the draft SEIS describes these streams as "seasonal" and associated with snowmelt, it also indicates that they exist in "extreme rainfall events." *SEIS* §3.5.1.2 at 3-16. The project area is described as "containing numerous such ephemeral and meandering channels and washes." *Id.* There is also a "seasonal pond" called "Crooked Well Reservoir" that is located within the project area that provides "seasonal drinking water for local wildlife and livestock". There is also no gauging data for streams within the Lost Creek project area. *Id.* Yet, the NRC's SEIS ignores this issue and does not include an alternative that conditions licensing on substantial additional studies that will supply this absence of data and properly characterize the surface water flows within the Lost Creek project site.

Second, the proposed ISL project is situated near Battle Spring Draw, which drains to Battle Spring Flat, approximately 9 miles southwest of the site. *SEIS* §2.1.1.1 at 2-5 "The shallowest occurrence of groundwater within the project area is within the DE horizon, with the depth to water table varying from approximately 24 to 46 m (80 to 150 ft) below the ground surface." *SEIS* §3.5.2.1 at 3-19. A significant consideration is whether contaminated

groundwater will be contained or escapes into the aquifers that serve as "regional water supplies."⁴ With respect to interaquifer communication, the SEIS states:

[I]n some locations within the mining units these confining units are only 1.5 m (5 ft) thick. These areas of thinning in the overlying and underlying confining layers suggest that there may be some hydraulic connection between the production aquifer and the overlying and underlying aquifers. These concerns are supported by the results of the 2007 pumping tests. Minor responses in the overlying and underlying aquifer were observed during these tests. A number of potential causes for these responses have been suggested in addition to leakage across the confining layers, including potential impacts from off-site pumping, leakage through abandoned boreholes, or communication across the Fault. However, the cause of these responses observed in the overlying and underlying aquifers during the 2007 pumping test have not been clearly identified. Thus, there remain some concerns regarding the degree of confinement of the HJ production aquifer.

Id. (emphasis added). This finding alone, given the potential for permanently polluting an entire aquifer, should have caused the NRC to consider other alternatives to granting this application—such as changes in location or provision of significant and extensive additional studies and tests. That kind of caution is not found in the NRC's SEIS for this project.

III. The NRC Fails to Consider Impacts from and on Climate Change

The NRC determined that the combined effects of climate change and ISL mining would not be considered in the GEIS. GEIS at 1-15. The NRC adopted a similar position in the SEIS, choosing to turn a blind eye to the cumulative adverse impacts of the project and climate change because of what NRC characterized as “the imprecise state of the science” on climate change. SEIS at 5-13.

While the exact extent and timing of impacts of climate change may not be certain, many adverse impacts have already been documented and many more are reasonably certain to

⁴ "These uppermost aquifers serve as regional water supplies for drinking water and livestock...." §3.5.2.1 at 3-18. "The Lost Creek Site is directly underlain by the Battle Spring Formation, the upper part of the shallow Lower Tertiary aquifer system that extends to a depth of over 1,890 m (6,200 ft). The formation is interpreted to represent a major alluvial system." §3.5.2.2 at 3-18.

occur in the future as warming continues. *See, e.g., Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 FR 66,496 (December 15, 2009). Moreover, as the recent Council on Environmental Quality Memorandum, attached hereto as Attachment B demonstrates, even though the science on climate change is rapidly evolving, federal agencies have an obligation to consider both the greenhouse gas emissions a federal action will contribute to the atmosphere and the impacts a federal action will have on natural resources impacted by climate change. Sutley, Nancy, Chair, Council on Environmental Quality. Memorandum for Heads of Federal Departments and Agencies, *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions* at 1 (Feb. 18, 2010) (“Draft NEPA GHG Guidance”).

As the attached document, SRIC’s Attachment C, demonstrates, the effects of climate change on the region where the Lost Creek project is proposed can be anticipated. U.S. Global Change Research Program, *Global Climate Change Impacts in the United States, Regional Climate Impacts: Great Plains* at 123-128 (2009) (“Great Plains Report”); *see also* Draft NEPA GHG Guidance at 8. Attachment C clearly shows that depending on which region of Wyoming the Lost Creek project is located, climate change will affect the Lost Creek project’s impacts and these impacts should be analyzed. If the Lost Creek project is in a region of Wyoming that can expect less snowpack and spring runoff and disruption of precipitation patterns over the next decades, as is expected to occur throughout the West, the NRC should disclose this and evaluate whether potable water sources outside the ore zone should be sacrificed⁵ in exchange for

⁵ The SEIS discloses that the Lost Creek project has high quality groundwater near the site. SEIS at 3-29 (“Within an 8-km (5 mi) radius, the applicant has identified fifteen active domestic or stock wells”). Assuming the NRC does not allow Lost Creek ISR, LLC to (“LCI”) “restore” groundwater to alternative concentration limits, it will only be required to restore groundwater to average baseline conditions within the wellfield. Additionally, it is unlikely that LCI will be able to restore groundwater to

extracting the mineral resource. If the Lost Creek project is in a region of Wyoming that could expect more precipitation over the next decades, the NRC should disclose that fact and evaluate how increased soil saturation, flooding and aquifer recharge would cumulatively interact with the Lost Creek project's impacts. A "hard look" analysis of the impacts of climate change, combined with the impacts of the Lost Creek project is critical, given that water is the most important factor affecting activities in the Great Plains region. Great Plains Report at 124; Draft NEPA GHG Guidance at 6-7.

The SEIS also does not fully disclose the impacts the mining operation will have on greenhouse gas emissions. The SEIS mentions how many greenhouse gas emissions the Lost Creek project is expected to generate in comparison to emissions generated at coal mines. SEIS at 5-14. However, this is an incomplete inventory of the greenhouse gas emissions that will result from the Lost Creek project. Before the yellowcake slurry from the Lost Creek project can be used for fuel for a nuclear power plant, it must be converted to uranium hexafluoride, enriched and fabricated⁶. These are indispensable processes if the uranium from the Lost Creek project will be used for nuclear fuel. These steps are also exceedingly energy intensive and rely on energy from carbon generating sources. Estimates for the carbon emissions generated in the nuclear fuel cycle range from 33 grams CO₂/kWh to 120 grams CO₂/kWh, depending on uranium ore grade and other variables. Öko-Institut, *Comparison of Greenhouse Gas Emissions and Abatement Costs of Nuclear and Alternatives Energy Options from a Life-Cycle Perspective* at 4 (2006).⁷ Since the uranium produced at the Lost Creek project would have no utility

even those inflated standards, since no ISL operation has ever restored groundwater to pre-mining conditions. See, § IV.C., below.

⁶ World Nuclear Association, <http://www.world-nuclear.org/info/inf03.html>, last visited Feb. 23, 2101.

⁷ Available at http://www.oeko.de/publications/reports_studies/dok/659.php, last visited Feb. 23, 2010.

without being enriched or fabricated into fuel, the SEIS should have disclosed these carbon emissions and analyzed their impacts. Draft NEPA GHG Guidance at 2 (“it is appropriate for an agency to quantify and disclose its estimates of the expected annual direct and *indirect* GHG emissions in the environmental documentation for the proposed action.”) (emphasis added).

IV. The NRC’s Water Resources Impact Analyses are Based on Inaccurate and Misleading Data

A. The NRC Misrepresents the Impacts from Excursions.

In the Lost Creek SEIS, the NRC makes an unprecedented analysis of impacts from excursions. Until the Lost Creek project⁸, the ISL industry and the NRC have taken the position that ISL mining can only occur in confined aquifers. *See, e.g.*, GEIS at 2-1 (“Characteristics of Uranium Deposits that are Amenable to ISL Extraction ... Confining Layers: Hydrologic (formation) geometry must prevent uranium-bearing fluids (i.e., lixiviant) from vertically migrating... This isolates the uranium-producing horizon from overlying and underlying aquifers”); National Mining Association, Comments on ISL GEIS, § 1.B.1 at 5 (“Uranium deposits amenable to ISR uranium recovery occur in permeable sand or sandstones that are confined above and below by impermeable strata”), § 1.B.1 at 7 (“The confining strata assist ISR operators’ control of recovery solutions by limiting their movement to radial or lateral flow paths.”). The NRC’s new approach to analyzing impacts from ISL operations in an unconfined aquifer is insufficient in two significant ways.

First, the NRC’s analysis masks how the inevitable excursions from the Middle HJ aquifer will impact groundwater quality in the Upper and Lower HJ, the overlying FG aquifer and the underlying UKM Sand. Indeed, rather than meaningfully analyzing this problematic fact, the NRC simply states that the Upper and Lower HJ will be lumped together with the

⁸ A similar situation is presented at the Moore Ranch project. *See*, SRIC’s Moore Ranch comments at § IV.A.

Middle HJ production horizon and will be evaluated as a single aquifer. SEIS at 3-18 – 3-18. Moreover, the NRC further evades meaningful evaluation of the Lost Creek project’s groundwater impacts by dismissing the overlying FG aquifer’s and the underlying UKM Sand’s water quality as bad, even though this conclusion is based on average quality, and not well specific data inside and outside of mineralized areas. Thus, by fiat, the NRC evades evaluating the impacts on an underlying, good quality aquifer and the alternatives and mitigation measures that follow from such an analysis. This is clearly not the “hard look” NEPA requires.

Second, as with the NRC’s analysis of groundwater restoration⁹, the NRC’s analysis of excursions in the context of an ISL operation in an unconfined aquifer highlights the fact that the NRC has no coherent framework for regulating ISL operations. This lack of any coherent and comprehensive regulatory framework results, as it does in the Lost Creek SEIS, in an arbitrary *ad hoc* analysis, where the public is unable to rely on any objective, consistent standards by which to judge the NRC’s site-specific environmental analyses. This arbitrary *ad hoc* approach which confounds public participation in the NEPA process is not supported by NEPA or its implementing regulations. Moreover, the NRC did not disclose that its analysis of the Lost Creek project’s excursion impacts on the Upper and Lower HJ, the FG aquifer and the UKM Sand represents a significant policy and technical shift from prior environmental analyses. The NRC should withdraw the Lost Creek SEIS and the GEIS and re-issue each after it has promulgated regulations governing ISL operations.

B. The NRC Misrepresents Spill Impacts in the GEIS and SEIS.

In evaluating the Lost Creek project’s impacts on water resources, the NRC relies heavily on the survey of leaks and spills at ISL operations in the GEIS (§ 2.11.2) and the NRC Staff’s memorandum, *Staff Assessment of Groundwater Impacts from Previously Licensed In-Situ*

⁹ Specifically, see § IV.C.3, below.

Uranium Recovery Facilities, ML091770187 (July 10, 2009). However, both these documents are incomplete or inaccurate. Moreover, the NRC's characterization of the data in these documents as used in both the GEIS and the SEIS is misleading. As a result, neither the GEIS, nor the Lost Creek project supplement to the GEIS are based on accurate data and therefore neither is sufficient under NEPA.

The attached data from the Irigaray/Christensen Ranch ISL project show that over the project's operating history, there have been nearly 100 leaks and spills resulting in hundreds of thousands of gallons of contaminated water being dumped on the site. *See*, SRIC Attachment D. Even as recently as 2004, the Christensen Ranch project recorded a spill over 1000 gallons, and in 1999, it recorded a series of spills over three months totaling over 100,000 gallons. *Id.* at Table 1.2, # 81 and #63-68.

The spill history at the Irigaray/Christensen Ranch project is not an anomaly. In 1995, a surface estate owner in Texas sued ISL operator Uranium Resources, Inc. ("URI") for damages to his land from a series of spills at URI's Longoria Ranch project. A copy of the complaint in that law suit is attached hereto as Attachment E. There, the plaintiff alleged that URI's operations caused contamination of soils, ecosystems, ground and surface water due to spills and purposeful discharge of radioactive and hazardous contaminants. Attachment E at 3-5. The lawsuit subsequently settled.

The NRC, to a limited extent, acknowledges the disastrous record of spills and leaks at ISL operations. For example, in the GEIS the NRC noted that the Smith Ranch-Highland ISL operation, had more than 80 spills from 1988 to 2007. GEIS at 2-44. Some of these spills were as large as 198,500 gallons. *Id.* Indeed, the attached Wyoming Department of Environmental

Quality Notice of Violation report (Attachment F) notes that spills, leaks and excursions at Smith Ranch – Highland had become “routine”. Attachment F at p. 17.

However, rather than meaningfully evaluating the impacts of spills and leaks on water resources in the GEIS, the NRC simply makes sweeping pronouncements about the potential impacts, largely concluding that they will be small to moderate. *Id.* at 4.3-10 - 4.3-12. Moreover, the NRC concedes in the GEIS that a meaningful evaluation of impacts from spills and leaks is contingent on site-specific conditions. *See, e.g., Id.* at 4.3-12 (“Hence, potential environmental impacts due to spills and leaks from pipeline networks or failures of well integrity in shallow aquifers would be expected to be SMALL to MODERATE, depending on site-specific conditions.”).

Rather than conducting the requisite NEPA site-specific analysis of reasonably foreseeable impacts from spills and leaks at the Lost Creek project, the NRC simply states that site-specific conditions at the Lost Creek project are consistent with the description of the affected environment described in the GEIS and concludes that the impacts from spills and leaks on surface waters would be small. *SEIS* at 4-23 to 4-27. The GEIS describes the **regional**, not local, affected environment which encompasses parts of four counties within the so-called Wyoming West Milling Region. GEIS, Fig. 3.1-1 at 3.1-2. This general regional description of the affected environment is no substitute for a meaningful description and analysis of the Lost Creek project’s impacts on the local environment.

Additionally, this analysis disregards the close proximity of mining operations at Lost Creek to surface water flows. *SEIS* §3.5.1.2. As a result, the NRC evades any meaningful analysis of impacts on surfaces waters by promising site-specific analyses in the GEIS, and then,

when presented with the opportunity to engage in a site specific analysis in the Lost Creek *SEIS*, simply incorporates the GEIS's analysis.

The NRC reaches a similar conclusion with respect to the impacts from spills and leaks on groundwater. *SEIS* at 4-30 – 4-31. In contrast to the evaluation of impacts from spills and leaks on surface water, the NRC considers some site specific conditions in analyzing impacts from spills and leaks. *Id.* However, the NRC's conclusion that impacts to groundwater from leaks and spills at the Lost Creek project will be small is just as unjustified as its conclusion about impacts on surface water. Again, the NRC's conclusion that impacts on groundwater from leaks and spills will be small rests on the assumption that LCI will use effective mitigation measures. *SEIS* at 4-31 ("As indicated by the GEIS, any potential impact of releases at or near the ground surface on shallow groundwater can be greatly reduced by leak detection programs required by the NRC. The applicant plans a leak detection and spill cleanup program as outlined in section 5.7.8.3 (Storage Pond Leak Detection) and section 4.0 (Effluent Control Systems) of the TR (LCI, 2008). In addition, preventative measures such as well mechanical integrity testing would limit the likelihood of well integrity failure during operations".)

As with its conclusions about the impacts from spills and leaks on surface waters, the NRC's conclusions about groundwater impacts completely disregard the operational history of all other ISL operations that have the same or similar leak detection and well integrity programs as proposed for the Lost Creek project. The Smith Ranch-Highland project is illustrative. As Attachment F demonstrates, one of the largest and oldest uranium ISL projects in Wyoming was found to have a disastrous history of leaks, spills and excursions, in addition to disregarding permit requirements. Attachment F, Moxley, Mark, Report of Investigation, Power Resources, Inc. at § 3 (Nov. 21, 2007). This fundamental contradiction between actual operational data and

the NRC's conclusions about the magnitude of impacts in both the GEIS and the *SEIS* is contrary to NEPA.

C. The NRC Misrepresents the Impacts from Groundwater Restoration.

In both the GEIS and the Lost Creek SEIS, the NRC's conclusion that ground and surface water impacts will be small to moderate are premised on the assumptions that 1) groundwater restoration will be successful and that 2) groundwater contaminated with radioactive elements and heavy metals will be contained within the production zone during operations and after restoration. Available data demonstrate that none of these assumptions are reasonable.

As with its analyses of water impacts from spills and leaks, the NRC mischaracterizes ISL mining's groundwater restoration efficacy history and unreasonably minimizes the impacts of groundwater restoration at the Lost Creek project. NRC's failure to reasonably consider the impacts of groundwater restoration stems from two fundamental problems: (1) the NRC's practice of averaging poor groundwater quality with good groundwater quality to characterize pre-mining groundwater quality, and (2) the failure to acknowledge that no ISL operation has ever been able to restore groundwater to pre-mining conditions.

1. *Groundwater Restoration Impact Analyses are Based on Averaging Poor Quality Groundwater with Good Quality Groundwater.*

Instead of considering restoration based on actual pre-mining groundwater quality, the NRC ties restoration, in the GEIS and SEIS, to the **average** of poor groundwater in the immediate ore zone with good groundwater quality outside the ore zone but within a mine area. The description of the affected environment in the *SEIS* reflects this bias toward inflating pre-mining contamination levels. Table 3-2 purports to show the groundwater quality in the aquifers underlying the Lost Creek project site. *SEIS* at 3-24 to 3-25; *see also* 3-22 to 3-26 for use of "averaging" to characterize the all the wells as not meeting EPA drinking water standards. This

table leaves the impression that all the groundwater in the aquifers within the proposed mine boundaries exceed EPA and Wyoming water quality standards for several constituents, but the elsewhere in the *SEIS*, the NRC discloses that nearby the mine area there are wells with good quality water. *Id.* at 3-29 (some wells within a 5 mile radius are "active **domestic** or stock wells" including four stock wells "within a 3.2 km [2-mi] radius.") (emphasis added). Moreover, as Figure 3.9 on page 3-23 illustrates, the wells from which water quality samples were taken are clustered closely together, most likely in the middle of the ore zone where the worst quality water is located, further skewing the baseline groundwater quality data. Because of the NRC's practice of averaging good groundwater quality with poor groundwater quality, these results are incomplete and misleading.

Moreover, average groundwater concentrations are virtually meaningless, especially if the sample locations, date of sampling and individual constituent concentrations are not disclosed or unknown. Therefore, instead of disclosing the average constituent concentrations in a particular aquifer, the *SEIS* should disclose all the groundwater sampling data, including the sample locations, date of sampling, and constituent concentrations. The written lab reports should also be included as part of the record. If those data are not available, the *SEIS* should disclose that fact.

Further, the practice of averaging good and poor groundwater quality misleads the public. It skews the impact analysis toward minimizing the groundwater impacts of ISL mining in general and the Lost Creek project in particular. In contrast, if groundwater quality within an ore zone and outside an ore zone (which has better pre-mining water quality) is analyzed separately and not averaged, the adverse impacts on groundwater outside the ore zone would be substantially larger. By averaging the pre-mining water quality outside and inside the ore zone,

the NRC is hiding the real groundwater impacts an ISL operation may have. Neither NEPA nor its implementing regulations contemplate such a result.

2. *The NRC Fails to Disclose that No ISL Operation has Ever Restored Groundwater to Pre-mining Conditions.*

Even though the NRC uses a mathematical artifice that inflates the pre-mining contaminant levels within a project's boundaries to leave the impression that pre-mining groundwater quality is poor and that restoration is possible, the NRC fails to disclose that no ISL operation in the United States has **ever** restored groundwater to pre-mining conditions. The GEIS's brief discussion of ISL restoration history implies that while restoration may be difficult at times, there have been some successful restoration projects. GEIS at 2-51. The GEIS's discussion of the impacts of groundwater restoration is similarly conclusory and misleading. The GEIS's analysis of groundwater impacts from restoration is largely limited to an ISL operation's effects on groundwater quantity, not quality. *Id.* at 4.3-17 – 4.3-19. The GEIS's discussion of potential groundwater quality impacts in the "Wyoming West Milling Region" is limited to a single paragraph and does not mention the invariable failure of ISL operations to restore groundwater to pre-mining conditions. *Id.* at 4.2-27 – 4.2 - 28.

The SEIS's analysis of groundwater impacts from restoration is also insufficient. The SEIS relies entirely on the GEIS's framework for analyzing groundwater quality impacts. The NRC's site-specific analysis of groundwater impacts at the Lost Creek project is therefore limited to consumptive impacts, i.e., water quantity. In the two pages of analysis that the SEIS devotes to groundwater impacts from restoration, there is no discussion of the fact that, historically, groundwater restoration at ISL projects has been unsuccessful. Indeed, the SEIS merely incorporates the analysis presented in the GEIS and concludes that groundwater restoration impacts will be small. SEIS at 4-35.

Neither the GEIS nor the SEIS reflect the actual groundwater restoration history of ISL mines. The United States Geological Survey (“USGS”) recently published a survey of restoration efforts in Texas¹⁰. Hall, Susan, *Groundwater Restoration at Uranium In-Situ Recovery Mines, South Texas Coastal Plain*. U.S. Geological Survey Open-File Report 2009-1143 (2009). That report is attached hereto as Attachment G. That report concludes that based on restoration efforts in Texas - the state with the longest history of ISL mining and with the most comprehensive database of restoration information - no ISL uranium mine has ever restored groundwater to pre-mining conditions, even if one considers the inflated pre-mining average contaminant levels as a legitimate representation of baseline. Attachment G at 21. These findings are consistent with the NRC’s own data which also demonstrate that ISL operation restoration efforts that are considered “successful” actually do not restore groundwater to pre-mining conditions. *Consideration of Geochemical Issues in Groundwater Restoration in Uranium In-Situ Leach Mining Facilities*, NUREG CR-6870 (Jan. 2007) at p.19, Table 3; p. 20, Table 4; p. 21, Table 5; p. 22, Table 6. Moreover, the same NRC report determines that after “restoration” has been deemed complete, contaminant levels may actually rise and migrate due to geochemical conditions. *Id.* at 17, 22, 23. Because the data show that, to date, restoring groundwater to pre-mining conditions has been unachievable, the NRC’s conclusion that impacts to groundwater from groundwater restoration will be small is arbitrary and unreasonable. The NRC should fully disclose the ISL industry’s groundwater restoration history and reconsider the impacts to groundwater, both regionally and locally, based on that history.

¹⁰ While Texas is an agreement state and the NRC therefore does not have direct regulatory authority over ISL mines in that state, the regulatory framework in Texas is substantially the same and the NRC’s, the NRC has oversight authority over the Texas regulatory system, and the technology used to “restore” groundwater is identical to the technology that will be used for the Moore Ranch project.

3. *The NRC's Groundwater Restoration Impacts Analysis Contradicts NRC Regulations.*

Finally, the NRC appears to evaluate groundwater restoration impacts assuming that if baseline groundwater quality is not achieved, “class of use” quality would be achievable. GEIS at 2-48. However, this analysis ignores that the NRC regulations governing ISL groundwater restoration make no mention of “class of use” as a restoration standard, and mandates that groundwater must be restored to background or the maximum contamination levels listed in Criterion 5D. 10 C.F.R., Part 40, Appendix A, Criterion 5B; *see also, In the Matter of Hydro Resources, Inc.*, CLI-99-22, 50 NRC 3, 8-9 (1999). Indeed, even the NRC Staff recognizes that “class of use” is an inappropriate restoration goal. In 2009, the Staff issued a Regulatory Issue Summary (“RIS”) where it concluded that Criterion 5B did not provide for restoration to “class of use” standards. RIS 2009-05 at 3-4 (April 29, 2009). Specifically the Staff wrote:

[T]he requirements in Criterion 5B of Appendix A apply to restoration of groundwater at uranium ISR facilities. The staff recognizes that NUREG-1569, “Standard Review Plan for In Situ Leach Uranium Extraction License Applications,” provides guidance that is not consistent with the requirements in Criterion 5B of Appendix A discussed above. In particular, the NUREG-1569 discussion of groundwater restoration to “pre-operational class of use” as being a secondary standard is not accurate, **and is not an appropriate standard to use in evaluating license applications**. Criterion 5B contains the appropriate standards that will be applied to groundwater restoration at ISR facilities.

Id. at 3 (emphasis added).

Moreover, the “class of use” restoration standard in the GEIS and *SEIS* illustrates a fundamental problem with the NRC’s regulatory framework. As noted in SRIC’s comments on the draft GEIS, and incorporated by reference herein, one of the significant problems with issuing the GEIS is that it would become a proxy for ISL regulations. SRIC et. al., Comments on Draft GEIS, §III at 3-6 (Nov. 7, 2008). The NRC does not have regulations specifically relevant to ISL operations; instead, the NRC has adapted some of the conventional milling regulations to

apply to ISL operations and have filled in the remaining gaps with license conditions, the ISL Standard Review Plan, and the GEIS. The way the NRC has used the GEIS and the *SEIS* in the Lost Creek project context simply confirms this *ad hoc* approach to ISL regulation. Thus, because “class of use” is a restoration standard that is not legally cognizable, it should not be the basis for an analysis of groundwater impacts.

V. The NRC Failed to Conduct Public Scoping for the *SEIS*

In preparing the GEIS, the NRC held a series of public scoping meetings to determine what issues should be addressed in the GEIS. *See*, 72 Fed. Reg. 40,344 (July 24, 2007).

Although many public comments urged the NRC to consider the impacts of previous uranium mining and milling, it deemed impacts from past uranium mining and milling to be outside the GEIS’s scope. GEIS at 1-15.

In the *SEIS*, the NRC adopted the GEIS’s scope, i.e., it would not disclose or analyze the impacts from past uranium mining and milling. *SEIS* at 1-5. However, unlike the GEIS, the NRC did not conduct **any** public meetings regarding the *SEIS*’s scope. Instead, the NRC met with government agencies and groups it considered “interested” in the *SEIS* and apparently determined the scope based on those meetings. *Id.*, § 1.4.2 at 1-5. As a result, the *SEIS* fails to consider an entire class of impacts, i.e., the cumulative impacts of past uranium mining and milling combined with the current project, based on an exclusionary process. The failure to conduct scoping on the *SEIS* also prevents the public from raising issues in addition to the cumulative impacts of past uranium mining and milling that should have been considered in the *SEIS*. Moreover, the NRC’s failure to conduct public scoping meetings in and of itself constitutes a violation of NEPA. The NRC must therefore scrap the current *SEIS*, conduct public scoping meetings, and issue another draft *SEIS* for public comment.

VI. Cumulative Impacts Analysis is Inadequate

Finally, both the GEIS's and the *SEIS*'s cumulative impacts analyses are grossly inadequate. The Council on Environmental Quality ("CEQ") regulations provide:

Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

40 C.F.R. § 1508.7. The NRC fails to consider cumulative impacts in either the GEIS or the *SEIS* in a number of respects.

Although the GEIS is the most appropriate document in which to consider the regional cumulative impacts of ISL mining, it fails entirely to analyze the cumulative impacts from proposed ISL projects. GEIS at 5-1 ("Due to the complex and site-specific nature of a cumulative impact assessment, this chapter provides useful information for understanding the potential for cumulative impacts when licensing future ISL facilities in the milling regions, but does not make any conclusions regarding cumulative impacts that could be applied to specific sites"). Instead, the NRC defers cumulative impact consideration for site specific *SEIS*s. *Id.* Thus, by its own terms, the GEIS does not take the "hard look" at cumulative environmental impacts required by NEPA. However, as with the statement of purpose and need, the purported site-specific analysis relies heavily on information in the GEIS as its basis. The NRC thereby evades any meaningful cumulative impacts analysis altogether.

Because it relies substantially on information provided in the GEIS, the cumulative impacts analysis in the *SEIS* is inadequate. Rather than meaningfully evaluating cumulative impacts, the *SEIS* instead simply lists other Federal projects (incorporated from the GEIS) for which environmental impact statements have been or are proposed to be generated and included

a seemingly boilerplate and conclusory statement that those projects “may” cause cumulative impacts. *See, e.g., SEIS* at 5-1 (“there are several ISR and conventional uranium projects in the decommissioning and pre-licensing stages, as well as oil and gas operations that could contribute to the cumulative effects in the area”); § 5.1.1 at 5-1 (“There are various oil and gas, uranium, and other natural resource extraction and exploration that have been ongoing, and that are planned for future operation within the Great Divide Basin. The Lost Soldier Wertz oil fields are located proximate to the projected area, and have been a significant source of exploratory drilling and oil extraction. These, along with other uses such as rangeland and recreational activities contribute to the overall cumulative impacts seen in the area.”); § 5.1.1.2 at 5-3 (“The total coal projected from the Carbon Basin Coal Lease is 31.1 million tons for the surface operations and 112 million tons for the underground operation”--this surface "disturbance" will involve 4, 896 acres--and there are other coal operations as well). Such laundry lists are insufficient to analyze the cumulative impacts and, therefore, do not comply with the requirements of the NEPA at 42 U.S.C. §4332(C).

The NRC should have presented a detailed analysis that would have informed agency decision-making and public input, instead of offering a completely conclusory list of projects that may have cumulative impacts. For example, the NRC should have disclosed what contaminants are released by coal bed methane operations, such as pit wastes, hydrological fracturing fluids, TENORM, and produced water and into which aquifers and surface waters those contaminants are likely released. The NRC should have then analyzed how the significantly elevated levels of uranium, radium and other pollutants that will be released from the ore zone and circulated through the aquifer at the Lost Creek project incrementally impact ground and surface water quality locally and regionally combined with contaminants from

coalbed methane production.

A similar analysis of incremental impacts on important resources such as ground and surface water, air and ecosystems should have been conducted for all the other industrial projects in the area, including oil and gas development when combined with contamination from the Lost Creek project. As demonstrated in SRIC's Attachments H, I, and J, significant chemical contaminants are associated with oil and gas production, from the chemicals in drilling and hydrological fracturing fluids to the waste that goes into pits. As noted in Attachments H, I, and J, these chemicals have known adverse health effects, including carcinogenic and mutagenic properties, endocrine disrupting effects, and acute toxic effects. Instead of analyzing the cumulative impacts of the Lost Creek project combined with nearby oil and gas operations, for example, the *SEIS* merely states that the Rawlins Resource Management Plan EIS evaluates groundwater impacts and anticipates impacts on consumptive use and degradation of groundwater quality. *SEIS* at 5-12. The NRC provides no independent analysis of impacts or even any evaluation of the Rawlins EIS's finding.

The *SEIS* also fails entirely to evaluate either the cumulative impacts from non-Federal projects combined with the Lost Creek project. The *SEIS* acknowledges that some rangeland in the area is privately owned and used for livestock grazing. *SEIS* §5.2 at 5-8. However, the *SEIS* fails to evaluate how the impacts from livestock grazing, such as erosion and surface water contamination might interact with the surface water impacts from the Lost Creek project.

Finally, neither the *SEIS* nor the GEIS adequately evaluates the cumulative impacts of the Lost Creek project combined with contamination from past uranium mining and milling. Indeed, in the GEIS, the NRC determined that contamination from past uranium mining and milling was beyond the GEIS's scope. GEIS § 1.5.4 at 1-14. The GEIS further provides, "[e]valuating the

potential impacts from past mining activities on new ISL proposals is a site-specific analysis that, if applicable to a proposed site, would be evaluated by applicants during the site characterization and by the NRC staff when a site-specific licensing review is conducted.” *Id.*, § 5.2.1 at 5-3. Although the GEIS does not provide any analysis of cumulative impacts from past uranium mining or milling, it does outline a protocol for determining whether these cumulative impacts should be considered in a site-specific evaluation. *Id.* at 5-2 and Appendix F. The GEIS’s decision-making framework effectively pre-determines to what extent cumulative impacts will be analyzed in a site-specific context. *Id.* at 5-27. In the GEIS, the NRC states that it anticipates that most site-specific cumulative impact analyses will only require a Level 1 or Level 2 evaluation. *Id.* In other words, while evading any meaningful discussion of cumulative impacts in GEIS, the nevertheless NRC manages to restrict any future site-specific evaluations to the most superficial of analyses. This was clearly not Congress’s intent in enacting NEPA.

This proactive restriction of cumulative impacts analysis is illustrated by the treatment of cumulative impacts from past uranium mining and milling in the Lost Creek *SEIS*. The NRC’s *SEIS* merely provides a list of the past, current and reasonably foreseeable uranium recovery projects in the region. *SEIS*, Table 5-1 at 5-2 - 5-3. This Table is obviously adapted from Table 5.2-1 in the GEIS. GEIS at 5-4 – 5-7. As in the GEIS, the *SEIS* provides no quantification or analysis of the cumulative impacts of the past, present and reasonably foreseeable uranium exploitation projects combined with the Lost Creek project. Cumulative impacts analysis could reveal significant environmental and public health threats.

The *SEIS* discloses that there are 15 past, present or reasonably foreseeable uranium extraction projects in the “area” around the proposed Lost Creek project. *SEIS* at 5-2. However, the *SEIS* fails entirely to disclose, quantify or evaluate how contamination from past mining or

milling sites may impact resources, particularly groundwater resources, when combined with the proposed Lost Creek project. Nor does the *SEIS* disclose how close other past, present and future uranium extraction projects are to the Lost Creek project, whether those projects are up or down gradient from Lost Creek or whether they are up or downstream. Consequently, there is no quantification or evaluation of impacts on air, water or public health associated with the incremental, cumulative or synergistic impacts from the Lost Creek project.

Without disclosing, quantifying and analyzing how those impacts, combined with the impacts from the Lost Creek Project, affect the environment and public health, the NRC cannot make a fully informed decision and the public cannot have meaningful input into the decision-making process. The NRC must consider the full range of cumulative impacts in accordance with NEPA. Therefore, the NRC should re-issue the GEIS - which is the more appropriate document for analyzing cumulative impacts - for public comment on its cumulative impacts analysis.

VII. Conclusion

The above comments demonstrate that both the GEIS and the Lost Creek *SEIS* are inadequate pursuant to NEPA, the NRC's regulations implementing NEPA, and the Council on Environmental Quality regulations implementing NEPA. The NRC must withdraw the Lost Creek *SEIS*, begin a meaningful scoping process for the Lost Creek environmental impact statement, and re-issue the *SEIS* for public comment. Further, the NRC should not rely on the GEIS for any aspect of site-specific analysis.

Thank you for the opportunity to comment on the Lost Creek *SEIS* and please do not hesitate to contact me if you have any questions or concerns.

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