

**Mendiola, Doris**

**To:** Lombard, Cori  
**Subject:** RE: Docket ID Nos. NRC-2008-0391, NRC-2009-0364, and NRC-2008-0339,

**From:** Lombard, Cori [mailto:clombard@nrdc.org]  
**Sent:** Wednesday, March 03, 2010 8:54 PM  
**To:** MooreRanchISRSEIS Resource; LostCreekISRSEIS Resource; NicholsRanchISRSEIS Resource  
**Cc:** Fettus, Geoffrey  
**Subject:** Docket ID Nos. NRC-2008-0391, NRC-2009-0364, and NRC-2008-0339,

To Whom It May Concern:

Please find attached "Comments on Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities (NUREG-1910), Docket ID NRC-2008-0420; Lost Creek SEIS, NUREG-1910 Supplement 3, Docket ID NRC-2008-0391; Moore Ranch SEIS, NUREG-1910, Supplement 1, Docket ID NRC 2009-0364; Nichols Ranch SEIS, NUREG-1910, Supplement 2, Docket ID NRC 2008-0339. "

Please do not hesitate to contact me via the email or telephone number below if you have any difficulty downloading the adobe file. A hard copy follows by regular mail.

Thank you,

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F-RDS = ADM-03  
Call = A. Bjornsen (abb5)  
J. Park (JRP)  
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B. Shroff (bps2)



March 3, 2010

Michael Lesar  
Chief, Rulemaking and Directives Branch  
U.S. Nuclear Regulatory Commission  
Mail Stop TWB-05-B01  
Washington, DC 20555-0001

RE: Comments on Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities (NUREG-1910), Docket ID NRC-2008-0420; Lost Creek SEIS, NUREG-1910 Supplement 3, Docket ID NRC-2008-0391; Moore Ranch SEIS, NUREG-1910, Supplement 1, Docket ID NRC 2009-0364; Nichols Ranch SEIS, NUREG-1910, Supplement 2, Docket ID NRC 2008-0339.

Dear Mr. Lesar:

The Natural Resources Defense Council (“NRDC”) writes today to comment on four documents issued by the Nuclear Regulatory Commission (“NRC”). Those four documents are the NRC’s (1) Environmental Impact Statement for the Lost Creek ISR Project in Sweetwater County, Wyoming Supplement to the GEIS for In-Situ Leach Uranium Milling Facilities Draft Report for Comment; (2) Environmental Impact Statement for the Moore Ranch ISR Project in Campbell County, Wyoming Supplement to the GEIS for In-Situ Leach Uranium Milling Facilities Draft Report for Comment; (3) Environmental Impact Statement for the Nichols Ranch ISR Project in Campbell and Johnson Counties, Wyoming Supplement to the GEIS for In-Situ Leach Uranium Milling Facilities Draft Report for Comment; and (4) Final Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities (hereinafter “SEIS” and “Final GEIS”).<sup>1</sup>

Respectfully, NRDC urges the NRC to withdraw the draft SEIS and the Final GEIS as all four documents fail to meet the requirements of the National Environmental Policy Act (“NEPA”) 42 U.S.C. § 4321 *et seq.* The comments which NRDC filed throughout the development of the Final GEIS are of continuing relevance – as most of those comments have

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<sup>1</sup> 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 FR 65804 (Dec. 11, 2009); Notice of Availability of Draft Environmental Impact Statement for the Moore Ranch In-Situ Recovery Project in Campbell County, WY; Supplement to the Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities, 74 FR 65806 (Dec. 11, 2009); Notice of Availability of Draft Environmental Impact Statement for the Nichols Ranch In-Situ Recovery (ISR) Project in Campbell and Johnson Counties, WY; Supplement to the Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities, 74 Fed. Reg. 65,808 (Dec. 11, 2009); Generic Environmental Impact Statement for In-Situ Leach Uranium Mining Facilities, 73 Fed. Reg. 43,795 (July 28, 2008).

yet to be addressed – and are incorporated by reference here. See, NRDC Scoping Comments, Nov. 30, 2007 and NRDC Comments on Draft GEIS, Nov. 7, 2008.

## **I. Summary of Comments**

We comment today on three entirely new site specific documents for proposed In-Situ Leach (ISL) uranium mines in Wyoming. These SEIS were “tiered” off of a larger effort by the NRC, the Final GEIS, published in the summer of 2009. As these are the first documents noticed in the Federal Register that are tiered off the Final GEIS, this is the public’s first opportunity to comment on the insufficiency of the Final GEIS as well (as well the first opportunity to offer comment on the SEIS).

The documents are legally deficient in four distinct areas. First, the NRC has violated NEPA because it has failed to respond to comments. NRDC, and many others (included several federal agencies) commented extensively throughout the NRC’s GEIS NEPA process and except for a small number of generally less important matters, nearly none of the public’s comments or the comments of the NRC’s federal brethren were addressed in a meaningful fashion in the Final GEIS. Moreover, to the extent the site specific documents were to have provided answers to many issues not addressed in the Final GEIS, the NRC has failed on that front as well. Second, with all four documents the NRC violates NEPA’s fundamental “hard look” provision as the agency’s analysis of environmental impacts of ISL uranium mining are entirely lacking. Third, the draft SEIS are inadequate as they fail to evaluate an adequate range of alternatives. And finally, though all three proposed mining sites are in areas of prolific historical and ongoing mining, NRC does not analyze the impacts these past, present, and future operations will have in combination with the proposed projects and thus fails NEPA’s requirement to assess the cumulative environmental impacts of the proposed major federal actions. In short, the Final GEIS and SEIS fail to meet the requirements of NEPA and should be withdrawn.

## **II. NRDC Statement of Interest**

NRDC is a national non-profit membership environmental organization with offices in Washington, DC, New York City, San Francisco, Chicago, Los Angeles and Beijing. NRDC has a nationwide membership of over one million combined members and activists. NRDC’s activities include maintaining and enhancing environmental quality and monitoring federal agency actions to ensure that federal statutes enacted to protect human health and the environment are fully and properly implemented. Since its inception in 1970, NRDC has sought to improve the environmental, health, and safety conditions at nuclear facilities operated by DOE and the civil nuclear facilities licensed by the NRC and their predecessor agencies.

## **III. Background on the Environmental Impacts of Uranium Recovery**

NRDC wrote an extensive background on the history of uranium mining in its initial comments on the commencement of this NEPA process. See, NRDC Scoping Comments, Nov. 30, 2007. As noted, we incorporate those comments here and remind the NRC that uranium mining’s dreadful environmental history is likely to repeat itself without meaningful oversight,

vigorous compliance with the requirements of NEPA and adherence to strict environmental protections. Unfortunately, the NRC is seemingly on a path that will doom us to repeat this sad chapter of American history.

As the NRC is well aware, the ISL uranium mining process does not represent an environmentally benign substitute for past methods of uranium recovery. Indeed, the NRC itself admits that no single uranium ISL mining operation has ever – not even once – restored an aquifer to pre-mining water quality once that aquifer has been mined for uranium, though this fact is glossed over in the GEIS or SEIS.<sup>2</sup>

Solution mining involves drilling and operating hundreds of injection and production wells at each mining site. Usually several hundred injection and production wells are installed at any one mining site. Mining the aquifer to recover uranium in this fashion changes the chemistry of the groundwater: concentrations of uranium in the groundwater are increased up to 100,000 times. Levels of other naturally occurring radioactive elements and heavy metals are increased similarly, making the groundwater in the mining zone unsafe for human consumption or for use in any agricultural setting.

While ISL mining operations are site-specific in both their design and the particular nature of the environmental harms inflicted, there is a consistent set of recurring problems with uranium solution mines in the disparate geological areas across the United States (and, indeed, in other countries as well). And unfortunately, the Final GEIS and the SEIS give short attention to these matters, simply state that there will be requirements that prevent such harms, and pay no attention to the long history of evidence that such harms do, in fact, occur at ISL sites. A short listing the harms the NRC fails to analyze in accordance with the law include:

- Mining solutions escape the mining areas during operations by flowing rapidly through the thin and narrow channels in an aquifer that has been inadequately characterized;
- Monitor wells intended to detect such “excursions” are often spaced too far apart;
- High levels of uranium and other contaminants in the mining solutions are not diluted by uncontaminated groundwater outside of the mining areas, should an excursion occur;
- All too often, mine sites are too close to historical, currently operating, or potential human or agricultural water wells;
- Restoration to pre-mining, “baseline” conditions has not been achieved at any commercial-scale ISL mine;
- Restoration that has been approved was done so only after the relevant regulatory agency relaxed the cleanup standards for uranium and other contaminants;
- Regulatory agencies regularly fail to require that these uranium mining companies post adequate financial assurance to address remediation of polluted groundwater;

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<sup>2</sup> In the attached 2009 memorandum to Commissioners, NRC Staff acknowledged that of eleven wellfield restorations at three facilities, “All of the restorations had levels of one or more parameters above baseline levels.” Memorandum for Chairman Jaczko, Commissioner Klein, and Commissioner Svinicki, Staff Assessment of Groundwater Impacts from Previously Licensed In-Situ Uranium Recovery Facilities (Jul. 10, 2009). NRDC also cited previous NRC acknowledgements of this fact in our scoping comments. See, NRDC Scoping Comments, Nov. 30, 2007 at 4.

- Biomedical studies have shown that uranium is toxic to the human kidney at levels lower than the national drinking water standard and much lower than in the mining solutions;
- Restoration and decommissioning plans have not been required;
- Radioactive radon gas released from injection well valves and tanks in the associated processing plants often exceed federal limits and can add to the unhealthy levels of radon in areas where abandoned uranium mines have not been cleaned up;

At a time when many in the nuclear industry allege that our nation is about to embark on a new round of reactor construction – with an associated spate of uranium recovery – it is incumbent upon the NRC and other relevant agencies to comprehensively address the environmental risks inherent in any expansion of the domestic uranium mining and milling industry, in order to ensure that the licensing process going forward contains sufficient protections that will prevent the recurrence of previous harms to the environment and public health. Thus far, the agency has failed at this important task.

#### **IV. The Final GEIS and SEIS Fail to Comply with the Requirements of NEPA.**

NEPA is the cornerstone of environmental laws. It was enacted to ensure informed decision making by the government and public involvement in major federal actions that will have a significant impact on the environment. NEPA requires government actors to address the concerns of the public; take a hard look at environmental impacts; explore a reasonable range of alternatives to the proposed action; and analyze the cumulative impacts of the proposed action. In the Final GEIS and subsequent SEIS, NRC has failed to comply with these requirements.

##### **A. NRC Violated NEPA by Failing to Adequately Address Legitimate Commenter Concerns.**

In its Final GEIS, NRC provides little more than a cursory response to NRDC's comments and those of many others. Indeed, the Final GEIS is largely unchanged from the draft despite searching questions from several members of the public and federal agencies, including the Bureau of Land Management ("BLM") and the Environmental Protection Agency ("EPA"). Under NEPA, agencies must respond to comments submitted by the public or cooperating agencies:

An agency preparing a final environmental impact statement shall assess and consider comments both individually and collectively, and shall respond by one or more of the means listed below, stating its response in the final statement. Possible responses are to:

1. Modify alternatives including the proposed action.
2. Develop and evaluate alternatives not previously given serious consideration by the agency.
3. Supplement, improve, or modify its analyses.
4. Make factual corrections.
5. Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if

appropriate, indicate those circumstances which would trigger agency reappraisal or further response.

40 C.F.R. § 1503.4(a).

Importantly, while agencies must attach comments considered “substantive” to the EIS (40 C.F.R. § 1503.4(b)), a comment need not be substantive to trigger the agency’s response requirement. BLM and EPA submitted approximately 77 comments, only 16 of which resulted in changes to the GEIS. Even when changes were made, they were not substantive and were often labeled as “clarifications.” NRDC submitted 91 comments, 29 of which were addressed in the GEIS, again many only in the form of “clarification.” In several instances, NRDC requested specific data for the purposes of better understanding the ISL process and was rebuffed. In a report that can be measured in inches, the Final GEIS gained only 18 pages from the draft version. This minimal response does not fulfill NRC’s responsibility under NEPA.

While we presume EPA will be commenting today on these documents, EPA’s prior comments mirror several of NRDC’s concerns about the adequacy of the GEIS. As an overarching measure of merit, EPA rated the Draft GEIS as “EC-2”, meaning EPA identified environmental impacts that should be avoided and may require corrective measures. See, EPA Comments on Draft GEIS, Nov. 6, 2008, at 6. According to EPA, the draft does not contain sufficient information to fully assess environmental impacts that should be avoided. Such paucity of information – a conclusion with which we concur – is a serious flaw and directly conflicts with the requirements of NEPA. EPA asked that the identified additional information, data, analysis, or discussion be included in the Final GEIS. Neither the Final GEIS nor the subsequent SEIS answer EPA’s request.

There are numerous examples in the Final GEIS and its progeny where a question was either not answered or simply received a minimal acknowledgement. As one example that directs a reader to a lack of data and paucity of searching analysis, one commenter suggested the GEIS “assess advantages and disadvantages of the various aspects of ISL projects and perhaps require the best (e.g. safest) methods for milling be used by applicants.” Final GEIS at G-138. Though the commenter was clearly searching for at least a minimal analysis of historical ISL practices and where environmental harms have been minimized, NRC flatly refused to provide any data and indeed, any detailed explanation whatsoever. The agency made no changes to the Final GEIS and stated, “NRC does not prescribe facility designs or technologies.” *Id.* While we do not expect NRC to prescribe industry’s design, we do expect the regulator to have an awareness of past industry practices and an informed opinion on ISL practices that have engendered more or less environmental harm. Such an answer as was given here demonstrates a departure from the duties of a safety and environmental regulator.

There are examples where the agency simply supplied a bit more data but no searching analysis. Here, commenters, including NRDC and BLM, requested more information on site conditions like site-specific hydrological and geochemical characteristics that could complicate aquifer restoration, commenting that if the “reported

values applied to post restoration, then an explanation was needed for the constituents that are elevated from baseline.” Final GEIS at G5.14.6.6 comment 5. In response, NRC updated Table 2.11-4. See, Final GEIS at 2-48. The revised table contains the requested pre and post restoration numbers. However, the NRC provided no explanation, made no changes to the text, and failed to direct the reader to any additional information.

Readers of the Draft GEIS posed a host of questions regarding the well-established NEPA subjects of alternatives and cumulative impacts. See e.g., NRDC Comments on Draft GEIS at 22-28. Unfortunately, alternatives and cumulative impacts were not addressed at all in the GEIS. Final GEIS at G-262 and G-263; Final GEIS G-137 to G-139. Rather NRC stated they would be analyzed under site specific reviews. As further detailed below, the minimal analysis of alternatives and cumulative impacts conducted in the SEIS demonstrates that the topic should have been first addressed in a comprehensive fashion in the GEIS. Likewise, the agency’s treatment of questions regarding Alternative Concentration Limits (ACLs) fails the requirements of NEPA. In response to an EPA comment questioning NRC’s conclusion that “potential impacts to the water quality of the uranium-bearing aquifer as a result of ISL operations would be SMALL and temporary given that the aquifer could be restored to higher than baseline (e.g. ACL),” NRC stated that a licensee, “may be able to return water quality to preoperational class of water use.” Final GEIS at G-184. The agency’s failure to address EPA’s substantive concern illustrates the obvious necessity for a thorough analysis of the role of ACLs in aquifer restoration. See, *infra* IV(B)(2).

The NRC’s Response to Comments in the Final GEIS are, in great measure, conclusory and non-responsive answers to commenter questions. Such action fails the basic requirement of NEPA and do not satisfy the agency’s duty to “supplement, improve, or modify its analyses.” 40 C.F.R. § 1503.4(a).

#### **B. NRC Has Failed to Take a “Hard Look” at Environmental Impacts.**

NEPA directs that NRC take a “hard look” at the environmental impacts of its proposed action, or series of related actions comprising a “program” of action, and compare them to a full range of reasonable alternatives for meeting the agency’s purpose and need for agency action that may avoid or mitigate environmental harms or risks posed by its preferred alternative. “What constitutes a ‘hard look’ cannot be outlined with rule-like precision, but it at least encompasses a thorough investigation into the environmental impacts of an agency’s action and a candid acknowledgement of the risks that those impacts entail.” Nat’l Audubon Soc. v. Dept of the Navy, 422 F.3d 174, 185 (4th Cir. 2005). In contrast to the complicated statutory and regulatory patchwork for uranium recovery operations, NEPA is clear in its well-established mandates. NEPA characterizes environmental impacts broadly to include not only ecological effects, such as physical, chemical, radiological and biological effects, but also aesthetic, historic, cultural, economic, and social effects. 40 C.F.R. § 1508.8. NEPA requires an agency to consider both the direct effects caused by an action and any indirect effects that are reasonably foreseeable. Effects include direct effects caused by the action and occurring at the same time and place and indirect effects caused by the action, but later in time or farther removed in distance, but still reasonably foreseeable. 40 C.F.R. § 1508.8

### **1. The Analysis in the SEIS Mirror the Analysis in the Final GEIS.**

NRDC voiced many objections to the Draft GEIS including the argument that NRC failed to take a “hard look” at the serious environmental and public health harms caused by ISL uranium mining. The “thorough investigation” and “candid acknowledgement” called for in well-established law is not present in these documents. The Final GEIS, which changed only minimally from its original form, is not legally sufficient to fully identify and characterize the prospectively harmful impacts on public health and the environment posed by uranium recovery operations at specific sites. The Draft GEIS failed to consider all reasonable alternatives for avoiding, preventing, minimizing, and mitigating these impacts and the Final GEIS did not correct this error. As detailed in the above section, NRC responded by stating that matters would be addressed in site specific reviews. However, now that NRC has drafted site specific reviews, the agency continues to fail in addressing a host of substantive concerns. In fact, the site specific reviews do little more than refer back to the GEIS with a cyclical ferocity. They add little if anything to the sufficiency of NRC’s analysis of environmental impacts. A frequent phrase employed in the SEIS is “consistent with assumptions stated in the GEIS.” The site specific data and associated conclusions do not meaningfully differ from the GEIS and therefore leaves gaping holes of necessary environmental analysis in the GEIS.

The site specific reviews which NRC promised would finally provide the “hard look” which the GEIS did not, fall far short of meeting NEPA requirements. Despite NRC’s claim that they conducted a “thorough and independent” review of each application, we can find no single instance where the conclusions on environmental impacts reached in the SEIS disagree with the minimalist treatment of the GEIS. For example, Section Four of the Lost Creek EIS is titled “Environmental Impacts and Mitigative Actions.” For every impact discussed in this section, NRC claims that the impacts will be small or that the initial presumptions in the GEIS proved true on the site specific review, stating, “while NRC Staff has identified additional new information during its independent review; it nevertheless, does not change the expected environmental impact beyond what was described in the GEIS.” In fact, in no portion of these 104 pages does the conclusion reached ever deviate from the assumptions made in the GEIS.

In a conclusion on groundwater impacts for the proposed Lost Creek ISL mine, a typical assessment, reads, “After its independent review of the Lost Creek Environmental Report...the NRC Staff concludes the site-specific conditions, along with the actions proposed, are comparable to those described in the GEIS for Groundwater and incorporates by reference the GEIS’ conclusions that the impacts to Groundwater during decommissioning are expected to be small.” Lost Creek EIS at 4-38. The Moore Ranch and Nichols Ranch EIS suffer the same defect with minor exceptions. Despite NRC’s promise that the site specific review would finally answer commenters’ questions (many posed originally in late 2007), NRC merely reiterates the sparse and unsatisfactory findings of the GEIS. The lack of any discernable difference between the findings on environmental impacts in the GEIS and the SEIS is clear evidence of the rubber stamping NRDC feared the GEIS would engender. The SEIS adopts the presumptions of the GEIS wholesale without undertaking the searching analysis NEPA requires.

## 2. NRC Needs to Assess the Potential Impact of Spills.

An essential part of any NEPA analysis is thoroughly assessing environmental impacts. As detailed above, in all instances the SEIS simply adopt the conclusions of the Final GEIS, despite an explicit acknowledgement in the latter document to provide more analysis in the site-specific EIS context. And in several substantive areas, the effect of failing to comply with NEPA's requirements is clear. As one example, NRC must provide a thorough assessment of the potential impacts of spills at ISL facilities – and while the agency fails to do so in the SEIS, the failure to do so in the programmatic larger document is even more disappointing. Additionally, NRC needs to address the detrimental impact ISL mining has on the aquifer mined and rework its analyses accordingly.

As the NRC is well aware, ISL mining produces dangerous chemical wastes and byproducts. One chemical byproduct of ISL mining which is liberated from the rock formation during mining is selenium. This is a well known effect of ISL uranium mining with far reaching environmental consequences. A relevant document notes that “[t]he effects of selenium on fish and aquatic migratory birds have been well documented. Selenium concentrations  $>2 \mu\text{g/L}$  in water are known to impair waterbird reproduction and survival due to the high potential for dietary toxicity through food chain bioaccumulation.” See, Ramirez and Rogers, “Selenium in a Wyoming Grassland Community Receiving Wastewater from an In Situ Uranium Mine” (Sept. 2000). Increased amounts of selenium in the soil and water caused by spills, as well as land application of waste water, have had documented adverse effects on wildlife in ISL mining areas. Id., at 1. Even small spills that are quickly contained can have a cumulative negative impact on the environment. Indeed, as noted in the relevant report “[s]ome of the spills may have little impact individually, but cumulatively they might have a significant impact on soils and/or groundwater.” Mark Moxley, LQD Report of Investigation Smith Ranch – Highland Uranium Project (Nov. 21, 2007). And of course, there is no guarantee that spills are always small or well contained.

Continuing on this specific matter, in responding to BLM's comment at G5.21.6 regarding soil impacts from surface spills, NRC states, “NRC does not assert that spills are caught promptly.” Final GEIS at G-163 and G-164 Yet, later in the same section, NRC states the impacts from spills would not be large, “based on the assumption that surface spills would be rapidly controlled and mitigated based on a site-specific spill prevention and control plan.” Final GEIS at G-205. So on one hand, NRC admits to one federal agency that spills are sometimes not caught promptly. On the other hand, the NRC assures another federal agency that spills are always caught promptly and will be mitigated. There is no meaningful explanation for this divergence of opinion within the same set of responses to comments. NRC cannot justify admitting that there is a potential for large spills that are not caught promptly and then determine, on the basis of no data, that the risk posed is only small to moderate. Potential impacts to groundwater, surface water, and land from spills must be considered in the proper framework considering the reasonable range of possible severity of spills. NRC admits a potential for large spills and it must assess the environmental impacts accordingly.

**3. NRC Has Not Taken a Hard Look at the Impact on Sage-Grouse and Other Wildlife.**

NRC fails to take a hard look at environmental impacts to wildlife in the proposed project areas. The U.S. Federal Wildlife Service is expected to issue a decision on Friday, March 5, 2010 as to whether the sage grouse will be included on the Endangered Species List. All three proposed mining facilities are located in areas where sage grouse are commonly found, one in a core breeding area. ESA listing would result in heightened requirements, but even assuming not, the sage grouse is a State of Wyoming species of concern and a BLM-designated sensitive species and as such extra care must be taken to protect the sage grouse and its habitat. "New development or land uses within Core Population Areas should be authorized or conducted only when it can be demonstrated by the state agency that the activity will not cause declines in Greater Sage-Grouse populations." Wyoming Governor's Executive Order (EO) 2008-2 (signed Aug. 1, 2008).

When the SEIS were first made publicly available in December 2009, NRDC noted that almost all of the maps and visualizations in the SEIS were essentially unreadable. Trying to address the matter informally, we contacted staff and requested versions of the documents that included readable (i.e., useful) maps and tables. While Staff kindly attempted to comply, the versions sent were simply downloaded and printed from the website and thus were no improvement. On January 15, 2010 as part of our Request for Extension of Time for Public Comment on Draft Environmental Impact Statements for In-Situ Leach Uranium Mining Facilities, we reiterated our December 2009 request for legible copies of the visual images reproduced in the SEIS. After speaking with Staff at the time a short extension of time was granted, several commentors submitted to Staff a list of unreadable visual representations. While we appreciated the effort of Staff, on February 26, 2010 (mere days before today's comment deadline), only 4 improved documents have been made available. See Attachment 2. Such failure to provide usable data and representations not only makes the job of the public and (we would imagine) NRC Staff that much more difficult, it also fails to comply with the basic requirements of the law.

In any event, it is difficult to critically review the provided data when the reproductions are so poor as to be illegible. We took it upon ourselves to produce our own maps. We used current Wyoming Game and Fish Department data on the location of occupied sage grouse leks, sage grouse high density breeding areas, and sage grouse core populations areas and overlaid the area affected by the proposed uranium mining facilities. The maps we generated are attached. See Attachment 3.

As our data shows, the Lost Creek ISR Project is located completely within the "South Pass" Governor's Sage-Grouse Core Population Area. Furthermore, Lost Creek falls completely within a high density Sage-Grouse breeding area, as determined by Audubon Wyoming. One Sage-Grouse Lek falls within the Lost Creek ISR Project Boundary: the occupied "Crooked Well" Lek. A second Sage Grouse Lek, "Discover

Satellite,” lies just closer than 0.6 miles from the ISR Project boundary. In total nine occupied Sage-Grouse Leaks are within five miles of the Lost Creek ISR Project Boundary. Moore Ranch ISR Project occurs within medium density and lower density Sage-Grouse breeding areas, as determined by Audubon Wyoming, and is not within Governor’s Core Areas. In total, five occupied Sage-Grouse Leaks are within five miles of the Moore Ranch ISR project boundary. Additionally, Nichols Ranch ISR Project, consisting of the Nichols Ranch Unit and Hank Unit, occurs within medium density Sage-Grouse breeding areas, as determined by Audubon Wyoming, and is not within Governor’s Core Areas. In total 20 occupied Sage-Grouse Leaks are within five miles of the Nichols Ranch ISR project boundary, including both units.

The GEIS and SEIS do not demonstrate a commitment to following strict measures to protect the sage grouse. Instead, the agency uses non-mandatory language that leaves protection at the discretion of the licensee. Specifically, NRC states “[I]mpacts to sage grouse ... could also be mitigated if BLM and WGFD guidelines are followed.” Lost Creek SEIS at 4-42. The NRC further states, “If BMPs are implemented that minimize noise, vehicular traffic, and human proximity in the vicinity of leks (within the 2-mile radius of an active lek), direct and indirect impacts to sage-grouse would be reduced from MODERATE to SMALL.” Lost Creek at SEIS 4-48. However, there is no indication or discussion in the SEIS of whether applicants will implement BMPs or whether they will implement BMPs which are sufficiently protective of the sage grouse and other wildlife. It is incumbent upon NRC to take a hard look at the impacts on wildlife and explore requirements or alternatives that remove or mitigate adverse environmental impacts.

**4. NRC Must Admit that Aquifers Are Permanently Contaminated by ISL Uranium Mining and Conduct the Environmental Assessment Accordingly.**

Perhaps the most serious failure to comply with the requirements of NEPA is the anemic discussion on ISL mining’s impact on groundwater. Despite the fact that ISL mining changes the composition of the groundwater chemistry in a way that has never been restored, NRC classifies impacts to water quality as “small and temporary.” The Final GEIS admits that groundwater quality in production zone is degraded by ISL operations and that aquifers used in mining must get EPA exemptions as a source of drinking water. Final GEIS at 4-33. However, the GEIS glosses over the profound import of the fact that aquifers used in ISL mining have never been restored to baseline conditions.

Ostensibly, groundwater standards at ISL mining facilities are set using NRC approved background or values, the maximum concentration levels set in 10 C.F.R. Appendix A to Part 40 § 5B(6), or EPA maximum concentration levels. See, Status of the Decommissioning Program: 2008 Annual Report (NUREG-1814, Rev. 1), at 24. Licensees are required to meet those standards unless they request and are granted NRC permission to apply alternative standards known as Alternate Concentration Limits. The NRC will grant the licensee’s request if the ACL “is equivalent to, to the extent practicable, or more stringent than the level which would be achieved by standards and requirements adopted and enforced by the Commission for the same

purpose and any final standards promulgated by the Administrator of the Environmental Protection Agency[.]” 42 USC § 2114(c). Although certain requirements must be met before an ACL is granted, there are no prerequisites to making a request. 10 C.F.R. Appendix A to Part 40 § 5B(6). This means that any licensee may request and be granted an ACL.

If the licensee demonstrates that concentrations of certain constituents cannot be restored to either background or Table 5C values in Appendix A, then the staff may approve ACLs, after considering all items required in Criterion 5B(6) in Appendix A. To obtain ACLs, the licensee submits a license amendment application and a detailed environmental report that addresses all the items in Criterion 5B(6). If the staff determines that the ACLs are protective of public health and the environment, the staff may approve the ACLs. The staff documents its review by publishing an EA and FONSI or developing an EIS and issuing a technical evaluation report (TER). After ACLs are approved, groundwater reclamation may cease.

Status of the Decommissioning Program: 2008 Annual Report (NUREG-1814, Rev. 1), at 24-5.

According to all the data we have seen, requirements for restoration for all parameters (i.e., all pollutants released into the aquifer by ISL operations) to background levels or MCL standards has been aspirational rather a reality. In practice, all regulators – the NRC or Agreement States – have allowed for ACLs rather than restoration of all parameters. See, Attachment 1, Memorandum for Chairman Jaczko, Commissioner Klein, and Commissioner Svinicki, Staff Assessment of Groundwater Impacts from Previously Licensed In-Situ Uranium Recovery Facilities (Jul. 10, 2009). Rather than acknowledge the irreversible environmental impacts of ISL mining in the GEIS and its site-specific progeny, the NRC passes on the opportunity to conduct the necessary historical analysis of groundwater restoration problems ISL sites across the country. Indeed, NRC allows mining to go forward with the admonition, “After production is completed, the licensee is required to initiate aquifer restoration activities to restore the production zone water quality to preoperational baseline levels, MCLs or ACLs.” Lost Creek SEIS at 4-33; Nichols Ranch SEIS at 4-27. The inclusion of “or” before the use of the ACLs demonstrates that restoration standards have been a moving target for each and every ISL mining site. Rather than provide a detailed and comprehensive history of ISL restoration operations and the utterly consistent failure to restore the groundwater quality of contaminated aquifers (regardless of whether such aquifer received an aquifer exemption), the NRC makes it nearly impossible for the reader to analyze environmental impacts and the actual standards to which the licensee is being held (or not). As waivers and exemptions are common (a problem unto itself), this fact must be part of the analysis and NRC must analyze the impact of the waivers and exemptions from meaningful standards in a comprehensive way. The GEIS and SEIS fail this most fundamental requirement of NEPA’s “hard look” standard.

Moving to specifics, in response to NRDC’s request for more data on ACLs such as when they are appropriate or instances when they have been employed in the past, NRC stated that, “to date, no ACLs have been granted to any operation ISL facilities.” Final GEIS at G-89. However, standards have obviously been repeatedly relaxed because no aquifer has ever been returned to baseline (i.e., pre-mining conditions). In a July 2009 Memorandum assessing the

groundwater impacts of ISL mining, NRC admits that in eleven restorations at three ISL facilities in Wyoming and Nebraska, "The data show that over 60 percent of the constituents were restored to their pre-operational concentrations." Attachment 1, Memorandum for Chairman Jaczko, Commissioner Klein, and Commissioner Svinicki, Staff Assessment of Groundwater Impacts from Previously Licensed In-Situ Uranium Recovery Facilities (Jul. 10, 2009). Clearly, approximately 40 percent of measured constituents could not be restored to baseline conditions and concessions to the licensee were made (but not significantly detailed in any meaningful fashion in the July 2009 memorandum or in any subsequent document, including the documents commented upon today).

This is hardly a new practice. A study was conducted to determine to what standards aquifers under the authority of the Texas Commission on Environmental Quality Underground Injection Control office were restored after mining operations were completed. Southwest Groundwater Consulting, Report on Findings Related to the Restoration of Groundwater at In-Situ Uranium Mines in South Texas, LLC (Sept. 28, 2008). The study found that mining operations were consistently unable to meet original restoration standards and routinely granted amended restoration standards which were far more lenient.

We could continue in this vein, but the agency's failure to perform a searching analysis on failures of groundwater restoration at ISL uranium mining sites as a singular matter demands that these documents be withdrawn and the agency return to work. Specifically, we suggest as we have done in the past that the NRC examine and present to the public a precise history of conditions at ISL uranium mining operations prior to mining and of groundwater conditions after mining and restoration. Essentially, the NRC should provide a comprehensive analysis of all ISL sites where:

- A complete listing of all mines where baseline and MCL standards were not met;
- A complete listing of all mines (regulated either by the NRC or an Agreement State) where ACLs were used;
- A thorough analysis of the post-closure monitoring of all sites (and we presume this includes all ISL mines in any state) and the current state of contamination and ongoing restoration;
- A thorough analysis of the short and long-term environmental impacts of the above matters, performed in conjunction with fellow federal and state regulators.

Until NRC addresses this most fundamental issue, it cannot properly assess the impact ISL mines have on the environment and without proper assessment of such impacts, NRC should not be issuing ISL uranium mining licenses.

## 5. NRC Has Not Analyzed the Environmental Impacts of Decommissioning and Financial Assurance Plans.

As the NRC is well aware, ISL uranium mining applicants are required to submit a financial assurance plan based in part on their decommissioning and reclamation plan. Failure to include this information is grounds to reject an application. See, In the Matter of Hydro Resources, Inc., 51 N.R.C. 227, 2000 WL 745370 (N.R.C.) (May 2000) (hereinafter "HRI case."). Specifically, in the HRI case, the Commission interpreted 10 CFR Part 40 Appendix A, Criterion 9 to require a license applicant to submit a plan for decommissioning in advance of the issuance of any license.<sup>4</sup> Additionally, NRC staff is required to review and approve that plan.

Clearly, such plans must be offered at the earliest time and should be available to the Staff for its environmental analysis. This is important as there is a long history of ISL uranium mines failing to post adequate financial assurance to restore contaminated aquifers (or even, in some instances, to fully decommission the site). The Commission explained the importance of this matter in its HRI decision, "We simply do not agree with the Presiding Officer (or with HRI and the NRC staff) that questions about the financial assurance plan can be left for later resolution or for a second round of hearings closer to the time of operation. A sensible and efficient process requires us to insist that those questions be addressed in connection with the initial application and license." *Id.* The Commission further explained,

Our "Final Generic Environmental Impact Statement on Uranium Milling," which was issued in conjunction with the promulgation of Appendix A, offered the following explanation of Criterion 9: "A plan for decommissioning of the mill buildings and site, and for disposing of the tailings, in accordance with requirements delineated above, must be proposed by applicants, and approved by appropriate agencies, **before issuance** or renewal of licenses." See NUREG-0706, at p. 12-5 (1979).

In the Matter of Hydro Resources, Inc., 51 N.R.C. 227, 2000 WL 745370 (N.R.C.) (May 2000) (emphasis added). As the Commission noted in the decision, the regulations governing license applications require each application to "clearly demonstrate how the requirements and objectives set forth in appendix A of this part have been addressed. Failure to clearly demonstrate how the requirements and objectives in Appendix A have

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<sup>4</sup> "Financial surety arrangements must be established by each mill operator prior to the commencement of operations to assure that sufficient funds will be available to carry out the decontamination and decommissioning of the mill and site and for the reclamation of any tailings or waste disposal areas. The amount of funds to be ensured by such surety arrangements must be based on Commission-approved cost estimates in a Commission-approved plan for (1) decontamination and decommissioning of mill buildings and the milling site to levels which allow unrestricted use of these areas upon decommissioning, and (2) the reclamation of tailings and/or waste areas in accordance with technical criteria delineated in Section I of this appendix. The licensee shall submit this plan in conjunction with an environmental report..." 10 CFR Part 40 Appendix A, Criterion 9.

been addressed shall be grounds for refusing to accept an application.” 10 C.F.R. § 40.31(h).

Despite several questions on the matter, the GEIS failed to analyze the history or impact of failures in the ISL industry to post adequate restoration funding. And when provided with three examples of ongoing licensing actions (where the licensing process has pre-dated the issuance of NEPA documentation, a severe flaw in and of itself), the three SEIS fail to analyze the financial assurance and decommissioning plans of the applicants. Each SEIS contains a single paragraph on financial surety that in no way comprises a “plan” or a searching analysis of the environmental viability of the plan. See, Lost Creek SEIS at 2-26; Moore Ranch SEIS at 2-24; Nichols Ranch SEIS at 2-26. Even the most basic question, such as how does the present submission compare to previous restoration funding in terms of dollars, plan, and likely results, is not presented in the SEIS.

**C. NRC Violates NEPA by Narrowly Defining the Purpose and Need for a Major Federal Action and Failing to Consider An Adequate Range of Alternatives.**

When NRDC commented that the range of alternatives analyzed in the GEIS were inadequate and that the statement of “purpose and need” for agency action was too narrowly defined, the NRC avoided engaging the matters by stating that alternatives would be considered in the site specific reviews. As is well established, NEPA requires that federal agencies provide a detailed evaluation of alternatives to the proposed action in every EIS. 42 U.S.C. § 4332(C)(iii); 40 C.F.R. § 1502.14(a). This discussion of alternatives is essential to NEPA’s statutory scheme and underlying purpose:

NEPA’s requirement that alternatives be studied, developed, and described both guides the substance of environmental decision-making and provides evidence that the mandated decision-making process has actually taken place. Informed and meaningful consideration of alternatives -- including the no action alternative -- is thus an integral part of the statutory scheme.

Bob Marshall Alliance v. Hodel, 852 F.2d 1223, 1228 (9th Cir. 1988), cert. denied, 489 U.S. 1066 (1989) (citations and emphasis omitted).

NEPA requires agencies to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources.” 42 U.S.C. §4332(E); 40 C.F.R. § 1508.9(b) “An agency must look at every reasonable alternative, with the range dictated by the nature and scope of the proposed action.” Northwest Env’tl Defense Center v. Bonneville Power Admin., 117 F.3d 1520, 1538 (9th Cir. 1997). An agency violates NEPA by failing to “rigorously explore and objectively evaluate all reasonable alternatives” to the proposed action. City of Tenakee Springs v. Clough, 915 F.2d 1308, 1310 (9th Cir. 1990) (quoting 40 C.F.R. § 1502.14). The law states:

[The alternatives] section is the heart of the environmental impact statement. Based on the information and analysis presented in the sections on the Affected Environment and Environmental Consequences, it should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public. In this section, agencies shall:

- (a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.
- (b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.
- (c) Include reasonable alternatives not within the jurisdiction of the lead agency.
- (d) Include the alternative of no action.
- (e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.
- (f) Include appropriate mitigation measures not already included in the proposed action or alternatives.

40 C.F.R. § 1502.14.

This fundamental requirement is the touchstone of every EIS and has not gone unnoticed by the federal judiciary, which has rejected EISs that fail to meet it. See e.g., Calvert Cliffs, Coordinating Comm., Inc. v. United States Atomic Energy Comm'n, 449 F.2d 1109, 1114 (D.C. Cir. 1971) (detailed EIS required to ensure that each agency decision maker has before him and takes into account all possible approaches to a particular project . . . which would alter the environmental impact and the cost-benefit balance); Natural Resource Defense Council v. Callaway, 524 F.2d 79, 93 (2d Cir. 1975) ("The duty to consider reasonable alternatives is independent from and of wider scope than the duty to file an environmental statement."); Alaska Wilderness Recreation & Tourism v. Morrison, 67 F.3d 723, 729 (9th Cir. 1995) ("The existence of a viable but unexamined alternative renders an environmental impact statement inadequate."); Northwest Env'tl Defense Center v. Bonneville Power Admin., 117 F.3d 1520, 1538 (9th Cir. 1997) ("An agency must look at every reasonable alternative, with the range dictated by the nature and scope of the proposed action."); Kootenai Tribe of Idaho v. Veneman, 313 F.3d 1094, 1122-1123 (9th Cir. 2002) (and cases cited therein) (stating that agencies must develop and analyze environmentally protective alternatives in order to comply with NEPA).

### 1. The “Purpose and Need for Agency Action” Is Too Narrowly Defined.

The “Purpose and Need for Agency Action” remains incoherently defined in a narrow manner— either move forward with licensing these ISL uranium mining facilities or not. Courts have long found that tailoring the “Purpose and Need” statement in this fashion to fit precisely the template of an agency’s proposed action is inconsistent with the purpose and requirements of NEPA. See, Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190, 198 (D.C. Cir. 1991) (stating an agency may not contour the purpose and need so unreasonably narrowly that “only one alternative... would accomplish the goals of the agency’s action, and the EIS would become a foreordained formality.”) There is a lengthy and tragic history associated with uranium recovery and no broad national purpose is identified, no overarching need for the proposed action is stated or weighed against alternative means of accomplishing the agency’s purpose and need for action.

NRDC has stated before and will do so again that NRC must, in full consultation with other involved federal and state agencies, first craft a statement of “Purpose and Need for Agency Action” that relates whatever uranium recovery program it eventually defines to broad national objectives that are within the NRC’s purview, including for example, such goals as “improving remediation of land and water impacts from the recovery of source or byproduct materials,” or “ensuring the long-term isolation from the human and natural environment of harmful radionuclides and chemical toxins produced in the nuclear fuel cycle.” We do not believe that the uranium recovery industry (at least how it has been operated in the past) will be effective in addressing any of these goals, but this prospect is present, at least in theory. We do note, however, that other concrete policy and program alternatives exist that address practical solutions to each of the challenges presented by these objectives, and therefore merit detailed consideration.<sup>5</sup>

Furthermore, as we detailed earlier in the comments, the NRC should have commenced its own particular portion of the work by focusing on evaluation of ISL uranium mining performance in the past 35 years, including in agreement states like Texas and Wyoming. And consistent with its regulatory obligations under NEPA, the NRC must also work with its federal brethren to define the region or regions where it anticipates significant environmental and public health impacts from a host of resource extraction technologies, the extent of known and anticipated ISL uranium mining and milling in these regions (and other resource extraction technologies), the timing of these

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<sup>5</sup> We also note – as we did above – that because of the splintered nature of the legal framework for uranium recovery, for the NRC to properly craft an appropriate “Purpose and Need for Agency Action,” the agency must work with its federal colleagues at the U.S. Environmental Protection Agency, the U.S. Department of Energy, and the U.S. Department of the Interior to develop a regulatory framework for uranium recovery cleanup and licensing that protects public health and the environment. As we have noted repeatedly to the agency in several public meetings, the NRC has been refusing to release a draft groundwater protection rule for nearly five years. Indeed, just yesterday, we were informed yet again by NRC staff that a rule would be “coming soon.” It is past time for the NRC to develop a coherent set of protective environmental requirements for ISL uranium mining and issuing a draft groundwater rule would be a minimal start.

developments, and a plan for licensing and that is adequate to the scale of the task envisioned.

**2. The Three SEIS Do Not Consider a Meaningful Range of Alternatives.**

Turning to the range of alternatives, the three SEIS fall far short of the requirement to “study, develop, and describe appropriate alternatives.” 42 U.S.C. §4332(E). All three SEIS use identical language to express the purpose and need for the proposed projects. The purpose is scoped so narrowly as to curtail nearly all alternatives besides the proposed option.

The Lost Creek SEIS is sparse at best. The SEIS states, “[U]nder the proposed action, LCI is seeking an NRC source material license for the construction, operation, aquifer restoration, and decommissioning of the ISR facilities at the Lost Creek ISR Project as described in the license application.” See, Lost Creek SEIS at 2-1. Besides the mandatory No-Action alternative, the only alternative considered is to dry and package the yellowcake on site as opposed to at another facility. This would eliminate the step of transporting the yellowcake slurry from the Lost Creek site to an intermediate dry processing facility before being shipped to Illinois. As stated in the SEIS, “The purpose and need for the proposed action is to provide an option that allows the applicant to use ISR technology to recover uranium and produce yellowcake slurry at the Lost Creek Project.” Lost Creek EIS at 1-1. The failure to consider anything other than the most modest modification is in obvious opposition to NEPA requirements.

The Nichols Ranch SEIS is similarly lacking. Besides the mandatory No-Action alternative and the proposed action, the only alternative considered is to not allow the licensee to build a satellite facility known as the “Hank Unit.” The Nichols Ranch SEIS’ purpose and need section is identical to that in the Lost Creek SEIS. “The purpose and need for the proposed action is to provide an option that allows for the applicant to use ISR technology to recover uranium and produce yellowcake at Nichols Ranch.” See, Nichols Ranch SEIS at 1-1.

The Moore Ranch SEIS is even more cramped. The only alternatives considered are the Proposed Action and the No-Action alternative. The restrictive purpose and need section appears: “The purpose and need for the proposed action is to provide an option that allows the applicant to use ISR technology to recover uranium and produce yellowcake at the Moore Ranch Project.” Moore Ranch SEIS at 1-1.

The scope of the SEIS (and the GEIS) forestalls viable alternatives by taking as a given that uranium mining will occur, ISL will be used, and that the proposed site is appropriate. This does not satisfy the rigorous exploration required by the regulations. There has been no inter-agency analysis of potential objectives that are surely within the NRC’s purview, such as “improving remediation of land and water impacts from the recovery of source or byproduct materials,” or “ensuring the long-term isolation from the human and natural environment of harmful radionuclides and chemical toxins produced in the nuclear fuel cycle.” And any

presentation of alternatives should allow for concrete policy and program alternatives to each of the challenges presented by these objectives, and therefore merit detailed consideration.

Nor does the SEIS even explore the range of options within ISL mining. As discussed below, NRC does not analyze the technologies and processes involved in ISL mining or the mitigation techniques available sufficiently to identify appropriate alternatives or to even properly assess the environmental impact of the process.

**3. NRC Needs to Analyze the Technology Employed in ISL Mining in Order to Conduct a Proper Environmental Assessment and Consider a Reasonable Range of Alternatives.**

In NRDC's comments on the Draft GEIS, NRDC asked specific, detailed, technical questions about the processes involved in in-situ leach mining of uranium. NRDC Comments on Draft GEIS at 6-19. NRDC sought information on how the process is conducted to better understand the risks involved in each aspect of the process and to learn which alternatives involve the least environmental harm.

Specifically, NRDC asked about the substantive differences between ion exchange circuits; the use and composition of resin beads; whether facilities that process resin have a substantially different impact on the surrounding environment; and whether there are advantages or disadvantages to elute the resin directly in the ion exchange column. *Id.* The Final GEIS' response to comments gives a brief explanation of ion exchange of uranium onto resin beads and a short paragraph explanation of ion exchange columns that barely touches the surface of these questions and concludes, "A discussion of the advantages and disadvantages of eluting the resin directly in the ion exchange column at the central processing facility is beyond the level of detail intended for the GEIS and, therefore, no changes to the GEIS were made in addition to this response." Final GEIS at G-121. The SEIS do not address the issue at all. Respectfully, NRC misses the point of our query. NRC has a duty to fully explain the science, technology, and techniques used in ISL mining of uranium and to fully analyze and assess the environmental impact of each aspect of the process. Without fully exploring the need for and impact of these practices, NRC cannot address and thoroughly analyze the environmental effect they have.

NRDC has posed multiple substantive questions about how ISL mining works and about the best technologies or, at a minimum, the strengths and weaknesses of technologies used. An environmental review is impossible without historical data on success rates. A full environmental assessment of ISL mining practices is necessitated to fulfill NEPA's "hard look" requirement and would allow NRC to broaden the scope of considered alternatives. NRDC's straightforward questions must be answered before the SEIS and GEIS can near compliance with the requirements of NEPA.

**D. NRC Fails to Analyze the Cumulative Impacts of ISL Mining and Other, Ongoing Resource Extraction Technologies.**

ISL uranium mining has serious environmental impacts<sup>6</sup> which must be assessed in conjunction with other historical, ongoing, and reasonably foreseeable impacts in the area of the proposed mining. NRC is quick to point out that it does not regulate conventional mining or abandoned mining sites, but seemingly agreed to address the issue in the SEIS. The SEIS in turn do an unsatisfactory job of fully exploring the cumulative impacts of mining in the affected areas. To provide an adequate cumulative impacts analysis, the SEIS must provide data on the “time, type, place, and scale” of past disturbance activities and explanation of how they affected the environment. The Lands Council v. Powell, 395 F.3d 1019, 1028 (9th Cir. 2005).

The analysis of cumulative impacts provides nothing more than virtually unexplained statements that impacts may be “moderate,” or are “not expected to be significant,” and so on. What data these conclusions are based on is not explained. They are nothing more than unsupported narratives. Again, this fails to meet the requirements of NEPA. Klamath-Siskiyou Wildlands Center v. Bureau of Land Management, 387 F.3d 989, 993-94 (9th Cir. 2004) (requiring explanation of what data a conclusion is based on, or why objective data cannot be provided).

There are eight ISL facilities and seven conventional uranium mining facilities in close proximity to the Lost Creek proposed mining area. There are an additional five proposed ISL and conventional uranium mining operation in various stages of the licensing process. Yet the SEIS claims there will be “no cumulative effect on land use.” Lost Creek SEIS at 5-10 to 5-13. The NRC also claims that small impacts to surface water from the Lost Creek Project contribute to small to moderate potential impacts to the Battle Springs Flat drainage area for past, present and reasonably foreseeable future actions. The groundwater cumulative impact is predicted to be moderate. These conclusory claims are unsupported – there are a potential twenty mining operations in one area, factoring in construction, transportation, and routine operations necessarily will have more than a small impact on the land and water. The agency’s claim of only moderate impact to groundwater is even more unavailing. NRC has admitted that groundwater conditions at mining sites have never, *not once*, been restored to their original conditions. The Lost Creek area has at least eight, and may have as many as thirteen, unrestored aquifers. That is a grave and serious LARGE impact to the area’s groundwater that the NRC fails to admit, let alone properly assess.

The Moore Ranch area has 26 former, operating, or potential sites for uranium mining. There are 17 coal mining operations in the area. There are 472 oil and gas production units in the Powder River Basin. There are 534 coal bed methane wells within two miles of the boundary of the proposed license area. Cumulative impacts on land and groundwater are estimated to be moderate. A moderate impact is one which is “sufficient to alter noticeably, but not destabilize

<sup>6</sup> See Storm and Smith, Nuclear Evaluation done for the UN Climate Conference, Part D, Page 28 (Oct. 2007) available at <http://www.stormsmith.nl/report20071013/partD.pdf> (stating “In our view the ISL technique cannot be reconciled with any sustainable development, for reason of its harmful and irreversible effects in the environment.”).

important attributes of the resource considered.” Moore Ranch SEIS at 5-7. The cumulative impact of substantial present, past, and anticipated future mining activities in this area is more likely to “destabilize important attributes” than the NRC is prepared to admit or to analyze.

The Powder River Basin is also home to the proposed Nichols Ranch project. The Nichols Ranch area boasts twenty traditional uranium mines, only two of which are operational, five ISL mines, and “prolific” coal bed methane mining consisting of approximately 44 leases. Nichols Ranch SEIS at 5-1 to 5-3. Again, this is a substantial density of mining activities within a finite area, yet the NRC anticipates no large impacts without providing any analytical support for such a conclusion.

Specifically, not only does coal bed methane mining in proximity to ISL mining increase the severity of drawdown to local groundwater, it creates a risk for cross-contamination. At no point in the documents is this analyzed in a meaningful fashion. As we understand it (and the NRC’s documents provide little certainty on any other these important matters), coal bed methane wells are being drilled in the same area as the proposed projects, suggesting at minimum there should be serious and publicly transparent agency consultation and analysis. We see no evidence of this in the documents.

There is also a risk of leaks from coal bed methane reservoirs that could contaminate the upper aquifers. As is well documented, coal bed methane gas operators do not have a stellar record of environmental safety compliance in Wyoming. A recent press report stated, “In February 2008, the federal Bureau of Land Management’s Buffalo field office issued a memo to coal-bed methane gas operators stating, ‘Recently, there have been an extraordinary number of spills and undesirable events reported to the Buffalo field office.’” *State Seeks Action in Illegal CBM Spill*, Wyoming Star-Tribune, Feb. 25, 2010. Moreover, the Wyoming Department of Environmental Quality recently issued a notice of violation to Williams Production RMT Co., the largest coal-bed methane producer in Wyoming’s Powder River Basin, for spilling 10,000 barrels of coal-bed methane water in western Campbell County. *Id.*

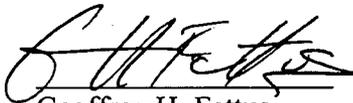
In short, the SEIS and GEIS do not meaningfully evaluate cumulative impacts, choosing instead to simply list other projects in the area that “may” have cumulative impacts on the region. NRC does not discuss the contaminants released by coal bed methane operations or even which aquifers and surface waters are affected by them. Regional aquifer drawdowns are not discussed or analyzed. Nor does NRC analyze how the significantly elevated levels of uranium, radium and other pollutants that result from ISL mining will impact the region when combined with contaminants from coal bed methane production. Similarly, there are issues with oil and gas exploration that NRC fails in whole to explore. No mention is made of the fact that groundwater has suffered substantial adverse effects as the result of previous uranium mining. NRC must provide a thorough accounting of the “time, type, place, and scale” of the mining and other disturbances in the project areas and, most importantly, explain the data on which it basis its conclusions.

**V. Conclusion**

As we noted at the outset, we respectfully urge the NRC to withdraw the draft SEIS and the Final GEIS as all four documents fail to meet the requirements of NEPA, 42 U.S.C. § 4321 et seq. The documents are legally deficient as the NRC (1) fails to addressing a host of substantive and serious matters; (2) fails to take the required "hard look" at the proposed agency action; (3) fails to consider a reasonable range of alternatives to the proposed actions; and (4) fails to analyze the cumulative impacts of ISL uranium mining in the regions of the proposed actions. For the foregoing reasons, the GEIS and SEIS should be withdrawn.

We appreciate the opportunity to comment and look forward to working with you. If you have any questions, please do not hesitate to contact us.

Sincerely,



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July 10, 2009

MEMORANDUM FOR: Chairman Jaczko  
Commissioner Klein  
Commissioner Svinicki

FROM: Charles L. Miller, Director */RA/*  
Office of Federal and State Materials  
and Environmental Management Programs

SUBJECT: STAFF ASSESSMENT OF GROUNDWATER IMPACTS FROM  
PREVIOUSLY LICENSED IN-SITU URANIUM RECOVERY  
FACILITIES

As a result of the December 11, 2008, Commission Briefing on the Status of Uranium Recovery, the Commission instructed the staff to "provide the Commission with the data that it has in hand that assesses environmental impacts to the groundwater from previously licensed in-situ uranium recovery (ISR) facilities" (SRM M081211). This memorandum provides results of the staff's review of information on groundwater impacts from ISR facilities.

Potential groundwater impacts at an ISR facility can result from: (1) residual constituent concentrations in excess of baseline concentrations after the restoration of the production aquifer; (2) a migration of production liquids from the production aquifer to the surrounding aquifers during operation; (3) a mechanical failure of the subsurface well materials releasing production fluids into the overlying aquifers; and (4) movement of constituents to groundwater outside the licensed area.

The staff examined the available data from the three U.S. Nuclear Regulatory Commission (NRC) licensed ISR facilities that are operational. With regard to Item 1 mentioned above, our records indicate that NRC has approved 11 groundwater restorations at the 3 facilities. The data show that over 60 percent of the constituents were restored to their pre-operational concentrations. Although the remaining constituents were restored to concentrations that were above baseline levels, they were all restored to levels that NRC staff found to be protective of public health and the environment.

With regard to the migration of production liquids toward the surrounding aquifer, each licensee must define and monitor a set of nonhazardous parameters to identify any unintended movement toward the surrounding aquifer. Exceedances of those parameters result in an event termed an excursion; excursion events are not necessarily environmental impacts but just indicators of the unintended movement of production fluids. The data show over 60 events had occurred at the 3 facilities. For most of those events, the licensees were able to control and

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reverse them through pumping and extraction at nearby wells. Most excursions were short-lived, although a few of them continued for several years. None had resulted in environmental impacts.

Mechanical integrity tests (MIT) are performed on a routine basis to determine if wells have a potential to leak during operation. The data indicates that a small percentage of the wells tested failed and they were replaced. One licensee also investigated the overlying aquifers and found no impacts for five of six MIT failures and mitigated the impact found from the remaining failure. The other two licensees did not specifically investigate the overlying aquifers; however, the aquifer above the production zone is continually monitored as part of the excursion monitoring program and data from that monitoring did not identify any impact attributable to well failure.

Routine regional aquifer monitoring programs are conducted by the existing ISR facilities as a license condition. The data from those monitoring programs do not show impacts attributable to the ISR facility. The staff is unaware of any situation indicating that: (1) the quality of groundwater at a nearby water supply well has been degraded; (2) the use of a water supply well has been discontinued; or (3) a well has been relocated because of impacts attributed to an ISR facility.

The enclosure discusses the staff's findings in more detail. It is the staff's intention to notify participants of the December 11, 2008 Commission briefing of the availability of the enclosed report once it is made public.

Enclosure: Data on Groundwater Impacts  
at the Existing ISR Facilities

cc: SECY  
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OCA  
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Date	6/30/09	7/1/09	7/2/09	7/10/09

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## **DATA ON GROUNDWATER IMPACTS AT THE EXISTING ISR FACILITIES**

### **INTRODUCTION**

On December 11, 2008, the U.S. Nuclear Regulatory Commission (NRC) held a briefing on the status of uranium recovery facilities during which the staff briefed the Commissioners on the status of uranium recovery applications, in-situ recovery (ISR) facilities generic environmental impact statement (GEIS), rulemaking for groundwater protection at ISR facilities, and Native American outreach. Following that briefing, the Commission directed the NRC staff to provide it with the data it has in hand that assesses environmental impacts to the groundwater from previously licensed ISR facilities (Staff Requirements Memorandum dated January 8, 2009, SRM M081211).

This report addresses that request. The NRC staff found relevant information from three NRC licensed ISR facilities and from Research and Development (R&D) ISRs that were licensed in the late 1970s to early 1980s. The existing data on impacts to groundwater at the Texas licensed facilities were not available for NRC review and not summarized in this report.

### **POTENTIAL GROUNDWATER IMPACTS AT AN ISR FACILITY**

Before an NRC-licensed ISR can begin operations at the project site, the licensee must obtain an Underground Injection Control (UIC) permit from the U.S. Environmental Protection Agency (EPA) or EPA-authorized State. The permit must exempt the portion of the aquifer subject to uranium mining from classification as an underground source of drinking water. The portion of the aquifer where uranium extraction occurs is referred to as the "production zone." Once uranium recovery operations begin, several different types of environmental impact can occur: impacts to groundwater quality in the production zone during operation and after restoration following the cessation of operation, impacts from the migration of extraction fluids to the aquifer outside the production zone and aquifers above and below the production zone, and impacts to aquifers above the production zone from well casing failures.

Within the production zone, the impacts from operations include elevated levels of various constituents introduced with the extraction fluids (e.g., oxygen, bicarbonate, and hydrogen peroxide) and chemical species that become mobile during the extraction process (e.g., uranium and other metals). After ISR operations are completed at a facility, NRC requires the licensee to restore the exempted aquifer water quality to pre-operational (or baseline conditions), drinking water standards, or alternate concentration limits. The primary goal of restoration is to return the production zone to pre-operational conditions, which would result in no impact; however, that is usually not attainable for all constituents at most ISRs. NRC regulations allow restoration to other standards that are protective of public health and safety and the environment but as restoration to these standards results in changes from pre-operational conditions, restoration results in impacts.

During operations, extraction fluids may directly impact the aquifer surrounding the production zone. A migration of fluids towards the surrounding aquifer is referred to as an excursion. Any excursion from an active wellfield is monitored and is closely controlled. A perimeter monitoring well network surrounds the production zone at a distance of 300 to 500 feet to detect excursions before they can cross the horizontal boundary of the exempted portion of the aquifer. Monitoring wells are also installed in the aquifer above and below the exempted aquifer to

detect vertical excursions. Licensees are required to correct excursions detected by the monitoring wells.

Another potential direct impact to the surrounding aquifers during operations is an uncontrolled release of fluids from the subsurface wells due to its loss of well integrity at a depth other than the screened horizon. This potential impact is primarily limited to overlying aquifers as production wells generally do not extend below the exempted aquifer. Impacts to overlying aquifers may occur from well failures involving either injection fluids or extraction fluids.

Several existing facilities also have the capability for disposal of 11e.(2) byproduct liquid waste through on-site deep well injection. An exemption from the EPA underground source of drinking water requirements is required for each deep well injection. This classification differs from the classification of the exempted aquifer for ISR operations because the injected fluids will remain permanently in this exempted aquifer.

Lastly, the potential exists for impacting the groundwater (e.g., from an undetected excursion) in the region of an operating ISR. As such, NRC-licensed ISR facilities are required to periodically monitor regional groundwater's for potential impacts from licensed operations.

The data in hand on the environmental impacts to the groundwater from ISR facilities are discussed below.

## **DISCUSSION OF GROUNDWATER IMPACTS AT NRC-LICENSED FACILITIES**

There are currently three operating facilities licensed by the NRC. Two facilities, COGEMA's Irigaray/Christensen Ranch facility and PRI's Smith Ranch/Highland Uranium Project (HUP) facility, operate in Wyoming and Crow Butte Resources Crow Butte facility operates in Nebraska. This report presents data from those licensed operating facilities. A fourth facility, Hydro Resources, Inc., Crown Point facility in New Mexico, has an NRC license but has never operated. Documentation for 34 early licensed R&D facilities were also reviewed for this paper. Data from these R&D facilities are similar in extent to the information provided in this paper for the existing, operational licensed facilities.

### **Exempted Aquifer – Restoration**

The NRC requires an applicant for an ISR license to document the restoration process in the license application. The staff reviews this information to ensure its potential effectiveness and adequacy in terms of defining an appropriate surety. During the restoration process, the licensee has the flexibility within certain parameters to adjust the process to meet the goal. After a licensee determines that the active restoration is completed, a licensee discontinues active restoration to allow stabilization monitoring. After the stabilization monitoring is complete, the licensee submits a restoration report for NRC approval. Generally, the restoration report is based on individual wellfields rather than one facility-wide report.

NRC staff has approved 11 wellfield restorations at the 3 existing licensed facilities. All of the restorations had levels of one or more parameters above baseline levels (a baseline level is defined as the mean value determined from a selected ground of wells screened in the exempted aquifer prior to ISR operations). The restoration data from the currently licensed facilities have shown that this goal is attainable for many parameters (50 to 70 percent of the 35 parameters commonly monitored) but is not attainable for other constituents, in particular, the

major and trace cations with solubilities most susceptible to the oxidation state of the aquifer water (i.e., iron, manganese, arsenic, selenium, uranium, vanadium and radium-226).

The data for the approved restorations are as follows:

Nine wellfield restorations, Wellfield Units 1 through 9, have been approved for the COGEMA Irigaray project. The restorations have been effective in reducing the levels of 50 percent of the parameters to their baseline levels. Of those parameters that did not meet the baseline levels, COGEMA reported that 13 parameters exceeded the observed range in baseline data for that parameter. The parameters that did not meet the range in baseline data are alkalinity, ammonium, barium, carbonate, chloride, calcium, conductivity, lead, magnesium, manganese, sodium, total dissolved solids, and radium-226.

One wellfield restoration, HUP Wellfield A, has been approved for the PRI HUP facility. The restoration was effective in reducing the levels of most parameters, 70 percent of the parameters have been restored to their baseline levels. The parameters that did not meet their baseline levels are alkalinity, arsenic, bicarbonate, chloride, calcium, conductivity, iron, magnesium, manganese, pH, sodium, selenium, sulfate, total dissolved solids, uranium, and radium-226.

One wellfield restoration, Mine Unit 1, has been approved for the CBR facility. The restoration was effective in reducing 70 percent of the parameters to their baseline levels. The parameters that did not meet their baseline levels are alkalinity, arsenic, bicarbonate, calcium, iron, magnesium, molybdenum, potassium, uranium, vanadium and radium-226.

The data in hand for the R&D indicate similar results as on the impacts to the production aquifer following restoration as summarized above for the currently existing ISR facilities. The R&D facilities generally required significantly more time to reach levels for an NRC approved restoration due to the use of an extraction fluid that included added ammonium at several early R&D facilities. A license condition on the makeup of the extraction fluid for the existing ISR facilities effectively prohibits the use of ammonium in the extraction fluids.

For the approved restorations, the impacts to groundwater in the exempted aquifer met all regulatory standards for the state or EPA UIC program, met the quality designated for its class of use prior to ISR operations, have been shown to decrease in the future due to natural attenuation processes, and have been shown to meet drinking water standards at the perimeter of the exempted aquifer. Therefore, the impacts to the exempted aquifer for each of the approved restorations do not pose a threat to human health or the environment.

#### Aquifers Surrounding the Exempt Production Aquifer

##### *Excursions*

By license condition, all existing licensees must: (1) establish approved excursion parameters and define an acceptable excursion monitoring well network on a production unit basis; (2) perform bi-monthly sampling at the monitoring well network for the excursion parameters; (3)

report to the NRC Project Manager within 24 hours (48 hours in some cases) of an initiation of an excursion with a follow-up report within in 30 days; and (4) perform weekly confirmatory monitoring for a well on excursion status until corrective actions prove successful to eliminate the excursion status. All existing licensees are required by license condition to maintain on-site a record of excursions and the associate corrective actions. These reports are examined by NRC staff during routine inspections of the facilities. A license condition for one licensee (COGEMA) also requires quarterly reporting on all wells on excursion status until termination of the excursion status.

Based on a review of historical licensing documentation, the number of excursions reported for the three existing NRC-licensed operating facilities and the duration of the excursions constitute a small percentage of the total number of samples analyzed over that period. The data indicate that excursions have been controlled by the pumping and injection processes. In some cases, the excursions continued for several years. The impact to groundwater was investigated for each long-term excursion and it was determined that the associated impact did not pose a threat to human health or the environment. Continued monitoring is required for several of the wells on long-term excursion status until the wellfield restoration is complete to ensure acceptable impact to groundwater throughout the ISR operations. Detailed information on excursions at the licensed operating ISR facilities is provided in Table 1.

#### *Well Integrity Failures*

By license condition, all existing licensees must perform mechanical integrity tests (MITs) for all injection and production wells initially, to ensure that the wells are constructed properly, and subsequently, on a routine schedule, to ensure that the wells do not develop leaks. The facility must maintain this information on-site for NRC review during routine inspections.

Based on a review of the historical licensing documentation, the number of MIT failures reported for the three existing NRC-licensed facilities indicates that the mechanical integrity testing programs provide early detection of well failures prior to impacts to the environment. Overall, the frequency rate of the MIT failures is low for all existing facilities, except for a brief period in 2002 during which an abnormally high failure rate was reported for the PRI facility. The high failure rate was attributed to the use of inferior casing material for the wells. The facility promptly corrected the situation and no impacts were reported during monitoring of the upper aquifer. One MIT failure at the Crow Butte facility was attributed to a casing coupling failure which resulted in impacts to the shallow aquifer. The impacts were mitigated. The staff currently reviews casing material proposed for new facilities based on these lessons learned.

The data in hand indicates that MIT failures do occur. At two of the three existing licensed ISR facilities, investigations into impacts to the overlying aquifers are not immediately performed. However, the aquifer immediately overlying the production zone is monitored on a continual basis for excursions and the monitoring data indicate no impacts to that aquifer attributable to a well failure. At the third licensed facility, the impacts to the overlying aquifers are investigated following an MIT failure. The impacts at that facility did not pose a threat to human health or the environment for five of the six MIT failures. In the case of the single failure that did result in measurable unacceptable impacts, the impacts were mitigated to levels that were protective of human health or the environment. Detailed information on MIT failures at the licensed operating ISR facilities is provided in Table 2.

### On-Site Liquid Waste Disposal by Deep Well Injection

Two of the three NRC licensed facilities have on-site deep injection wells for disposal of waste liquid 11e.(2) byproduct material waste. In a license application, an applicant must document the location of each disposal well, its depth and separation from potable aquifers, anticipated rate of injection, and liquid chemistry of the byproduct waste. The NRC generally approves usage of an on-site disposal through deep well injection if this action is approved through the EPA 40 CFR Part 146 UIC program or state-approved UIC program and as long as exposure at the wellhead is protective of human health and the environment.

During the life of the facility, the licensee must maintain records on the disposal well usage and provides annual reports to the NRC. In addition, the licensee must perform routine MIT tests on each disposal well.

The data for the existing NRC-licensed operating facilities indicate that on-site deep well disposal of byproduct material waste has been conducted in a manner that is protective of human health and the environment.

### Regional Aquifers

Annual reporting that includes monitoring of the aquifers regionally (i.e., at a distance from the operations) is a license condition for all existing NRC-licensed operating ISR facilities. The constituents analyzed for the regional monitoring program include uranium and radium-226. The sampling locations include domestic wells, livestock wells or any nearby groundwater source. Based on a review of historical licensing documentation, data from the regional monitoring at all existing ISR facilities indicate that no impacts attributable to an ISR facility were observed at the regional monitoring locations. In addition, the staff is unaware of any situation indicating that: (1) the quality of groundwater at a nearby water supply well has been degraded; (2) the use of a water supply well has been discontinued; or, (3) a well has been relocated because of environmental impacts attributed to an ISR facility.

The data in hand on regional monitoring at the existing ISR licensed facilities includes the following:

For the COGEMA Irigaray/Christensen Ranch facility, semi-annual monitoring is required for seven regional ranch water supply wells.

For the PRI Smith Ranch/HUP facility, quarterly monitoring is required at 18 groundwater sites throughout its permit area.

For the CBR Crow Butte facility, semi-annual monitoring is required at 19 groundwater sites within 1 kilometer of a wellfield.

## **SUMMARY AND CONCLUSIONS**

Potential environmental impacts to groundwater at an ISR facility can result from inadequate restoration of the production aquifer following completion of the ISR operations, leakage from a failure of the subsurface well materials, or an excursion of the leaching fluids to the aquifers surrounding the production or exempted aquifer.

For NRC-approved restorations of the production aquifer, the staff acknowledges that several parameters require a long time to reach pre-mining concentration levels after operations at an ISR facility are completed. However, the concentration levels at the time of restoration approval have been determined to be protective of human health and the environment.

Excursions and MIT failures have been reported but, in most cases, are controlled and do not pose a threat to human health or environment to the surrounding aquifers. In the case of excursions, several long-term excursions have been reported for two existing ISR facilities. The existing impacts were investigated and determined not to pose a threat to human health or the environment. In the case of MIT failures, two license facilities do not investigate the impacts to the overlying aquifers; however, routine monitoring of the aquifer immediately overlying the production zone at those facilities has not detected impacts attributed to an MIT failure. At the third facility, the impacts to the overlying aquifers are investigated for each MIT failure. For five of the six reported MIT failures at that facility, no impacts to groundwater were identified. For one reported failure, the impacts were mitigated to levels protective of human health and the environment.

Regional groundwater monitoring is required for all three existing facilities. The monitoring data indicated no impacts attributed to the migration of impacted groundwater from the existing facility.

TABLE 1

## DATA IN HAND ON EXCURSIONS AT THE NRC-LICENSED OPERATING ISR FACILITIES

COGEMA Irigaray/Christensen Ranch Facility

Thirty-one excursion events were reported for the COGEMA Irigaray/Christensen Ranch facility. Of the 31 excursion events, 20 events were horizontal excursions and 11 events were vertical excursions. Most horizontal excursions were short-lived as the licensee was able to correct the situation by controlling the pumping and/or extraction rates at the nearby wellfield. Because the wellfields were undergoing restoration rather than operation (the database reviewed for excursions extended from the present back to the year 2000 during which time wellfields at the COGEMA facility were undergoing restoration), the control by changing pumping rates was slightly more difficult because the pumping and injection rates were low during the restoration process. Vertical excursions were less likely to occur but generally their durations were longer than horizontal excursions.

One horizontal excursion event at COGEMA was not controlled in a timely manner during 2004-2005. The Wyoming Department of Environmental Quality (WDEQ) released a well from excursion status based on a request by the licensee. The request was based on supporting documentation in which the licensee stated that the Best Practicable Technology had been applied during the wellfield restoration, the chemical makeup exceeded the baseline data but was consistent with the pre-mining class of use for the aquifer, area of the aquifer denoted by the "excursion" was limited in extent, and the chemistry of the production zone was not the source of the excursion. The licensee proposed quarterly monitoring at that well until final regulatory approval of the restoration activities. In 2008, the licensee submitted restoration data for Mine Unit 5. The excursion in question was addressed in that restoration package. The licensee indicated that while the excursion parameters (chloride, conductivity and alkalinity) remained elevated, the levels of trace metals and radionuclides were not elevated and consistent with attenuation within the wellfield. As part of its review process, NRC staff has requested additional information on the chemistry at this well. The restoration data currently are under NRC staff review.

The duration of vertical excursions at the COGEMA facility was generally longer than the typical horizontal excursion. In fact, most "long-term" vertical excursion events were terminated prior to reaching pre-excursion levels by the regulatory agencies following an in-depth review of impacts. It was shown that all parameters stabilized below the levels the state required for the pre-mining use of the aquifer. Therefore, the environmental impacts to the aquifer from the excursion were considered negligible and excursion status was terminated.

PRI Smith Ranch/HUP Facility

Twelve excursion events were reported for the PRI Smith Ranch/HUP facility. All 12 excursion events were horizontal excursions. Eleven of the 12 excursion events occurred at the HUP project. One event was induced by drawdown

during the required sampling of the well based on the geologic conditions. Sampling procedures for the wells in that vicinity were modified to minimize drawdown during the sampling. Unlike COGEMA, PRI does not routinely report the termination of their excursion events. The NRC guidance for a review of an ISR license application only addresses a timely notification for the initiation of an excursion but not a notification for its termination. The termination is addressed during NRC routine inspections and/or the licensee's quarterly (60-day) reports.

Seven wells at the PRI facility have been on excursion status for at least 60 days. The excursions at four (4) wells were attributed to effects of a former underground mine in the area of the wellfields and those at the other three wells were during wellfield restorations. The reported data on the long-term excursion events indicate that the water quality meets the WDEP pre-mining class of use for the aquifer. The NRC staff will review the data during the wellfield restoration report to ensure that the environmental impacts are protective of human health and the environment at the completion of the wellfield operations.

#### CBR Crow Butte Facility

Twenty excursion events were reported for the CBR Crow Butte facility. Eleven events were horizontal excursions of which four excursions lasted for up to six years. Three of the four excursions were due to wellfield geometry, i.e., the excursion event was at monitoring wells between wellfields (within the exempted aquifer) and the elevated levels were attributed to production at both wellfields. The fourth excursion was located in an area where the production zone wells were partially penetrating, i.e., within the lower portion of the exempted aquifer. Fully penetrating wells were installed and a control on the excursion was returned. The nine vertical excursions were attributed to natural fluctuations in the parameter levels in the upper aquifer and therefore, concluded not to be an excursion.

TABLE 2

## DATA IN HAND ON MIT FAILURES AT THE NRC-LICENSED OPERATING FACILITIES

COGEMA Irigaray/Christensen Ranch Facility

One-hundred thirty-five MIT failures have been reported for the COGEMA Irigaray/Christensen Ranch facility since 1998. The failure rate has been consistent on an annual basis at less than five percent of the wells tested.

PRI Smith Ranch/HUP Facility

Eighteen MIT failures were reported for the PRI Smith Ranch/HUP from the fourth quarter of 1999 to the first quarter of 2002. The MIT reports are included in submittals to Wyoming Department of Environmental Quality for the mining permit. The MIT failures are reviewed by NRC personnel during routine inspections. The failure rate was approximately equal to the rate reported for COGEMA (five percent of the wells tested).

During the fourth quarter of 2002, PRI reported an abnormally high failure rate. The source of the failure rate was attributed to faulty casing material. The casings were replaced. No impact to the surrounding overlying aquifer was detected during the excursion monitoring.

CBR Crow Butte Facility

Six MIT failures were reported for the CBR Crow Butte facility. The MIT failures were investigated to determine the depth of the casing failure. Five failures were determined to be at shallow depths. One failure resulted in impacts to the shallow groundwater in the immediate vicinity of the well. Those impacts were remediated to the aquifer baseline levels.

**Fettus, Geoffrey**

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**From:** Fettus, Geoffrey  
**Sent:** Wednesday, February 03, 2010 3:30 PM  
**To:** Kock, Andrea  
**Cc:** Shannon Anderson; ejantz@nrmelc.org; Robinson, Paul; Chris Shuey; 'Jones Steve'  
**Subject:** Lists of Illegible Figures - Draft Wyoming SEIS documents  
**Attachments:** Nichols Ranch EIS Figures 2-3-2010.doc; MooreRanchFigureRequestFeb2010.doc

Andrea-

Thanks again for taking the time to try to address the legibility issue of many of the figures in the Draft Environmental Impact Statements.

Per our phone call, please see below the attached list of figures for two of the Draft SEISs that are not legible (Moore Ranch and Nichols). I understand that Eric Jantz has requested a list of figures. To the extent that our requests do not overlap, please include us in any response you have to his request and send us more legible versions of the documents that he has requested. If this is a problem, please let us know as soon as possible. As noted in the call, we don't have bound versions, but pdfs either downloaded from the site or sent from NRC Staff per our letter of last month. We also reviewed the PDFs at the highest resolution and still could not make out significant portions of the text or the figures. Thanks very much and we look forward to receiving your response,

Cheers and thanks very much,

Geoff Fettus

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**Items that need to be resent with clearer versions from the  
Environmental Impact Statement for the Nichols ISR Project in  
Campbell and Johnson Counties, Wyoming;  
Supplement to the Generic Environmental Impact Statement for the  
In-Situ Leach Uranium Milling Facilities—Draft Report for Comment**

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6-2	6-1
6-3	6-2, 6-3
6-4	6-4

6-5	6-5
6-6	6-6
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6-10	6-8
6-11	6-9

**Items that need to be resent with clearer versions from the  
Environmental Impact Statement for the Moore Ranch ISR Project  
in Campbell County, Wyoming;  
Supplement to the Generic Environmental Impact Statement for  
In-Situ Leach Uranium Milling Facilities—Draft Report for Comment**

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## Fettus, Geoffrey

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**From:** Kock, Andrea [Andrea.Kock@nrc.gov]  
**Sent:** Friday, February 26, 2010 3:14 PM  
**To:** Fettus, Geoffrey  
**Cc:** Shannon Anderson; ejantz@nrmelc.org; Robinson, Paul; Chris Shuey; Jones Steve; Swain, Patricia  
**Subject:** RE: Lists of Illegible Figures - Draft Wyoming SEIS documents

Geoff I wanted to let you know that NRC has an initial revision to several of the figures you requested be clarified up on our web site. They can be viewed at: <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1910/s3/> and <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1910/s2/>

Please keep monitoring the web site where the documents are available for additional revised figures in the next few days as more will be posted..

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**From:** Fettus, Geoffrey [mailto:gfettus@nrdc.org]  
**Sent:** Wednesday, February 03, 2010 3:30 PM  
**To:** Kock, Andrea  
**Cc:** Shannon Anderson; ejantz@nrmelc.org; Robinson, Paul; Chris Shuey; Jones Steve  
**Subject:** Lists of Illegible Figures - Draft Wyoming SEIS documents

Andrea-

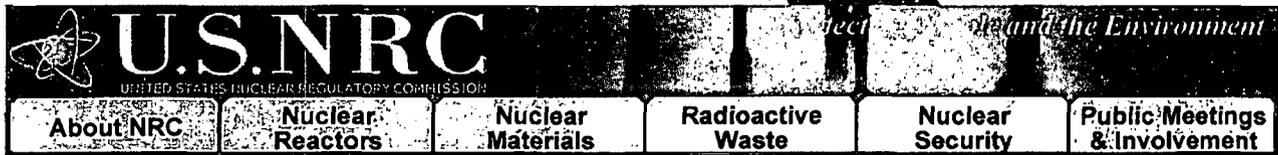
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Cheers and thanks very much,

Geoff Fettus

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## Environmental Impact Statement for the Nichols Ranch ISR Project in Campbell and Johnson Counties, Wyoming: Supplement to the Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities — Draft Report for Comment (NUREG-1910, Supplement 2)

This NUREG publication has been issued for public comment. Comments will be accepted until February 1, 2010. Comment period has been extended for 30 days. Please see the comment form.

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- [NUREG-1910, Supplement 2 \(PDF - 21.42 MB\)](#)
- The following figures have been revised for the final SEIS. Additional revised figures will be added as they become available:
  - o [Figure 6-5. Nichols Ranch Unit Surface Soil Sample Locations](#)
  - o [Figure 6-6. Hank Unit Surface Soil Sample Locations](#)
  - o [Figure 6-8. Nichols Ranch Unit Monitoring Well Locations](#)
  - o [Figure 6-9. Hank Unit Monitoring Well Locations](#)

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U.S. Nuclear Regulatory Commission  
Office of Federal and State Materials and  
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### Abstract

The U.S. Nuclear Regulatory Commission (NRC) issues licenses for the possession and use of source material provided that proposed facilities meet NRC regulatory requirements and would be operated in a manner that is protective of public health and safety and the environment. Under NRC's environmental protection regulations in the *Code of Federal Regulations* (CFR), Title 10, Part 51, which implement the *National Environmental Policy Act of 1969* (NEPA), issuance of a license to

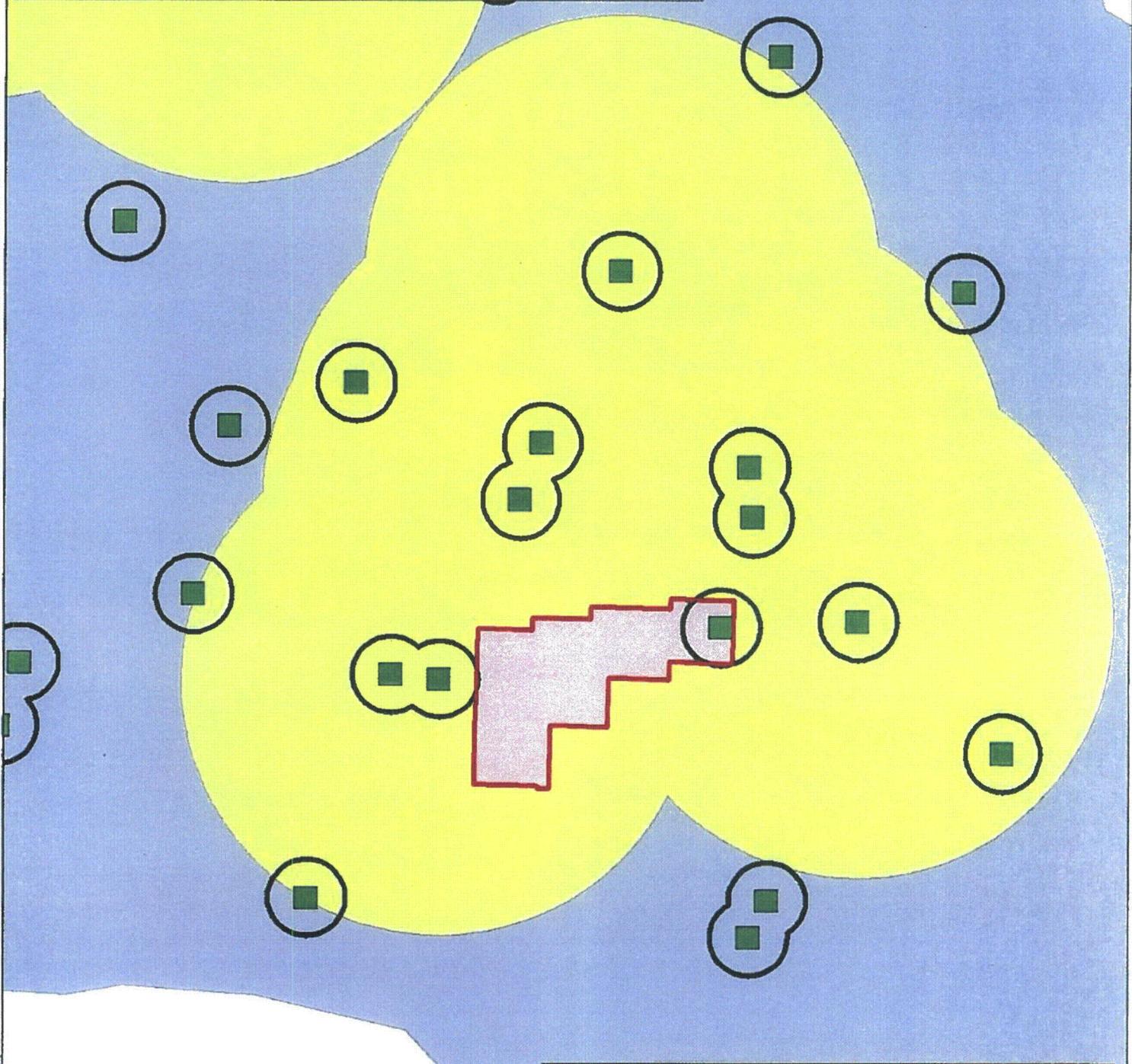
possess and use source material for uranium milling requires an environmental impact statement (EIS) or a supplement to an environmental impact statement.

In June 2009, NRC issued NUREG-1910, *Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities* (the GELS). In the GELS, NRC assessed the potential environmental impacts from the construction, operation, aquifer restoration, and decommissioning of an in-situ leach uranium recovery facility (also known as an in-situ recovery (ISR facility)) located in four specified geographic regions of the western United States. As part of this assessment, NRC determined which potential impacts would be essentially the same for all ISR facilities and which would result in varying levels of impacts for different facilities, thus requiring further site-specific information to determine potential impacts. The GEIS provides a starting point for NRC's NEPA analyses for site-specific license applications for new ISR facilities, as well as for applications to amend or renew existing ISR licenses.

By letter dated November 30, 2007, Uranerz Energy Corporation (Uranerz) submitted a license application to NRC for a new source material license for the Nichols Ranch ISR Project. The proposed Nichols Ranch ISR Project would be located in Campbell and Johnson Counties, Wyoming, which is in the Wyoming East Uranium Milling Region identified in the GELS. The NRC staff prepared this SEIS to evaluate the potential environmental impacts from Uranerz's proposal to construct, operate, conduct aquifer restoration, and decommission an ISR uranium milling facility at the Nichols Ranch ISR Project. This SEIS also describes the environment potentially affected by Uranerz's proposed site activities, presents the potential environmental impacts resulting from reasonable alternatives to the proposed action, and describes Uranerz's environmental monitoring program and proposed mitigation measures. In conducting its analysis in this SEIS, the NRC staff evaluated site-specific data and information to determine whether the applicant's proposed activities and site characteristics were consistent with those evaluated in the GELS. NRC staff then determined relevant sections, findings and conclusions in the GEIS that could be incorporated by reference, and areas that needed additional analysis. Based on its environmental review, the NRC staff recommends that, unless safety issues mandate otherwise, environmental impacts of the proposed action (issuing a source material license for the proposed Nichols Ranch ISR Project) are not so great as to make issuance of a source material license an unreasonable licensing decision.

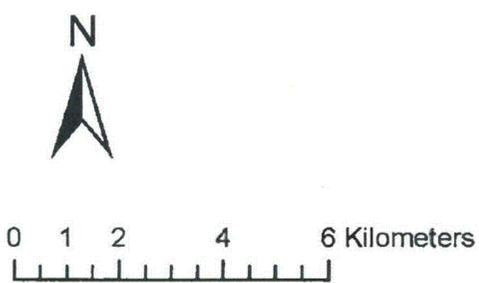
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# Lost Creek ISR Project Sweetwater County, Wyoming

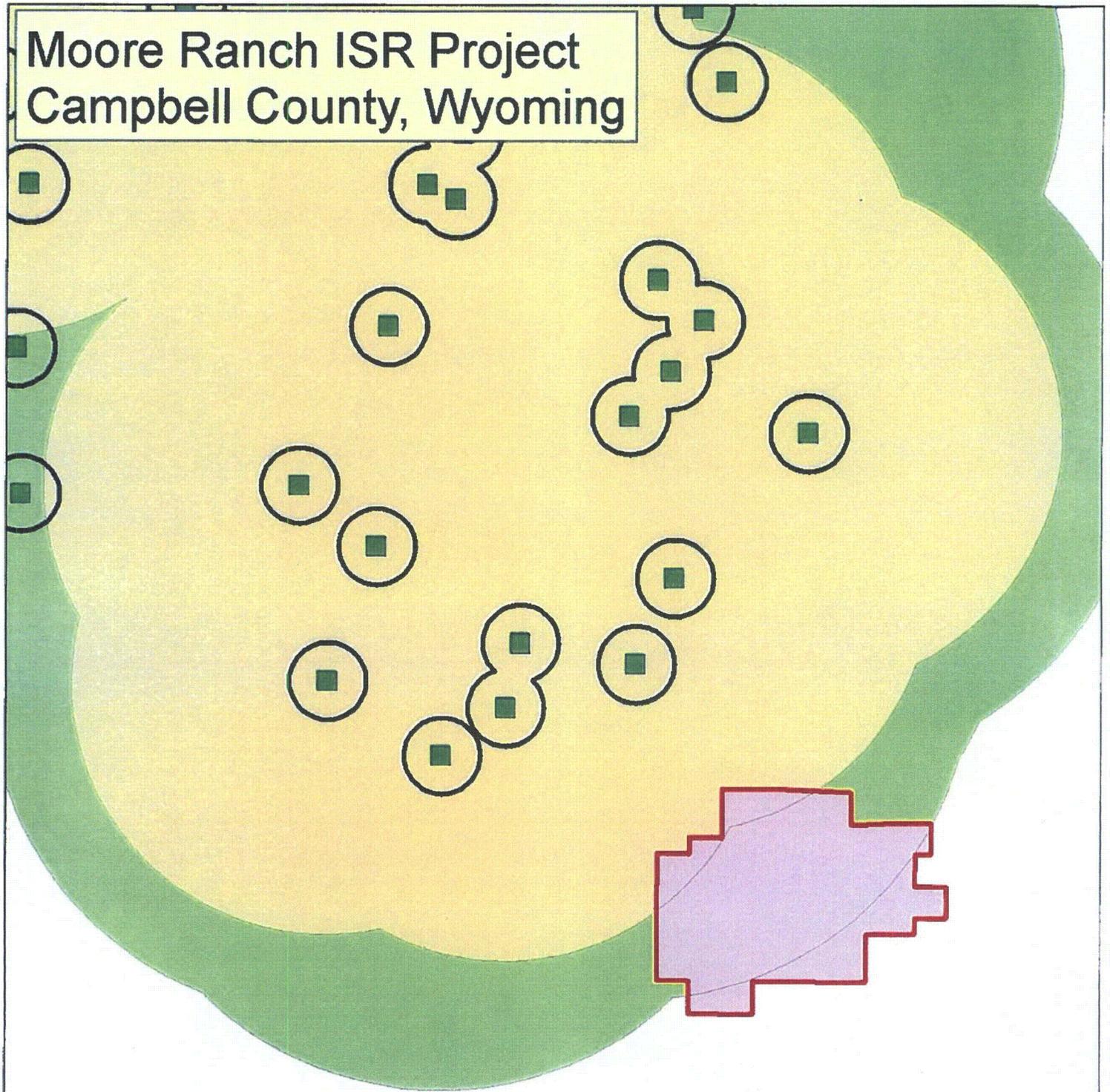


**Legend**

-  Lost Creek ISR Project Boundary
-  Occupied Sage Grouse Lek (WGFD)
-  0.6 Mile Buffer around Occupied Lek
-  Sage Grouse High Density Breeding Area
-  Governor's Sage-Grouse Core Population Area



# Moore Ranch ISR Project Campbell County, Wyoming



## Legend

-  Moore Ranch ISR Project Boundary
-  Occupied Sage-Grouse Lek (WGFD)
-  0.6 Mile Buffer around Occupied Lek
-  Sage-Grouse Medium Density Breeding Area
-  Sage Grouse Lower Density Breeding Area



0 1 2 4 6 Kilometers

# Nichols Ranch ISR Project Campbell and Johnson Counties, Wyoming

