

**GENERIC ENVIRONMENTAL IMPACT STATEMENT
FOR
IN-SITU LEACH URANIUM MILLING FACILITIES**

SCOPING SUMMARY REPORT

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U.S. Nuclear Regulatory Commission
Rockville, Maryland

1. INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) expects to receive a number of new license applications for uranium milling at sites in the states of Nebraska, South Dakota, Wyoming and New Mexico over the next several years. NRC anticipates that most of these potential license applications will involve uranium milling facilities that would use the in-situ leach (ISL) process. Because there are environmental issues common to ISL milling facilities, NRC has prepared a Generic Environmental Impact Statement (GEIS) to evaluate the potential environmental impacts associated with the construction, operation, aquifer restoration, and decommissioning at future ISL milling facilities in specific regions of interest within these four western states, where NRC is the licensing authority for uranium milling.

In the ISL process, a leaching agent, such as oxygen with sodium bicarbonate, is added to native ground water for injection through wells into the subsurface ore body to dissolve the uranium. The leach solution, containing the dissolved uranium, is pumped back to the surface and sent to a processing plant, where ion exchange is used to separate the uranium from the solution. The underground leaching of the uranium also frees other metals and minerals from the host rock. Operators of ISL facilities are required to restore the ground water affected by the leaching operations. The milling process concentrates the recovered uranium into the product known as "yellowcake" (U_3O_8). This yellowcake is then shipped to uranium conversion facilities for further processing in the overall uranium fuel cycle.

As part of its evaluation of a license application for uranium milling, NRC conducts an environmental review, as required by 10 CFR Part 51, to meet its obligations under the National Environmental Policy Act (NEPA) and publishes either an environmental assessment or environmental impact statement. NRC also regulates the radiological safety of ISL facilities, including the safe disposal of the waste materials associated with the milling process (these waste materials are regulated as "11e.(2) byproduct material" under the Atomic Energy Act). NRC documents the results of its safety review of a license application in a Safety Evaluation Report. The results of NRC's environmental and safety reviews form the bases for NRC's determination whether or not to issue a 10 CFR Part 40 source material license for uranium milling.

The NRC staff will use the GEIS in its review of site-specific ISL license applications. As part of its comprehensive site-specific review, the NRC staff will incorporate by reference appropriate background information from the GEIS and apply GEIS conclusions to the extent applicable. The GEIS will enhance the quality, consistency, and efficiency of NRC site-specific reviews of ISL license applications by allowing the NRC staff to focus on the issues unique to each proposed site.

The public scoping period for the GEIS opened on July 24, 2007, with the publication in the Federal Register of a Notice of Intent to prepare the GEIS and to conduct the scoping process (72 FR 40344). Scoping is an early and open public process designed to help determine the range of actions, alternatives, and potential impacts to be considered in the GEIS and to identify significant issues related to the proposed action. Input from the public is solicited to focus the analysis on the issues of genuine concern.

On August 7, 2007, August 9, 2007, and September 27, 2007, the NRC staff held public scoping meetings in Casper, WY; Albuquerque, NM; and Gallup, NM; respectively, to solicit both oral

and written comments from interested parties. At those meetings, the NRC staff provided an overview of NRC's mission and responsibilities and described both the *in-situ* leach process and NRC's regulatory process for the licensing of ISL facilities. Additionally, the NRC staff explained why the GEIS was being prepared, provided the schedule for the GEIS, and described how the public could participate in the development of the GEIS. After the NRC staff presentations, the remainder of the meeting time was set aside for members of the public to provide oral comments. Transcripts were prepared for all three meetings and are available online at the NRC Agencywide Documents Access and Management System (ADAMS), which is accessible at <http://www.nrc.gov/reading-rm/adams.html> or through the NRC website for the GEIS at <http://www.nrc.gov/materials/fuel-cycle-fac/licensing/geis.html>.

In addition to comments received at those three public meetings, interested members of the public also provided written scoping comments by regular mail and electronic mail to NRC. The public scoping period closed on November 30, 2007. Comments received by NRC are available for viewing online through ADAMS (<http://www.nrc.gov/reading-rm/adams.html>).

The public also will be invited to comment on the draft GEIS when it is made available. NRC will announce the availability of the draft GEIS in the Federal Register, on NRC's website (www.nrc.gov), and in the local news media. NRC's announcement also will provide the dates for the public comment period and information about public meetings. The NRC staff will consider the comments received on the draft GEIS and address them in the final GEIS.

This report summarizes the issues identified during the scoping process. Section 2 of this report summarizes the comments expressed, Section 3 identifies the issues to be considered in the GEIS, and Section 4 identifies those issues that are not within the scope of the GEIS.

2. ISSUES RAISED DURING THE SCOPING PROCESS

2.1 OVERVIEW

During the three public scoping meetings, 79 individuals offered comments. Not all commenters addressed the GEIS scope specifically, preferring instead to comment on the more general topic of uranium mining or milling; however, most expressed an opinion, either favorable or unfavorable, on either the GEIS or uranium mining or milling. Among the 79 commenters who spoke, roughly half of them expressed support for either the GEIS or for uranium mining or milling, while the other half neither supported the GEIS nor uranium mining or milling. The remaining individuals who spoke either expressed concerns or suggestions requesting NRC consider a particular topic of interest in the GEIS or provided information on local conditions.

Additionally, nearly 1400 individuals sent in written comments by electronic mail. Approximately 90 percent of these comments (1246) were sent as identical “form letters” opposing the GEIS. About two percent (28) of the e-mails were modified versions of the form letter (mostly opposing), and the remaining comments (123) were unique individual letters addressing a variety of topics. Five percent of the e-mail submittals (70) were from locations outside the US. Table 1 provides a list of individuals and entities that submitted scoping comments and a classification of the comments. Table 2 provides a list of individuals and entities that submitted duplicate scoping comments by email.

Finally, individuals and organizations provided written scoping comments by regular mail.

In addition to private citizens, commenters included:

- Members of the United States Congress
- Governor for the State of New Mexico
- Representatives of Native American governments
 - Navajo Nation Council
 - Navajo Nation Environmental Protection Agency
 - Eastern Navajo Agency
 - Navajo Attorney Generals Office
 - Pueblo of Acoma
- Members of the New Mexico State Senate
- Local Officials from Crook County in Wyoming; McKinley and Cibola counties in New Mexico; and the City of Grants, New Mexico
- Representatives from Federal agencies or organizations
 - Environmental Protection Agency, Office of Radiation and Indoor Air
 - Department of Interior, Bureau of Land Management
 - Department of Interior, Fish and Wildlife Service
- Representatives of State agencies or departments
 - State of Wyoming, Department of Environmental Quality
 - State of Wyoming, Department of Agriculture
 - State of New Mexico, Department of Fish and Game
 - Commonwealth of Virginia, Department of Mines, Minerals, and Energy
 - State of Colorado, Department of Public Health and Environment

- Representatives of the mining industry
 - National Mining Association
 - Alaska Miners Association
 - New Mexico Mining Association
 - Wyoming Mining Association
- Representatives of uranium mining companies
 - Energy Metals Corporation
 - Neutron Energy, Inc.
 - UR Energy USA
 - Uranerz Energy Corporation
 - Uranium Resources/HRI
- Representatives of other organizations, including:
 - Amigos Bravos
 - Blue Water Valley Down Stream Alliance
 - Biodiversity Conservation Alliance
 - Cebolleta Land Grant
 - Concerned Citizens for Nuclear Safety
 - Diocese of Gallup, New Mexico
 - Eastern Navajo Allottees Association
 - Eastern Navajo Dine Against Uranium Mining (ENDAUM)
 - Hunger Grow Away, Inc.
 - Juan Tafoya Land Grant Corporation
 - National Indian Council on Aging
 - New Mexico Environmental Law Center
 - Post 71 Uranium Committee
 - Powder River Basin Resource Council
 - Puerta Villa Land Grant Corporation
 - Powder State Chapter
 - Sierra Club

The following general topics categorize the comments received during the public scoping period:

- Purpose, need, and scope of the GEIS
- Scoping process for the GEIS
- Public involvement
- History and legacy of uranium mining
- Native American concerns
- Surface and ground water
- Land use
- Ecology
- Site-specific analyses
- Operational safety and emergency response
- Decommissioning and waste management
- Socioeconomics
- Environmental justice
- Historic and cultural resources

- Transportation
- Visual impacts and noise
- Surety
- Alternatives considered
- Cumulative impacts
- Monitoring programs
- Regulations and guidance
- National Environmental Policy Act
- Credibility of NRC

In addition to these comment topic areas, miscellaneous opinions and concerns were raised that dealt with issues such as national energy policy, reprocessing spent nuclear fuel, nuclear power, nuclear weapons, and pre-emptive war.

2.2 SUMMARY OF ISSUES RAISED

Section 2.2 provides a summary of the comments received during the public scoping period. As noted previously, comments were received on a variety of topic areas. The following discussion summarizes the public scoping comments by technical area and/or issues.

2.2.1 Purpose, Need, and Scope of GEIS

A number of comments received dealt with the purpose, need, and scope of the GEIS. Both general and specific comments regarding the content of the GEIS and whether to address both ISL and conventional milling technologies in the GEIS were received.

The majority of commenters questioned the usefulness of a GEIS given the unique site-specific conditions in the geographic areas where uranium recovery is by ISL extraction. These individuals commented that topics such as hydrology, water quality, geology, socioeconomics, and cultural diversity were examples of site-specific attributes that could not be adequately assessed in a GEIS.

Commenters were also concerned that NRC had not requested input on the decision to prepare a GEIS. A few commenters expressed the opinion that the GEIS process should initially assess whether uranium recovery operations should be expanded and then if the conclusion was affirmative, decide to prepare a GEIS. These commenters believed the current demand for uranium was based on market speculation rather than actual demand.

A few commenters thought the purpose for the GEIS was not sufficiently clear, noting that it should identify a specific federal action with all specific sites and locations identified. Another commenter noted that because there are no ISL permits in New Mexico, there was no need for a GEIS addressing ISL uranium recovery activities in New Mexico.

Specific comments regarding the content of the GEIS offered a wide variety of suggestions. A majority of commenters favored a rigorous environmental analysis, with a number of these commenters implying that the GEIS would not be rigorous because of its broader scope. These commenters suggested a site-specific environmental assessment to support a licensing review

would also be a limited analysis. A few commenters requested that various topics be included in the GEIS such as:

- uncommon features among ISL facilities that should be considered in site-specific reviews;
- resource estimates for all site-specific license reviews;
- evaluation of the proposed action and all connected actions;
- documentation of the geographic extent of new extraction activity including the details of schedule and licensing process;
- consideration of each type of ISL technology;
- lists of companies that intend to pursue uranium recovery; and
- detailed discussions of air quality standards, implementing agencies, ambient conditions, monitoring requirements, enforcement, and potential air quality impacts including cumulative and indirect impacts.

One commenter suggested the scope of the GEIS should be limited to regional cumulative and synergistic impacts. Another requested the GEIS address “agency capture” and the Federal Advisory Committee Act.

An additional group of comments came from residents or officials of states with uranium deposits that were not identified in NRC’s scoping notices. These commenters wanted their states to be included in the scope of the GEIS.

2.2.2 Scoping Process for the GEIS

Numerous commenters provided feedback on the scoping process. Many of these comments reflected concerns regarding public involvement (section 2.2.3). Other comments pertained to cooperation with other agencies. Some comments went beyond the scoping process and applied to the entire GEIS or licensing processes.

Comments from the U.S. Environmental Protection Agency (EPA) requested NRC designate EPA as a commenting rather than cooperating agency because they have statutory authority for various laws that apply to the operation of an ISL (for example, the Uranium Mill Tailings Radiation Control Act, the Safe Drinking Water Act, Clean Water Act, and Clean Air Act). The State of Wyoming requested cooperating agency status for the GEIS. Another comment recommended NRC enter into an MOU with the New Mexico Department of Environmental Quality for regulation of ISL facilities. A U.S. Bureau of Land Management (BLM) employee stressed the importance of communicating with local BLM staff during site-specific actions. The Governor of New Mexico expressed concern about the lack of prior consultation with respect to preparing the GEIS.

2.2.3 Public Involvement

Many commenters stressed the need for meaningful public participation in the GEIS and in the site-specific environmental reviews. One commenter recommended NRC expand the public outreach process for the preparation of both environmental assessments and environmental impact statements. Some individuals desired enhanced transparency, democracy, and sensitivity to potentially affected cultural groups.

Comments were also received on the GEIS scoping process (e.g., the number and location of scoping meetings, the short notice prior to the public scoping meetings, the limited time provided for public comment); the lack of public input on the need for a GEIS (e.g., preparation of the GEIS was a forgone conclusion); and the perception that public involvement could be limited by using a GEIS for site-specific licensing decisions when an environmental assessment is published.

Many commenters favored extending the comment period and having scoping meetings in all affected communities, including: Grants, Gallup, Crownpoint, and Church Rock in New Mexico, and in the states of Utah, Arizona, Colorado, and South Dakota. Other commenters wanted to include specific states and communities so that national interest groups could participate. Another commenter suggested that NRC hold public hearings in the affected areas for each site-specific license application.

2.2.4 History and Legacy of Uranium Mining

A number of individuals commented on the history and legacy of past uranium mining in western states. Some commenters recommended that the GEIS include discussion of both historic and current information on uranium recovery operations and also discuss environmental contamination remaining after the end of operations and remediation. Other commenters provided historical accounts of local public health and environmental problems associated with past uranium mining. Other commenters stressed the need to consider the impacts of existing contaminated “legacy” sites in site-specific assessments (e.g., local cumulative impacts of proposed operation with existing contamination). The need to avoid creation of additional “legacy” sites was also mentioned.

Some commenters expressed concern about remediating contamination after uranium milling is completed. These commenters cited past experience with ISL facilities in Texas where the ground water chemistry was unable to be restored to baseline conditions. Other commenters noted that conventional tailings sites in Utah and Colorado had complex and costly remediation issues.

A number of commenters linked local health problems to past uranium mining and expressed concerns regarding the lack of complete remediation and the limited compensation of workers and communities impacted by past mining activities. Commenters described past environmental contamination that resulted from abandoned conventional mines and unremediated tailings piles, breach of operational evaporation ponds, and ground water contamination. One commenter noted high radium concentrations in soils and the need to subsequently relocate families. Another commenter stated there were 150 abandoned mines in McKinley County (New Mexico) and 50 abandoned mines in Cibola County (New Mexico). A few commenters noted that NRC should not license new facilities until issues at formerly operating uranium recovery facilities had been resolved. A commenter asked who would be responsible for cleanup of legacy sites and feared a repeat of history. One commenter requested that NRC provide the public and other federal agencies with historical information on the existing legacy sites to inform the background characteristics of proposed sites.

2.2.5 Native American Concerns

Uranium ore deposits are located in or adjacent to some Native American communities. Commenters stressed that some of these communities have been impacted by past uranium mining activities and were therefore concerned about future uranium recovery activities in the same areas.

A number of commenters were concerned that the GEIS would undermine the sovereignty of indigenous peoples. Various commenters identified the Diné Natural Resources Protection Act of 2005, which prohibits uranium mining and processing on the Navajo Nation. Commenters stated that New Mexico sites overlapping Navajo Indian Country are subject to tribal law and review. One commenter suggested that NRC consult with the Navajo Nation Environmental Protection Agency to ensure that water quality is protected and that drinking water standards are met. A commenter noted that some lands have special cultural significance (e.g., Mt. Taylor in New Mexico). Another commenter described how Acoma Pueblo, Laguna Pueblo, and All Indian Pueblo Council have adopted resolutions opposing any new resource development (including uranium milling) that could negatively impact Pueblo sacred sites, lands, and water resources. The commenter suggested NRC not license uranium facilities on Pueblo land.

Other commenters noted the lack of formal consultation with Native American tribes by NRC prior to making decisions. They noted that consultation is necessary as both a federal legal requirement and to address Native American concerns. It was recommended that the GEIS describe the process for government-to-government consultation between NRC and potentially affected tribal governments and summarize issues identified and their resolution. Another commenter suggested that the GEIS include a section on Native American water rights and impacts that uranium milling may have on binding treaties between the U.S. government and Tribal governments.

Other commenters recommended that cultural resource and environmental justice evaluations in the GEIS include water supply, cultural, health, and other impacts on Native American tribes. The tribes identified included the Navajo, Sioux, Hopi, Yavapai-Apache, Shoshone, Northern Arapaho, Ute, and a number of Pueblo tribes. Some Navajo commenters indicated ongoing problems from past uranium mining including the lack of full monetary compensation to former Navajo uranium workers and families, the existence of un-remediated sites, and the lack of health studies in affected communities. Some commenters stated that NRC was insensitive to Native American concerns.

2.2.6 Surface and Ground Water

Surface Water: Some commenters expressed concerns about surface water. Specific issues identified in comments were changes to the chemistry of local surface water bodies from ISL surface water discharges and the potential to subsequently impact the chemistry of local ground water. One commenter recommended that the GEIS include information on surface water flows and the potential impact to local community surface water from proposed ISL operations. Commenters also recommended that surface water mitigation measures be described. Another commenter was concerned about the potential for mining interests to impact the Colorado River since the river is a key water resource for a number of western states.

Ground Water: A large number of commenters, both at the public scoping meetings and in written comments, expressed concerns about ground water contamination. In addition to general comments on ground water, commenters asked about ground water protection requirements and guidance, ground water restoration goals, restoration techniques, specific local ground water conditions, and ground water issues at existing milling sites.

A general ground water concern expressed by numerous commenters was contaminant migration away from the uranium recovery site during operations, and the mitigation measures taken once contaminant migration had been detected to control that migration. Some commenters noted that ISL operations are conducted only in portions of an aquifer that are exempted by EPA and therefore not considered to be suitable for use as drinking water due to poor water quality. One commenter was concerned about the criteria used to assess the potability of water supplies. Another commenter noted that ISL operations are conducted between horizontal confining layers of rock to limit potential vertical migration of contaminants.

Other commenters were concerned about water use impacts given that water is a limited resource in western states. Some recommended that the GEIS estimate the quantity and quality of water used and the potential impact to local area users and natural resources. Another commenter noted that ISL operations are not large water consumers, particularly compared to conventional uranium milling. Still other commenters were concerned about the potential for increased water usage during the ground water restoration phase of the ISL lifecycle.

Some commenters noted that heavy metals and other minerals in addition to uranium are released from the ore body by the injection of lixiviant or other re-injection fluids. These commenters recommended that the GEIS evaluate impacts of the release of these metals and minerals, with one commenter recommending NRC consider the impacts from past and existing Superfund mining sites as a point of comparison for the analysis of impacts from ISL sites.

Other commenters provided detailed technical comments in recommending that the GEIS include hydrologic flow data and assess the potential impacts on local communities where proposed facilities would be located. Another commenter recommended that the GEIS include hydrologic and biogeochemical information needed for site-specific conceptual models, data input requirements, model and parameter uncertainty, variability of interpretations, and risk assessments.

Ground Water Protection Requirements and Guidance: Some commenters questioned the requirements for restoring ground water after ISL operations end, noting that NRC discussed that restoration to pre-operational baseline conditions is required, but yet granted some sites approval of alternate concentration limits that were above baseline water quality conditions. Another commenter recommended that the GEIS describe the applicable standards (including the Navajo Nation's drinking water standards) and the agencies responsible for ensuring compliance with the restoration requirements. Other commenters noted that some NRC-approved alternate concentration limits were too high above baseline levels, while other commenters stated that NRC's authorizing of alternate concentration limits merely allowed the restoration of still contaminated sites.

A few commenters focused on the aquifer "class of use" designation (i.e., the use(s) to which the aquifer water could be put). One commenter recommended that the GEIS identify the "class

of use” for each aquifer potentially impacted by ISL licensing, while another commenter was opposed to “class of use” cleanup goals in place of current regulations (noting this would abridge current standards). One commenter asked NRC to re-evaluate the practice of allowing applicants to average ground water quality within a proposed well field area to establish baseline water quality (suggesting that averaging the poorer ore zone waters with outlying cleaner water skews the average toward higher levels of contamination).

Restoration Goal: Some commenters recommended using pre-operational baseline water quality as the appropriate restoration goal (i.e., returning the water quality after operations to its pre-uranium extraction state). A commenter noted that the Wyoming Department of Environmental Quality standards require restoration to baseline. Another commenter recommended that the drinking water standards as the appropriate restoration goal. One commenter noted that at a NRC regulated facility, the uranium concentration following restoration was 100 times the EPA drinking water standard for uranium. Some commenters stated it was not possible to restore ground water to baseline water quality conditions and claimed no ISL sites have been restored to baseline. One commenter referred to an NRC report that showed restoration at two ISL sites was not to baseline conditions. Another commenter recommended that the GEIS include site examples where ground water had been restored to baseline conditions.

Restoration Techniques: Comments were also received on the techniques of ground water restoration. One commenter recommended that the GEIS provide assurance that ground water can be restored. Another commenter suggested the GEIS discuss surface and ground water restoration procedures and include protocols to establish background concentrations for radioactive and hazardous constituents. One commenter suggested the use of bioremediation technologies be addressed in the GEIS. Another commenter noted that a recent Texas A&M seminar on uranium mining had concluded that the technology is not available to restore ground water to baseline conditions. Another commenter recommended that the GEIS describe past failures in ground water restoration.

A few commenters also identified geochemical issues. One commenter was concerned about increases in post-restoration ground water contaminant levels resulting from oxidation due to infiltrating oxygen-rich waters. Another commenter recommended that the GEIS include information on the variable rates of mineral oxidation/reduction to estimate the time required for aquifer conditions and dissolved mineral concentrations to return to baseline conditions. The same commenter stated the GEIS should consider changes in geochemical conditions, including issues such as carbon loss, pyrite oxidation, and other reactions.

Local Ground Water Conditions: Some commenters described local ground water conditions, focusing particularly on the water quality of local aquifers and the uses of these aquifers. A commenter expressed concern that uranium exploration wells located west of Mt. Taylor in New Mexico could potentially provide a pathway between contaminated and uncontaminated aquifers. Another commenter indicated that ISL milling could impact water supplies such that some communities might be forced to move their existing water supply wells as a result.

2.2.7 Land Use

Some commenters were concerned about land use. One commenter noted that ISL facilities typically are sited in remote areas where livestock grazing and oil and gas exploration occur.

Another commenter recommended that the GEIS evaluate the impacts to ranching activities, livestock, and wildlife from both the operation of ISL facilities and of other local mining activities. Another commenter noted that unique land tenure circumstances (e.g., emphasizing split estate lands, public lands, and Native American lands) were not specifically addressed in NRC's notices of scoping. The impact of ISL facilities to local property values was also discussed by some commenters. A number of other commenters questioned the acquisition of uranium leases and how landowners with only surface rights (and no mineral rights) would be impacted. Another commenter suggested land use mitigation measures be described in the GEIS and it was suggested that land reclamation for surface disturbance include both topsoil specifications and re-vegetation success standards.

2.2.8 Ecology

Some commenters were concerned about potential ecological impacts and how they would be considered in the GEIS. One commenter recommended that the GEIS consider surface disturbance impacts to wildlife and vegetation, including sensitive and endangered species. A few commenters were concerned about the potential harm to wildlife from uranium and other metal concentrations in the water extracted during ISL operations. Another commenter suggested that the GEIS analyze habitat fragmentation on the sage grouse and other species of concern from ISL operations. One commenter noted that ISL operations are minimally intrusive, have a small surface footprint, and therefore would result in small disturbances to ecology.

Other commenters provided examples of protective measures that could be taken to protect wildlife. These included ensuring that open water bodies (e.g., pits, ponds, tanks, lagoons) that could attract wildlife were covered, screened, or netted; that coverless impoundments include escape ramps operable at any water level; and that fences, roads, overhead power lines, and trenched piping be constructed to minimize adverse impacts to wildlife.

Other commenters expressed concern about the concentrations of selenium in wastewater from ISL operations and the potential impact of selenium on waterfowl using evaporation ponds, as well as concerns about the bioaccumulation of chemical constituents in biota from the land application of treated waste waters. A commenter noted that selenium co-exists with uranium deposits and could be mobilized by lixiviant from ISL operations. Technical information was provided on those metal concentrations associated with wildlife impacts.

The New Mexico Department of Fish and Game provided construction guidelines which they recommended be included in the GEIS. A commenter recommended that NRC work with both the Navajo Department of Fish and Game and the U.S. Fish and Wildlife Service to assess potential impacts to wildlife. Another commenter stated that native plants and trees should be restored in compliance with Executive Order 13112 on invasive species.

2.2.9 Site-Specific Analyses

A number of comments addressed either the relationship between the GEIS and the performance of site-specific licensing reviews or requested clarification of what topics would be addressed generically in the GEIS and which would need to be considered in site-specific reviews.

Over 90 percent of the written comment letters expressed a concern that site-specific issues could only be addressed by a site-specific environmental impact statement. These commenters were concerned about the usefulness of a GEIS given the site-specific nature of ISL operations. These commenters were also concerned that because of the GEIS, the site-specific NEPA review documents would be environmental assessments (EAs), which would have the effect of limiting public participation in the NEPA process by those potentially affected. These commenters also stated that the preparation of an EA involves less stringent environmental analyses and public participation requirements than would occur if an environmental impact statement (EIS) were prepared. One commenter requested that the GEIS clearly state the form of the site-specific analysis and associated public participation that would be conducted for any site-specific NEPA reviews tiered from the GEIS. Another commenter recommended that the GEIS include the decision-making criteria for preparing a site-specific EA versus an EIS.

Another commenter recommended that the GEIS clarify the environmental topics that would be resolved by the GEIS versus those that would be addressed in site-specific reviews. Other commenters provided opinions on topics they believed were site specific and, therefore, could not be analyzed in a GEIS. These topics included: transportation, geology, water resources, hydrology, local water quality, geochemistry, ecology, special status ecological species, critical habitat, socioeconomics, agricultural impacts, cultural properties, and cumulative impacts. Still other commenters were unclear as to whether any site-specific NEPA analyses would be done. One commenter suggested that preparation of the GEIS would eliminate the requirement for NEPA studies on individual ISL projects. A few commenters felt that preparing the GEIS would limit both the preparation of site-specific EISs and the public participation associated with this process; while another commenter disagreed, claiming that the GEIS would not preclude preparing site-specific EISs. Still another commenter expressed their opinion that, with the GEIS, EAs would be sufficient for site-specific ISL licensing. Finally, one commenter strongly recommended that NRC prepare individual EISs for all applications for uranium milling in NM.

2.2.10 Operational Safety and Emergency Response

A number of the individual written comment letters expressed general concerns about public safety at ISL facilities, environmental impacts, and worker safety. Some commenters requested that the GEIS consider specific types of operational impacts including the potential contamination of soil, surface water, air, ground water; the release of radon gas; the potential for either well field or other spills; the potential risk to children, and the potential risk associated with exposure to various processing solutions and processing resins. One commenter recommended that ISL facilities be required to install leak detection systems in injection and production wells. Another commenter questioned how NRC will ensure that ISL plants are constructed in a sound manner and not prone to failure.

Other commenters offered opinions on operational conditions at ISL facilities. One commenter recommended that the GEIS not assume that ISL facilities would be in remote areas, noting that experience in Colorado was contrary to this assumption. Another commenter noted that in Wyoming ISL facilities were typically located away from high population areas and designed to reduce risks. The commenter also noted that ISL facilities neither have ore stockpiles nor tailings impoundments, which reduces airborne emissions compared to conventional milling facilities, and that because of the common use of rotary vacuum dryers at ISL facilities for yellowcake drying operations, there were no particulate uranium emissions.

Safeguards and security concerns were also raised by a few commenters. Some commenters were concerned about the inclusion of credible accident scenarios, including sabotage and terrorism, in the GEIS and the evaluation of the emergency response to such scenarios. Another commenter was concerned about how information would be disseminated to local communities in the event of ISL facility contamination or release incidents.

2.2.11 Decommissioning and Waste Management

Some commenters were concerned about decommissioning and waste management. Some of the topics discussed in this section were also identified as issues discussed in Section 2.2.4 (History and legacy of uranium mining).

One commenter suggested that the availability of NRC licensed sites for the disposal of ISL radioactive wastes is limited and that the GEIS should include a discussion of this concern. Another commenter recommended that the GEIS also identify and discuss the disposition of wastes generated by construction, operation, and decommissioning, and explain the handling and disposal practices for such waste, including: annual waste volumes generated, disposal location, transportation routes to disposal locations, regulatory requirements for storage and disposal, and discussing whether the waste would be classified as hazardous under federal or tribal law. Another commenter noted that wastes produced by ISL facilities are considered 11e.(2) byproduct material and produced in smaller quantities as compared to the amounts produced by a conventional uranium mill.

Other commenters had specific concerns with particular waste treatment or disposal methods. One commenter stated the GEIS should evaluate the potential impact to surface and ground water from discharges from an ISL facility; identify specific discharges and needed National Pollutant Discharge Elimination System (NPDES) permits; and also consider the impact to both current and future water users. Another commenter recommended that the GEIS include information concerning the risk to the public and the environment from the use and availability of Underground Injection Control (UIC) deep well injection of waste waters in relation to the depth and location of public water supply wells.

2.2.12 Socioeconomics

A few comments on potential socioeconomic impacts were received. One commenter recommended that the GEIS evaluate social and economic impacts to communities both during operations and after decommissioning. Another person commented on the cost-benefit of ISL facilities with respect to creating jobs. Another commenter noted that ISL facilities are not large employers and that their operation would not have the same magnitude of impact as coal bed methane operations or oil and gas operations in the State of Wyoming. Another commenter stated the GEIS should assess impacts to overburdened communities already affected by oil, gas, and coal development, noting in particular the potential impact on the infrastructure such as roads, police, emergency response, the effect on housing costs and labor supply, and the effect on crime and drugs use. A few commenters noted that ISL milling would bring economic stimulus to the region by expanding the tax base for communities.

2.2.13 Environmental Justice

Comments related to the topic of environmental justice generally pertained to whether the issue should be analyzed in the GEIS. Additionally, commenters provided views on how the

environmental justice analysis should be done, and discussed the potential consequences of assessing environmental justice in the GEIS.

Some commenters believed environmental justice should be analyzed in the GEIS, while other commenters stated it should be assessed for each license application on a site-specific basis. One commenter stated that environmental justice could not be evaluated generically and that if it were analyzed in the GEIS, this would eliminate the need for further site-specific environmental justice reviews. The commenter further stated that NRC's environmental justice policy indicates meaningful analysis would be unlikely in the GEIS, even though NRC's public scoping notices identifies the issue of environmental justice as being addressed in the GEIS. Another commenter noted that since an environmental justice analysis is not required for an NRC environmental assessment, the analysis in the GEIS could be the only one performed to support site-specific licensing reviews. Another commenter stated that the concept of environmental justice assumes there is a choice for locating facilities; however, uranium recovery facilities must be located where the ore deposits occur.

A number of commenters provided recommendations regarding how to conduct an environmental justice evaluation in the GEIS. One commenter advised following the Council on Environmental Quality's guidance on environmental justice. Another commenter suggested that NRC provide opportunities for affected communities to participate in the NEPA process. It was further suggested that information and materials on the GEIS be provided in the Navajo language. Another commenter recommended that the GEIS document the existing health and environmental risks to affected communities. One commenter stated that an environmental justice analysis should consider the rights of indigenous groups under international law, impacts on lifestyle, economy, and disruption to property and cultural practices. Another commenter suggested the GEIS consider environmental justice impacts to Navajo people and ranchers. Commenters also stated that the GEIS needed to consider potential environmental justice mitigation measures for community disruption (including those communities that could be displaced or relocated), changes in existing transportation routes, and changes to water access. One commenter noted that a past NRC environmental justice evaluation for a particular site had not considered impacts from past contamination.

2.2.14 Historic and Cultural Resources

Comments relating to the issue of historic and cultural resources recommended that the GEIS comply with the requirements of the National Historic Preservation Act to protect historic properties located on tribal lands. Another commenter stated the GEIS should describe the notification process for local communities in the event that historical or cultural artifacts were found at an ISL facility. A commenter wondered how tribal cultural sensitivity would be considered in the NEPA process, what recourse local communities would have in that process related to cultural matters, and what importance any feedback from these communities would have in the NEPA process.

Other cultural resources comments are described in section 2.2.5 Native American Concerns.

2.2.15 Transportation

Transportation comments were related to the safety of transporting uranium from mill sites. Comments related to safeguards, security, and terrorism during transportation of yellowcake

uranium was identified as a concern. Another commenter stated the GEIS should describe all proposed uranium facilities and the miles of new road that would be required to support them. Dust generation from increased road use was also discussed, and the use of speed limits and dust suppression methods were identified as mitigation measures, along with the suggestion for ISL companies to work with local governments on solutions. Another commenter recommended that the GEIS not assume processing facilities would be located near well fields, citing a Colorado site that ships uranium solutions 250 miles for processing, and another company which proposed to ship uranium-loaded ion exchange resin beads from Colorado to Wyoming for further processing.

2.2.16 Visual and Noise Impacts

A few commenters expressed concern over the potential for visual impacts from ISL facilities, and also noted that noise impacts were low at ISL facilities.

2.2.17 Bonding / Surety

A range of comments were provided on the topic of financial assurance and bonding. A few commenters suggested the GEIS should describe and assess bonding for the complete restoration of ground water and land. Another commenter recommended that the GEIS describe the NRC formula used to calculate ground water restoration costs, which include ground water sweep, reverse osmosis, and other methods to return ground water to baseline conditions. A few commenters were concerned about past regulation of bonding (surety) for the clean up of sites and provided examples where the cleanup costs exceeded estimates. One commenter stated NRC should reconsider its policy of allowing the surety amounts for ground water restoration to be phased to match well field development. Another commenter recommended that the bonding analysis be based on either the greater of the worst case or 150 percent of the estimated clean-up costs. A bonded evaluation period for reclamation was also recommended. The role of state programs in restoration and avoiding duplication of effort were also mentioned as a cost factor. One commenter asked whether background checks are conducted to ensure that "bad companies" do not manage an ISL facility.

2.2.18 Alternatives Considered

Opinions on the alternatives included in the scoping notice for the GEIS were provided, however, most comments recommended additional alternatives for consideration in the GEIS.

One commenter stated that comparing ISL milling and conventional uranium milling as alternatives is flawed, because both are not usually applicable alternatives for a given site or for the type of uranium ore deposit to be exploited. Additionally, the commenter stated that both methods are not mutually exclusive alternatives since the uranium-rich lixiviant from the ISL facility can be processed at a conventional mill. The commenter recommended separate evaluations for each milling method (ISL and conventional mill). A few commenters supported analysis of conventional mills in the GEIS. Another commenter suggested that additional alternatives be included in the GEIS analysis, noting that NEPA requires a reasonable range of alternatives to be considered (even those outside the jurisdiction of the lead agency) and that rationales be provided for those considered but not evaluated in detail.

Recommendations for considering other alternatives in the GEIS included a variety of suggestions. A commenter recommended that alternative sources of uranium processed at ISL facilities be considered in the GEIS, including reprocessed spent fuel, drinking water treatment residuals, and uranium in sea water and phosphates. Another commenter suggested the use of government stockpiles of uranium to meet the nation's needs rather than milling as an alternative.

Other commenters recommended that the GEIS analyze variations in the ISL process. These variations touched on

- alternative leaching solutions (e.g., the use of sulfuric acid or hydrogen peroxide lixiviants) based on local mineralogy or other geologic factors,
- alternative ISL techniques of uranium recovery, such as the artificial flooding of unsaturated zones
- well field restoration methods,
- transportation modes and routes,
- well field sizes, configurations and access methods,
- locations and types of processing facilities, and
- treatment and disposal of process-related waste water.

Commenters also recommended that the GEIS consider establishing limitations on where ISL milling would be allowed (e.g., based on the types of aquifers and geology involved). A related comment recommended not allowing ISL operations in aquifers that are used or possibly could be used as a source of public drinking water.

A few commenters also recommended that the GEIS include consideration of alternative energy sources that they considered are less damaging to the environment, as well as alternatives to nuclear power that creates the demand for uranium and uranium milling.

2.2.19 Cumulative Impacts

Commenters also suggested topics that should be included in the GEIS analysis of cumulative impacts. The assessment of cumulative impacts involves assessment of the incremental impacts from the current action when added to those from past, present, and reasonably foreseeable future actions.

A commenter stated the GEIS should consider the environmental impacts from both licensed and non-licensed activities from all past uranium recovery activities. Other commenters suggested the GEIS analysis of cumulative impacts should include the impacts from past uranium mining and milling legacy sites and the existing contamination in the vicinity of proposed ISL operations. Other commenters stated the GEIS analysis of cumulative impacts should consider the combined impacts from both proposed ISL facilities and proposed conventional mills.

Some commenters noted that the locations of ISL facilities in Wyoming would be near to existing and planned oil and gas development, coal mining, and coal bed methane operations (including aquifer dewatering), and these activities should be considered in the analysis of cumulative impacts. Other commenters noted past problems with types of mining other than

uranium mining (e.g., oil and gas, copper). Still other commenters identified specific nuclear and non-nuclear facilities that they felt should be included in the evaluation of cumulative impacts. A few commenters expressed concern over the cumulative impacts to the quantity and quality of locally available ground and surface water, and to air quality.

2.2.20 Monitoring programs

A commenter recommended that the GEIS discuss the environmental monitoring programs that are designed to assess impacts from facility operations and the effectiveness of waste disposal technologies, including methods used and requirements for monitoring disposal and waste management plans. The commenter suggested that this discussion describe how monitoring would ensure that impacts are addressed and mitigated once the impacts are identified. The commenter further recommended that the GEIS discuss the use of adaptive management as incorporated into the monitoring protocols for each facility's environmental measures.

Another commenter expressed a concern that monitoring requirements are needed for the whole ISL mill process to limit the potential for ground water contamination from operations by helping to mitigate and prevent spills and ground water contamination before they happen. A commenter recommended that the time limits on restoration monitoring be extended to 20 years to ensure that there are no long-term impacts to the ground water. A few commenters recommended that the distance between ground water monitoring wells for an ISL well field reflect the geometry of the ore deposit so as to more effectively to detect the movement of the leaching solution from the well field during operations. Other commenters stated that there is a need for additional checks and balances on monitoring, and suggested the use of a third party to monitor and gather baseline ground water data so that local residents could be reassured that their water quality is not being impacted. A commenter also recommended that sampling requirements be established for monitoring oxidation-reduction conditions in the ore-bearing aquifer before, during, and after ISL operations.

2.2.21 Regulations and Guidance

A number of comments were provided that pertained to regulatory topics, including: comments on existing regulations, agencies involved in regulating uranium recovery facilities, existing guidance and practice, agreement state issues, and rulemaking activities.

Some commenters suggested that existing regulations and guidance are either outdated or should be improved and provided recommendations for making revisions. These included a suggestion to revise 10 CFR Part 40 and to proceed with a 10 CFR Part 41 rulemaking to address issues such as requirements for compliance location, ground water monitoring, compliance demonstration, surety, limiting excursions, remediation following excursion, and establishing pre-operational baseline ground water conditions. Other commenters recommended similar changes to regulations, but focused on single areas of interest such as monitoring, baseline conditions, or restoration. One commenter noted that the GEIS should clarify how any new ISL ground water restoration standards and the existing 10 CFR Part 40 will meet the Uranium Mill Tailings Radiation Control Act and 40 CFR Part 192 for a demonstration of how onsite or offsite water resources will be protected. Another commenter recommended that climate change be added to updated regulations, including consideration of impacts to ISL facilities from increases in storm events, changes in precipitation, and consideration of "carbon

footprint” issues. One commenter expressed the opinion that current environmental standards for air, water, soil and waste are adequate.

A few commenters expressed confusion regarding the authorities and responsibilities of various local, state, and federal regulatory agencies in regulating uranium recovery facilities. They recommended that the GEIS clarify the roles of each agency. A few commenters asked who would be responsible for providing clean water to communities if ground water is contaminated by ISL operations and who would be responsible for the clean up of contamination once operations stopped. Another commenter recommended that the GEIS recognize the U.S. EPA role in regulating aspects of uranium extraction activities, including underground injection control. A commenter recommended that the GEIS include procedures for how licensing actions that span two states are addressed.

Others provided comments on existing regulatory guidance or practices. One commenter requested NRC identify and remedy any past regulatory assumptions or practices that have contributed to adverse environmental impacts from uranium recovery activities. A number of commenters expressed the opinion that the 1980 GEIS on conventional uranium milling was out of date and needed to be revised. Detailed suggestions were provided by a few commenters on how NRC should revise the 1980 GEIS, including using documents identified by the commenters in any update to that GEIS. Another commenter recommended that NRC amend its environmental justice policy to require a supplemental environmental impact statement analyzing environmental justice in every instance where an ISL operation is proposed in or near an environmental justice community. The commenter felt that this would ensure that environmental justice is considered when a site-specific environmental assessment was prepared. One commenter stated that NRC’s guidance concerning the disposal of certain materials in a conventional uranium mill’s tailings impoundment was not final nor enforceable, because the definition of “ore” in the guidance was too broad and allowed particular materials that were not similar to uranium ore or tailings to be disposed in the impoundment.

Additional comments provided recommendations to change past or current regulatory practices. One commenter suggested the NRC position that pre-1978 tailings are outside the authority of the Uranium Mill Tailings Radiation Control Act should be clarified, perhaps by a rulemaking on conventional milling standards. Another commenter suggested the NRC policy of performance-based licensing has evolved into industry self-regulation (e.g., allowing major changes without appropriate oversight) and that the policy needed to be reconsidered. One commenter stated that the NRC practice of characterizing radiation from conventional mine waste on or near an ISL site as background radiation for the purpose of calculating ISL operational air impacts violates the plain language and intent of NRC regulations and ignores cumulative impacts from past and current milling activities. Another commenter recommended that NRC address problems with its fee-based regulatory structure. One commenter suggested that radiation dose standards be set for the most vulnerable individuals (e.g., women and children), while another mentioned that “reference man” standard used in the dose calculation was not representative of most people in New Mexico. Regarding the practice of limiting the number of waste sites by disposing of ISL wastes in existing conventional mill tailings impoundments, one commenter recommended that if such sites are not available, NRC should allow ISL sites to join together to construct a common 11e.(2) byproduct material disposal site that meets 10 CFR Part 40, Appendix A requirements. Another commenter recommended establishing laws and penalties for a licensee’s corruption.

A few commenters expressed concerns regarding how NRC agreement states might be impacted by publication of the GEIS. One recommended that NRC recognize the effectiveness of non-agreement state regulations and recommended that NRC enter into a memorandum of understanding with non-agreement states so as to limit dual regulation of ISL facilities.

2.2.22 National Environmental Policy Act

A number of commenters expressed opinions about the GEIS in the context of the intent and requirements of the National Environmental Policy Act (NEPA). One commenter recommended that NRC explain how a GEIS meets the requirements of NEPA, which requires a site-specific analysis considering local impacts, mitigation measures, and public participation. The commenter further requested that NRC discuss examples of other GEIS's. Another commenter suggested that since the licensing of an ISL facility was a major federal action, an environmental impact statement was required. Other commenters claimed that the GEIS was inconsistent with the intent of NEPA, noting that a GEIS is similar to a programmatic environmental impact statement, which is only applicable to broad and similar actions. Another commenter noted that the GEIS is applicable due to similarities among ISL recovery processes among sites, and still another suggested the GEIS would allow consideration of redundant issues in ISL licensing.

One commenter suggested that NRC's approach in applying a generic, and therefore abstract, approach to the analysis of environmental impacts in the GEIS fails to meet the required "hard look" standard in NEPA concerning the review of individual licensing actions and their potential impacts. Another commenter claimed the language of the scoping notice that indicated NRC's intent to tier site-specific environmental assessments (EAs) to the GEIS actually pre-determined the outcome of the NEPA process (i.e., an EA and finding of no significant impact) and therefore indicates NRC's intent to avoid preparing site-specific environmental impact statements (EISs). Still another commenter recommended that NRC use tiering to examine program level decisions and apply the "hard look" review to site-specific actions, preparing an EA or EIS as necessary and allowing public participation in either case. One commenter recommended that the GEIS include the levels of coordination, analysis, and public outreach required for completion of the NEPA process for individual licensing decisions.

One commenter mentioned that NRC had not listed a number of potentially related actions to the GEIS in the scoping notice, and thus being inconsistent with an open decision-making process. The actions identified by the commenter included various uranium recovery rulemakings; the perceived "blanket approval" of pending ISL license applications and conventional mill restarts; and the establishment of a national radioactive source tracking system. Other commenters stated that the GEIS was unlawful in the context of NEPA, because the description of the proposed action in NRC's scoping notice failed to identify the specific licensing actions or rulemakings at issue, and therefore the proposed action to be evaluated was not clear.

2.2.23 Credibility of NRC

Some commenters questioned the credibility of NRC in its regulation of uranium milling, its execution of the scoping process, and in publishing a GEIS.

Some commenters mentioned that the way in which the scoping meetings were announced, it appeared that NRC was not interested in seeking public comment in good faith (e.g., "hoped no

one would notice”). Another mentioned the NRC decision to develop a GEIS without public comment suggested that NRC was indifferent to the communities most affected by the decision. A number of other commenters claimed that NRC was more concerned about satisfying the uranium milling industry or lobbyists (one referred to NRC as “corporate lapdogs”). Several other commenters suggested that since NRC has failed to enforce regulations to ensure safety in the past, it could not be trusted for ensuring safety now.

2.2.24 Miscellaneous

A number of comments conveyed either general support for or opposition to the GEIS, to uranium milling, to nuclear power, to nuclear weapons, and to alternative energy sources.

3. SCOPE OF GEIS AND SUMMARY OF ISSUES TO BE ADDRESSED

The scoping process and the comments received during the public scoping period for the GEIS were used by NRC to aid in determining the scope of the GEIS. The following topical areas and issues will be analyzed in the GEIS:

- *Proposed Action and Alternatives.* The proposed action for the GEIS is the construction, operation, and decommissioning of and ground water restoration at ISL uranium milling facilities in regions of four western states where NRC is the licensing authority for uranium milling. These four states are Nebraska, South Dakota, Wyoming, and New Mexico. The boundaries of the regions were based on the presence of (1) uranium ore amenable to the ISL process, (2) ISL facilities previously licensed by NRC, and (3) potential future ISL facilities as identified to NRC by uranium milling companies. The GEIS will also address the no-action alternative to the proposed action. The no-action alternative is to not license additional ISL facilities in the identified milling regions.
- *Applicable Statutes, Regulations and Agencies.* Various applicable statutes, regulations, and implementing agencies at the federal, state, and local levels involved in regulating ISL facilities will be identified and discussed in the GEIS. The roles of the various agencies involved in ISL regulation will also be described.
- *Purpose of the GEIS and Use in Site-Specific Licensing Reviews.* The GEIS will provide a statement of purpose and include a description of the NRC licensing process and how NRC intends to use the GEIS to aid in its evaluation of potential environmental impacts in site-specific licensing reviews.
- *Opportunities for Public Involvement.* As part of the description of the NRC licensing process, the GEIS will include description of opportunities for public involvement in site-specific ISL reviews.
- *Applicable Rulemaking Activities.* The GEIS will be based on the existing regulations in effect at the time the GEIS is written. As appropriate, any applicable ongoing or planned rulemaking activities applicable to ISL facility licensing will be described.
- *Land Use.* The GEIS will discuss the potential impacts to existing land uses in the ISL milling regions associated with the construction, operation, decommissioning, and ground water restoration of ISL facilities. This will include potential impacts to ranching, grazing, recreation, industrial, and cultural activities.
- *Transportation.* The GEIS will discuss potential radiological and non-radiological impacts from ISL transportation activities during construction, operation, ground water restoration, and decommissioning. This includes shipment of supplies, yellowcake product, and wastes associated with each phase of the ISL facility lifecycle. Normal transportation and accident conditions will be considered. Potential non-radiological impacts to be evaluated include dust generation and impacts to infrastructure, such as roads and local traffic conditions. Potential radiological impacts considered will include direct radiation and potential release of radioactive material from accidents during shipment.

- *Geology and Soils.* The GEIS will describe the geology and the soils of the ISL milling regions. These descriptions will be used in support of the evaluation of potential impacts to surface and ground water from ISL activities. The GEIS will also address the potential impacts to the geology and soils from the different phases of the ISL facility's lifecycle.
- *Water Resources.* Potential impacts to surface water, wetlands, and ground water from construction, operation, ground water restoration and decommissioning will be assessed in the GEIS. The potential for ground water impacts, in particular, is noted as a key concern that historically has been a key area of focus in ISL licensing. The GEIS will address the potential impacts to surface and ground water quality and availability in the vicinity of an ISL facility, and this will include discussion of the requirements for and the process of operational ground water monitoring, the management of liquid wastes from the ISL process, and the methods used in ground water restoration.
- *Ecology.* The GEIS will assess the potential impacts of proposed ISL facility operations, construction, decommissioning and ground water restoration to ecology in the ISL milling regions. This will include consideration of potential impacts to terrestrial, aquatic, and threatened and endangered species from all phases of the ISL facility lifecycle.
- *Meteorology, Climatology, and Air Quality.* The GEIS will consider the potential impacts of proposed ISL facility construction, operations, ground water restoration, and decommissioning to local and regional air quality from both radiological and non-radiological emissions. Radiological emissions will include radon from well field, processing, and waste treatment operations and the potential for uranium particulate emissions from yellowcake drying operations. Non-radiological emissions include combustion engine exhausts from trucking and well drilling operations and fugitive dusts from a variety of activities.
- *Noise.* Potential noise impacts from proposed ISL facility construction, operations, ground water restoration, and decommissioning will be assessed in the GEIS. This includes noise from well field development, uranium processing activities, and trucking activities associated with all phases of the ISL facility lifecycle.
- *Historic and Cultural Resources.* The GEIS will discuss potential impacts from proposed ISL facility construction, operations, ground water restoration, and decommissioning to historical and cultural resources. Local and regional historic and cultural properties in ISL milling regions will be addressed. The process for consultations concerning historic and cultural resources will be discussed in the GEIS.
- *Visual Resources.* Potential impacts to visual resources in uranium milling regions from proposed ISL facility construction, operations, ground water restoration, and decommissioning will be assessed in the GEIS. Assessments will consider scenic vistas and how the ISL facility lifecycle could impact these resources.
- *Socioeconomics.* The GEIS will address the potential impacts of proposed ISL facility construction, operations, ground water restoration, and decommissioning to socioeconomic conditions in uranium milling regions. Local and regional characteristics

pertaining to demographics, income, housing, employment, finances, and education will be considered.

- *Public and Occupational Health.* Potential impacts to public and occupational health from proposed ISL facility construction, operations, ground water restoration, and decommissioning will be assessed in the GEIS. This assessment will include both non-radiological (including chemical) and radiological effluents and releases under normal (routine) and accident conditions.
- *Waste Management.* The GEIS will consider impacts from waste management activities of proposed ISL facility construction, operations, ground water restoration, and decommissioning. Generation, handling, treatment, and disposal of process-related wastes and municipal wastes will be addressed.
- *Ground Water Restoration.* The restoration of the uranium ore-bearing ground water aquifer(s) following operations will be assessed in the GEIS. Hydrologic conditions in uranium milling regions will be considered as well as available restoration technologies and methods. Available data from aquifer restoration efforts at past and current ISL sites will inform the analysis. A discussion of regulatory requirements and the roles of various federal, state, and local agencies regarding ground water restoration will also be included in the GEIS.
- *Decontamination, Decommissioning, and Reclamation.* The GEIS will assess the potential impacts to the environment following the end of ISL operations, including removal of facilities and equipment, disposal of waste materials, cleanup of contaminated areas, and reclamation of lands to their pre-ISL facility condition.
- *Accidents.* Potential accident conditions will be addressed in the GEIS. This will include consideration of a range of possible accidents and estimation of their consequences, including: well field leaks and spills, excursions of the leaching solution beyond the well field, processing chemical spills, and ion exchange resin and yellowcake transportation accidents.
- *Environmental Justice.* The GEIS will discuss the potential for disproportionately high and adverse impacts on minority and low income populations from future ISL licensing in the uranium milling regions.
- *Cumulative Impacts.* The GEIS will discuss the cumulative impact of adding the potential environmental impacts from proposed ISL facility construction, operations, ground water restoration, and decommissioning to other past, present, and reasonably foreseeable future actions in the uranium milling regions.
- *Monitoring.* The GEIS will discuss various monitoring requirements and techniques used to detect and mitigate the spread of radiological and non-radiological contaminants beyond boundaries of the ISL facility.
- *Financial Assurance.* The GEIS will describe the requirements and practices designed to ensure that companies engaged in ISL uranium recovery will have sufficient funds set

aside to close down operations, restore affected ground water, decontaminate and decommission facilities and reclaim lands.

4. ISSUES CONSIDERED OUTSIDE THE SCOPE OF THE GEIS

Some issues and concerns raised during the scoping process were not directly related to the assessment in the GEIS of potential environmental impacts from the ISL process, and for that reason, these issues and concerns will not be specifically addressed in the GEIS. However, the lack of in-depth discussion in the GEIS does not mean that an issue or concern lacks value. Issues beyond the scope of the GEIS either may not yet be ripe for resolution or are more appropriately discussed and decided in other venues.

Categories of issues outside the scope and therefore not analyzed in detail in the GEIS include:

- NRC's licensing process and the decision to prepare the GEIS
- General support or opposition for GEIS or uranium milling
- Requests for cooperation or agreements
- Matters that are regulated by agreement states
- Impacts associated with conventional uranium milling past or present
- Requests for compensation for past mining impacts
- Recommendations for changes to regulations or guidance
- Resolution of dual regulation issues
- Consideration of human induced climate change
- Analysis of all variations of ISL technology
- Alternate sources of uranium feed material
- Energy debate
- Expanded cumulative impact analysis
- NRC credibility

4.1 NRC's Licensing Process and the Decision to Prepare the GEIS

A number of commenters raised issues that involved NRC's process for licensing ISL milling facilities and NRC's decision to prepare the GEIS. These issues included (1) concerns about the lack of public input in the decision to prepare the GEIS; (2) comments on the scoping process for the GEIS that included the location and number of public meetings, the comment period duration, and the notice for the meetings; and (3) recommendations for types of analyses be done instead of the GEIS (e.g., an evaluation of deficiencies in the ISL licensing process, an evaluation of ISL milling performance and compliance by an independent third party).

NRC considers feedback on the scoping process important and made efforts to respond to public concerns by extending the public comment period several times and by adding a third public scoping meeting. NRC did not request public comment on the need for a GEIS, because NRC considers this to be an internal agency decision. The NRC staff was directed by the Commission to prepare the GEIS. Given the large number of expected ISL license applications, the NRC determined that the preparation of a generic EIS (other federal agencies use the term "programmatic EIS") was the most efficient use of agency resources. Additionally, while other types of analyses may be informative, NRC considers the GEIS to be the appropriate NEPA document to be prepared at this time.

4.2 General Support for or Opposition to the GEIS or to Uranium Milling

Some commenters stated general support for or opposition to the GEIS or to uranium milling activities in general. These types of comments are useful for understanding public opinions on the GEIS, but by themselves, do not impact the scope of the document.

4.3 Requests for Cooperation or Agreements

Some commenters representing federal or state agencies expressed requests for cooperation or specific cooperative agreements regarding the regulation of ISL facilities. These types of requests will be considered and addressed, as necessary, by NRC on a case-by-case basis. These are separate actions that do not relate to the scope of the GEIS.

4.4 ISL Licensing Regulated by NRC Agreement States

A number of comments were received pertaining to current or future uranium milling activities in NRC agreement states. These included requests that potential future ISL milling in states such as Colorado, Utah, and Texas be addressed in the GEIS. ISL licensing actions in NRC agreement states are outside the scope of the GEIS, because the licensing authority for such actions is the agreement state, and the purpose of the GEIS is to support NRC's licensing review for ISL facilities. This point will be further clarified in the GEIS.

4.5 Impacts Associated with Conventional Uranium Milling Past or Present

A number of commenters addressed conventional uranium milling topics. These topics included: (1) the GEIS on conventional milling (NRC,1980), (2) the legacy of past conventional milling activities, and (3) conventional mill waste management practices.

Because the need for the GEIS is to address NRC's licensing reviews for ISL facilities, topics related to conventional milling will not be addressed in the GEIS. The legacy of past conventional uranium milling will be identified in terms of cumulative impacts in the GEIS; however, a detailed cumulative impacts analysis is a site-specific evaluation.

4.6 Requests for Compensation for Past Milling Impacts

Some scoping comments requested the issue of compensation for past uranium milling impacts be addressed in the GEIS, including injured workers involved in uranium milling prior to 1971 and Navajo workers and families. Such compensations claims are outside the purpose and scope of the GEIS.

4.7 Recommendations for Changes to Regulations or Guidance

A number of commenters recommended changes to existing regulations or guidance. Public input on changes to regulations or guidance are outside the scope of the GEIS and are addressed in other NRC forums, such as comment periods associated with proposed rules and draft guidance documents or petitions for rulemaking.

4.8 Resolution of Dual Regulation Issues

Some scoping comments requested NRC resolve issues related to dual regulation of ISL recovery well fields. The GEIS will be based on the current regulations, authorities, and practices. Changes to regulatory jurisdiction or practice are addressed by other means and are outside the scope of the GEIS.

4.9 Consideration of Human-Induced Climate Change

One comment suggested NRC should include climate change in the GEIS. Natural climate variation is within the scope of the GEIS to the degree that it applies to the potential environmental impacts of the ISL facility lifecycle. Human-induced climate change is not considered in the GEIS because of the imprecise state of the science for making human-induced climate predictions and the relatively short time frame of the ISL facility lifecycle.

4.10 Analysis of All Variations of ISL Technology

One comment recommended that the GEIS assess impacts from each type of ISL technology. For practical reasons, the GEIS will emphasize commonly used technologies (including some variants) but all possible variants of ISL technology will not be addressed. Proposals to use technologies not addressed in the GEIS will be evaluated by NRC in a site-specific licensing review.

4.11 Alternate Sources of Uranium Feed Material

Some commenters suggested various options for alternative sources for uranium feed material, including reprocessing spent fuel from nuclear power plants, recovery of uranium from drinking water treatment residuals, extraction of uranium from sea water, and use of government stockpiles of uranium.

These alternatives are considered outside the scope of the GEIS, because the GEIS is focused on ISL facility licensing and is not intended to address the broader issues of how to meet the US demand for uranium or what sources of uranium should be used.

4.12 Energy Debate

Some commenters focused on the broader energy debate, including support for or opposition to nuclear energy, and suggestions to promote renewable energy sources, such as wind, solar, and tidal energy. The GEIS is focused on ISL facility licensing and is not intended to address the broader issues of what source of energy should be pursued.

4.13 Expanded Cumulative Impact Analysis

Another commenter suggested the scope of the cumulative impact analysis in the GEIS should include: nuclear testing, nuclear war, disposal of warheads, nuclear winter, proliferation, pre-emptive war, terrorist diversion, use of weapons in foreign conflicts, nuclear power and associated radioactive waste disposal, and mishandling of materials by other countries. These concerns are outside the scope of the GEIS, because they deal with topics unrelated to uranium recovery and to NRC's licensing reviews of ISL license applications.

4.14 NRC Credibility

Scoping comments that questioned NRC credibility are considered important and taken seriously by the staff. Therefore, these comments are incorporated into the GEIS in the documentation of concerns raised during the scoping period. However, the comments do not change the scope or content of the GEIS.

5. REFERENCES

NRC. NUREG-0706, Vol. 1, "Final Generic Environmental Impact Statement on Uranium Milling." Washington DC: NRC. September, 1980.

NRC. NUREG-1748. "Environmental Review Guidance for Licensing Actions Associated with Office of Nuclear Material Safety and Safeguards (NMSS) Programs, Final Report." Washington DC: NRC. August, 2003.