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Date: 10/29/2007 1:21:40 PM
Subject: Uranium Recovery GEIS
cc: "Paul Michalak" <PXM2@nrc.gov>, <phil.egidi@state.co.us>

Dear Sir or Madam,
Please find attached my comments on the GEIS for In-situ leaching.
Thank you for providing the opportunity to comment.
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October 29, 2007

Chief, Rules Review and Directives Branch
Mail Stop T-6D59
U. S. Nuclear Regulatory commission
Washington, DC 20555-001

RE: Uranium Recovery GEIS

Dear Sir or Madam:

I am submitting personal comments on the proposed GEIS for in-situ leaching of uranium, and am submitting them in addition to those of the State of Colorado. These comments have not been vetted by the State of Colorado, or any other organization I belong to (e.g., CRCPD¹, HPS).

I am an Environmental Protection Specialist/Health Physicist in the Colorado Radiation Control Program. As a regulator of all types of radioactive materials (natural and man-made), my duties include the regulation (licensing and inspection) of one of the only operating uranium mills in the Country, as well as experience at many Title II sites under decommissioning. This includes a 7-year license renewal effort (for a 5-year license) on the operational mill. In addition, I have 13 years experience working on Title I UMTRA mill sites and vicinity properties out of the DOE Grand Junction Project Office. I have worked in or around uranium mills and their surrounding communities for 25 years. My experiences have led me to submit these comments for your consideration.

The State of Colorado has long been a leader in promoting the effective regulation of uranium recovery. Starting with the investigation of water bodies impacted by uranium mills in the early 1950s, the State of Colorado has been at the forefront of “encouraging” the Federal government to promulgate effective regulation of uranium milling. In 1966, Colorado passed the first comprehensive legislation requiring stabilization of mill tailings piles, long before the AEC would do so (Radiation Regulation #2).² The Grand Junction experience with uranium mill tailings and hazards from radon are well known and need not be repeated here. The UMTRA Act of 1978 is based largely on the Grand Junction experience. Our continued experience in Colorado with the legacy of past uranium milling gives us a long-term perspective to future uranium recovery issues, both for in-situ leaching and conventional milling.

¹ I am currently Chair of CRCPD committee for the suggested state regulations SR-U on uranium and thorium recovery, as well as a member of Committee E-24 on D&D of nuclear facilities. I am a member of the ISCORS committee on TENORM and the ISCORS committee on protection of biota in the environment. I am the State representative to the NRC workgroup on source material in drinking water residuals. I am a member of the Health Physics Society, although I am not active on any of their committees at this time. I also belong to local and national environmental groups, but am not active in them either.

² As described in Mogren 2002. Warm Sands, Eric Mogren, University of New Mexico Press, ISBN 0-8263-2280-8.

I have also listed inadequacies in 10 CFR 40, and hope that this scoping process will illuminate the need to revisit the GEIS for conventional milling as well as in-situ leaching, and to go forward with the scuttled Part 41 rulemaking, and incorporate lessons learned from the decommissioning rule experience.

General comments:

1. The aborted 10 CFR Part 41 rulemaking should proceed, and therefore the GEIS for conventional milling should be revisited. The economic reasons put forth by the Commission in the CVR for SECY-01-0026 (hereby included by reference to these comments) are no longer valid. NRC staff and commissioners at that time make a case for revision of Part 40 as well as the new Part 41 in that document.
 - a. The Agreement States were put at a severe disadvantage when the Commission caved to industry on the Part 41 rulemaking. Agreement States must have regulations that are compatible to NRC's; by killing the rulemaking for a few operators in NRC States, the regulators and operators in Agreement States are left with outdated regulations, unenforceable guidance, and possibly generation of additional legacy sites.
2. There is no urgency to uranium supplies that would preclude taking the time for proper rulemaking.
 - a. Based on presentations made yearly at the NRC/NMA uranium recovery workshops, over 90% of the uranium used in manufacturing fuel for the domestic uranium industry is imported, much of it from Canada. This is not going to change significantly in the near future. There is time to do the rulemakings properly.
 - b. A recent report on world supplies show that known reserves of uranium were "more than adequate to supply reactor requirements to well beyond 2030." The report further states "In the period 2010-15 the strong build-up of new uranium production could even lead to a surplus."³
3. I concur with the State of Colorado that there should be no abridgement of environmental standards for air, water, soil, or waste. The State of Colorado has standards for these media and will continue enforce them.
 - a. The proposal to use class of use for cleanup goals instead of current regulation is unacceptable. This is an abridgement of current standards and will not be tolerated in Colorado.
 - b. Dual regulation is often the norm, not the exception. It is a cost of doing business. Dual regulation is often complimentary, and is not automatically inappropriate.

³ *The Global Nuclear Fuel Market, Supply and Demand 2007-2030*. World Nuclear Association, London, UK.

- c. Colorado will require mining permits from the Colorado Department of Natural Resources as well as UIC permits from EPA (as well as the radioactive materials license).
4. I agree with the Colorado comment that using sulphuric acid as a lixiviant presents different impacts and different aquifer restoration challenges than the use of hydrogen peroxide. Will the GEIS address acid as well as alkaline processes?
5. While it is desirable to some to have a comprehensive GEIS and a streamlined approach, the wide variety of situations that will be encountered at in-situ sites in reality limit the scope of what an effective GEIS can address. I believe that a separate, limited GEIS should be considered for in-situ leaching that can be compiled concurrently with a revised GEIS for conventional milling.
6. The existing GEIS for conventional uranium-milling is outdated (e.g., predated a public dose limit of 100 mrem/y). It also only made projections through 2000, and many of the assumptions in the original GEIS are no longer valid.
 - a. The Bush administration has recognized that climate change is real, and is occurring. Clearly, the original GEIS could not have anticipated this change in environment. This is particularly germane to Part 40, because of the long time frames involved with post closure issues. The design standard of 200/1000 years needs to be re-evaluated in the light of:
 - i. More intense storm events. Current evaluations for maximum storm and flood events are highly dependent on the past; how is NRC going to modify their evaluations in light of increasing severity of weather events?
 - ii. Changes in weather that can affect cap designs. Some areas will be experiencing less precipitation, others more.
 - iii. As water becomes scarcer, the consumptive use of water in the milling process becomes more important. How do 1970s mill designs address more effective water balance?
 - iv. What is the carbon footprint of a conventional mill? Are these plants worth the impacts? The value of uranium recovery as part of the fuel cycle should be evaluated, including the impacts from mining and milling.
 - b. The “model mill” in the original GEIS is based on 1970s technologies.
 - c. Statements that the mills are typically in areas of low population density and that they typically process ores from mines within thirty miles are clearly out of date and unrealistic, and require reconsideration in the GEIS. For example, one of the two active conventional mills, the Cotter

Corporation milling facility in Canon City, CO, takes ore from as far as 250 miles away.

- d. In addition, the PowerTech in-situ proposals for South Dakota and Colorado envision transporting pregnant resins to Wyoming for processing.
 - e. The existing GEIS anticipated tailings piles to have a 15-year operational life. That is not a valid assumption, as the Cotter impoundment is rapidly approaching 30 years of service.
7. The social and economic impact reviews in the original GEIS are not valid. History has shown that there are impacts to communities during operation, but also during and after decommissioning. The legacy sites have had a negative impact on tribes and communities that were not considered in the GEIS socio-economic reviews. Environmental justice was not evaluated in the original GEIS.
8. I concur with the State of Colorado that the recent approach of the NRC to reclassify many materials as 11e.(2) byproduct material has expanded the nature of materials potentially disposed in uranium mill impoundments, as has the acceptance of alternate feed materials significantly different from traditional uranium ore. These practices were not evaluated in the original GEIS, as noted by USEPA and others.
- a. RIS-00-023 is only guidance, and is neither enforceable nor final.
 - i. The definition of “ore” put forth in RIS-00-023 that states “...or any matter from which source material can be extracted at a uranium mill...” is a major shift that should have had a NEPA review and subject to rulemaking. The definition is so broad, my kitchen table is now a candidate for alternate feed at a uranium mill.
 - ii. Colorado has had negative experiences with respect to alternate feed materials that are not physically, chemically, or radiologically similar to uranium ore or tailings, yet were put forth as being such. The classic example is the Sequoyah fuels raffinates, which are highly fluorinated, and as such, much more dangerous to handle and process. Data were not presented to us or the Commission containing information about the true chemical nature of these materials (yet the information was available in ADAMS - the RCRA site characterization). SECY-02-0095 should be retracted. The fact that these raffinates are so highly fluorinated demonstrate that they should not be attributed status as 11e.(2), but rather, low level waste, as they had been classified for decades. Additionally, the claim that the front end of the conversion process is essentially uranium milling is clearly challenged by the data. Since when does solvent extraction of yellowcake yield fluorine at

concentrations as high as 30,000 ppm? The fluorine is from the conversion process, not solvent extraction.

9. The issue of pre-1978 tailings not falling under UMTRA (the Fonner letter), clearly needs to be clarified, and a review of conventional milling (and rulemaking) could provide that opportunity.
10. NRC staff will be more consistent and efficient in the reviews if there were clear rules to evaluate applications against rather than guidance.
 - a. Guidance does not carry the force of regulation. The industry has lobbied for “flexibility” in regulating uranium recovery facilities by using guidance over rulemaking, particularly during the scuttled Part 41 rulemaking. NRC should contemplate the “flexibility” that could be introduced should a less-friendly Administration and Congress get elected. Rulemaking brings more certainty for both sides.
11. NRC has realized that some requirements of Part 40 are not protective of the environment and are not cost effective. SECY-03-069 and subsequent documents have described lessons learned about preventing legacy sites (e.g., early characterization and surety) that are applicable to uranium mills.
 - a. Allowing tailings piles to remain saturated until closing creates a situation where closure may be delayed for years while dewatering occurs. Tailings need to be dewatered as soon as possible. While the 40-acre constraint in the NESHAPS is an improvement over Appendix A, consideration still should be given to requiring dewatering as soon as practical, require smaller cells, or for pretreatment of the tailings slurry prior to placement in the impoundments.
 - b. There are numerous requirements for monitoring around the impoundments, but little to no requirements for the mills themselves. Conventional mills handle large volumes of uraniferous liquids, and there are routine spills and leaks that can contribute to gw contamination. It is not an exaggeration that there are more monitoring wells around the corner gas station than there are around some of the production areas at one existing mill. More attention needs to be given to mitigating sources to groundwater from the mills while they are in production rather than waiting for closure. The licensee is often out of money by the time closure comes around.
 - c. The lack of early monitoring, coupled with characterization at closing and leaving impoundments saturated until closing have impacted the timeframes for closure, and impeded transfer to DOE in a timely manner.
 - d. Draft Regulatory Guide 4012 provides insight into NRC experience with design considerations for new applications and renewals under Part 20,

which are also applicable at Part 40 sites. I have not been able to review SECY-07-0177 yet.

12. With respect to in-situ, I concur with ACNWN that:
 - a. the rule should provide specific guidance on the three-dimensional location of the point of compliance, groundwater monitoring requirements, methods of demonstrating compliance, and financial surety considerations.
 - b. The rule should establish guidance on measures to reduce the likelihood of contaminant excursions outside the mined zone (the exempted aquifer unit that contains the uranium ore deposit) and the site property (the land that is under control of the licensee), and for remediation outside the mined zone if excursion occurs.
 - c. The rule should provide requirements for establishing pre-mining background or baseline groundwater quality.

Specific comments:

1. Alternatives. The paradigm of no action, in-situ, or conventional milling as an alternative as proposed in the Federal Register notice is ill-conceived.
 - 1.1. Some ore bodies are candidates for in-situ, others are not. It is the rare situation where either can be considered equally.
 - 1.2. The two processes complement each other in that materials harvested by in-situ methods may be processed at a conventional mill as demonstrated by the recent Powertech announcement that source material from in-situ will be trucked to a conventional mill for recovery.
 - 1.3. Since the two processes are different, separate evaluations should be considered.
 - 1.4. Consider reprocessing spent nuclear fuel as an alternative.
 - 1.5. Consider recovery of drinking water treatment residuals as an alternate feed.
2. Environmental Impact Areas to be Analyzed.
 - 2.1. While all the categories listed in the Federal Register notice need to be evaluated, many will not be candidates for a GEIS. Some of those areas are:
 - 2.1.1. Transportation. Due to the range of populations, and quality and quantities of roads in the areas where in-situ is likely, a site-specific transportation analysis should be considered for each application, particularly in areas where development is likely over the lifetime of the facility.
 - 2.1.2. Water resources. Each site has its own unique surface and groundwater regime, and should be evaluated on a case-by-case basis.
 - 2.1.3. Ecology. All the topics described may vary from site to site and should be evaluated on a case-by-case basis.
 - 2.1.4. Socio-economics. One cannot assume that only unpopulated areas are going to be impacted, as demonstrated by the current in-situ proposal in

Colorado. Our experience in the west is that areas previously thought not to be desirable for development have become developed. People will live almost anywhere. Risk assessments should be conservative in the development of scenarios.

2.1.4.1. The legacy impacts to communities have not been adequately addressed. Operational phase impacts are looked at, but not what happens when the operations cease. There are post-operational impacts that leave local populations with legacies to address. The GEIS should evaluate what happened to communities that have had both conventional and in-situ recovery operations, take those lessons-learned and consider them in subsequent rulemaking.

2.1.5. Cumulative effects. Since each location will have had varying amounts of previous impacts, it is not feasible to evaluate cumulative effects on a generic basis. One example would be coal bed methane or natural gas drilling on or adjacent to uranium recovery.

Thank you for the opportunity to comment on the scoping of these documents. Please give serious consideration to conventional milling as well as in-situ for the reasons cited above.

Sincerely,

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