KATIE SWEENEY
General Counsel

January 23, 2015

Mr. Larry Camper
Director
Division of Decommissioning, Uranium Recovery, and Waste Programs
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mr. Camper:

I wanted to bring to your attention a major issue that the uranium recovery industry and Nuclear Regulatory Commission (NRC) staff have attempted, and failed, to resolve to mutual satisfaction and in a realistic and technically appropriate manner at least since 2008. Specifically, the uranium recovery industry is concerned about NRC staff positions on several health physics issues related to effluent monitoring and public dose calculations specific to Radon-222 and its decay products (for ease of reference, this suite of issues will be referred to hereafter as "HP issues". These issues have been recurring over the years as evidenced by requests for additional information (RAIs), negotiations of draft license conditions, presentations given by industry members and questions regarding compliance of existing licensees.[1] The National Mining Association (NMA) believes that not only are the staff positions legally flawed in that they deviate from existing Commission regulations, guidance and policy, the approaches advocated are not merited by the risks related to the emissions involved nor are they always technologically feasible due to conditions specifically related to radon including both high and variable background concentrations in air.

The latest development, and the impetus for this letter, is a communication from NRC to Lost Creek ISR LLC dated November 3, 2014 (Staff's Evaluation of Lost Creek's

[1] *See e.g.,* 12/12/2008 Lost Creek response to RAIs; 2/28/2009 Crow Butte responses to RAIs; NRC summary of 4/16/2009 meeting with Lost Creek; 5/15/2009 Lost Creek responses to RAIs; NRC summary of 8/18/2009 meeting with Moore Ranch; NRC summary of 10/5/2009 meeting with Crow Butte; NRC Summary of 11/17-11/18, 2009 industry meeting; Kennecott Uranium Company e-mail dated Wednesday, January 19, 2011 and reply dated Monday, February 28, 2011. For a more recently example, see, the November 12, 2014 denial off acceptance for review for Uranium One (ML14295A668) where NRC refused to even accept Uranium One's submittal for review. There are many more examples as virtually all current and prospective licensees have had to address these HP issues.

Submittal to Satisfy License Condition 12.10 and Amend the Source and Byproduct Materials License SUA-1598). The communication contains a number of problematic statements that highlight the NRC staffs' continued intransigence on these HP issues as well as the general difficulties related to them in regards to radon in the natural environment. Please note, this letter is not written on behalf of Lost Creek, which will formulate its own response to the Nov. 3 letter. Rather, this letter more broadly provides the position of NMA's uranium recovery members regarding these HP issues since they impact all licensees regardless of the type of operation conducted by a given licensee. This letter is divided into several parts: the background of these issues; the broader industry response to specific issues raised in the Lost Creek letter; the issues associated with radon and its decay products in the natural environment; radon measurement issues; and the lack of a risk-informed approach to these health physics issues.

I. Background

These HP issues arose first in the context of RAIs in 2008 and 2009. By late 2009, it was evident that industry and staff had diverging views on how to approach these HP issues.

- November 2009 Meeting

As a result, in November 2009, NRC held a public meeting to facilitate the preparation of applications for uranium milling licenses based on "lessons learned" from processing the applications for the first three uranium recovery facilities to be licensed under the GEIS. In particular, an entire day of the meeting was devoted to radiological issues at *in situ* recovery (ISR) facilities. At this meeting, it became apparent that NRC and industry had significant disagreement over approaches to key radiological issues.

For example, one presentation, entitled radon effluent, focused on the radon limits to be used when reporting radon-222 in accordance with the effluent monitoring reporting requirements of 10 CFR 40.65. From that presentation, at least two HP issues came to the forefront: (1) what does the term "demonstrate by measurement or calculation" mean for the purposes of 10 CFR.1302(b)(1) and (2) which the values industry should use for radon-222 from 10 CFR Appendix B, Table 2 (specifically should radon in effluents be considered to be released with daughters present or not).

- January 2011 Workshop

Additional back and forth over these HP issues continued throughout 2010, prompting an additional uranium licensing workshop in Jan. 2011. As the NRC meeting summary for the Jan. 2011 workshop noted, the workshop was prompted by the need to resolve these issues:

> During the past three years NRC reviews of license applications for new uranium recovery facilities have identified certain issues regarding health physics … These issues have been the subject of numerous requests for additional information, the resolution of which has caused delays in completing licensing actions. The staff therefore convened this workshop to discuss the issues and seek a path forward."

At that workshop, NRC staff gave presentations related to the following HP issues: meteorological data collection and use; compliance issues associated with 10 CFR 40.65(a)(1); compliance issues association with 10 CFR 20.1301/1302/Subpart C; demonstrating compliance with 10 CFR 20 exposure limits for Rn-222 and daughters. Industry also gave several presentations regarding its views on these issues primarily questioning NRC staff approaches as not consistent with NRC policy and precedent or not merited by risk. Notably, two health physics experts, attending on their accord, presented on the monitoring versus measuring issue and lack of risk from radon emissions at ISR facilities.

- April 2011 Focus Group Meeting

The Jan. 2011 workshop failed to provide a path forward on these issues, which prompted a decision to convene a focus group of NRC staff and industry representatives to develop some solutions to these issues. That focus group met in April 2011. Progress was made on a couple smaller issues but no resolution was reached on the major HP issues. For example, on the issue of acceptance of offsite meteorological data and despite its permissibility under Regulatory Guide 3.63, NRC staff continued to push for on-site data, claiming representativeness was too difficult to prove with off-site data. Regarding the issue of compliance with 10 CFR 20.1301/1302, as noted at the Jan. 2011 workshop, staff thinking on this issue has continued to evolve and staff have been reevaluating methods for demonstrating compliance and questioning historically accepted methods. Staff promised revised guidance in the future but still is imposing its "evolving" thinking on applicants and licensees. Another troublesome issue discussed by the focus group was the difficulty in demonstrating compliance with 10 CFR Part 20 exposure limits for Radon-222 and progeny. Again, deviating from past practice, staff began expecting industry to use measurement, in addition to modeling, to demonstrate compliance. In response, industry indicated that measurement of incremental radon contributions from ISR facilities is not technologically possible given the small radon signal from ISR and the relatively large and variable background radon levels. In sum, while the focus group did not resolve all the issues, the exercise was useful in that it brought the areas of disagreement into more focus.

- First Draft Radon Guidance (2011)

In Nov. 2011, NRC issued draft guidance for public comment entitled "Evaluation of Uranium Recovery Facility Surveys of Radon and Radon Progeny in Air and Demonstrations of Compliance with 10 CFR 20.1301" (hereafter radon guidance). The guidance, however, merely memorialized NRC staff position and did not reflect changes in approach necessary to address industry's concerns as raised at the 2011 workshop and focus group meeting. The guidance proposed no new thinking or new solutions to the existing problem. For example, see comments of Kennecott Uranium, Wyoming Mining Association, Cameco Resources, Homestake, and SENES Consultants.

- Throughout 2012 and 2013

Comments submitted on the guidance were taken into consideration during 2012 and 2013 while simultaneously these health physics issues continued to be raised in RAIs, compliance matters and industry/staff meetings. For example, the NMA Uranium Recovery Workshops in 2012 and 2013 included presentations on the following health physics issues:

  - Duane Schmidt, NRC Staff gave a presentation in 2012 on the draft radon guidance reiterating staffs' positions; and
  - Doug Chambers and Steve Brown, SENES Consultants in 2013 on unresolved radon issues.

- December 2013 Industry/Staff Meetings

These health physics issues also arose at a Dec. 2, 2013, meeting between NMA and NRC. At that meeting, industry learned that NRC was close to finalizing the radon guidance. Industry expressed significant concern regarding its finalization, especially given new information industry had gathered over the last two years. NMA requested a meeting to present its new information before NRC moved forward. NRC agreed and a meeting was held on Dec. 19. At that meeting, the following presentations were provided by industry:

  - Kari Toews, Cameco Resources, presented data from one of the Cameco sites that showed the variability of radon background can be much greater than the dose to be measured.
  - Anthony Thompson, Thompson & Pugsley discussed the legal implications of the draft guidance, emphasizing the fact that the guidance cannot be implemented

The issues discussed in the Cameco presentation regarding the variability of background are not unique to Cameco. Kennecott Uranium Company discussed both the high temporal and spatial variability of background in their license renewal

application (ADAMS Accession Number: ML14251A115 - http://pbadupws.nrc.gov/docs/ML1425/ML14251A115.pdf) in 2.10 Background Radiological Characteristics. Following the Dec. 19 meeting, NRC decided not to move forward directly with finalizing the guidance, but instead to issue the latest version of the guidance as a draft for additional comment. In addition, during the comment period NRC agreed to host a technical workshop on issues related to measuring radon.

- Second Draft Radon Guidance (2014)

On March 27, NRC issued a second version of the draft radon guidance for additional comment. As can be seen in the March 2014 Summary Responses to Comments on the September 11 Draft Report, NRC staff disagreed with most of industry's comments on the 2011 draft guidance. In particular, the staff, while noting difficulty in measuring low environmental concentrations of radon, indicated that minimum detectable concentrations should not be a difficult issue as in most cases background concentrations are above the MDC for the detectors typically used. This may be the case; however, the added radon effluent from a facility may not be above the MDC for the detectors typically used and is thus not discernible from background. In addition, the MDC for the detectors typically used when read at high resolution is 0.06 pCi/L which is very close to 0.1 pCi/L the 10 CFR Part 20 Appendix B Table 2 Effluent Concentration for Radon-222 with daughters present. Additionally, the staff repeated its opinion that compliance should not be demonstrated by modeling alone and that modeling and calculations should be supported by environmental monitoring to demonstrate compliance.

- April 2014 Radon Workshop

As a follow-up to the Dec. 2013 meeting, NRC held an April 2 workshop on the radon guidance.

An NRC staff presentation on the guidance by Duane Schmidt provided an overview of the draft guidance and highlighted differences between the 2011 and 2014 versions. In addition, Schmidt addressed the issue of whether licensees are correctly accounting for radon progeny to comply with 10 CFR Part 20. Industry presentations included:

  - Doug Chambers, SENES Consultants, on the challenges of measuring small incremental (above background) levels of Rn-222, suggesting that measurements of such small increments is not possible. This was a key presentation and is central to the issue at hand;
  - Kari Toews, Cameco Resources Inc., followed up on the Chambers presentation with site-specific data that suggested a system based solely on measurements is not practical and instead proposed a verified modeling approach;

- Oscar Paulson, Kennecott Uranium Co., presented on a new development related to measurement of radon: problems with discrepancies in readings for some RadTrak detectors at co-located units causing the Colorado Department of Public Health and Environment to question the use of these devices and that such detectors may be quantitatively unreliable at low radon concentrations and unacceptable for regulatory purposes;
- Mark Salasky, Landauer Global Technology, discussed the recent issue experienced by radtrak detectors from the prospective of the company that manufactures the detectors and possible causes of the problems; and
- Robert Meyer, Keystone Scientific gave a presentation on how to solve problems related to the uranium facility radon decay product 100 mrem/year public dose limit.

- May 2014 Comments on the Draft Radon Guidance

Comments on the March 2014 revised draft radon guidance were due in May 2014. While the comments generally noted the improvements made relevant to the previous version, several problems remain. Significantly, while NRC recognizes that in the past, calculations alone have been acceptable to demonstrate compliance with public dose limits, the guidance still appears to insist upon field measurements to validate calculations and expresses a preference for measurements as the method to demonstrate compliance.

- Current Status of Radon Guidance

The current status of the radon guidance is unclear. But one thing is not unclear – in effect, NRC staff are using the guidance already to push industry to change historic, commission-approved approaches to dose estimation and licensing. At the June 2014 NMA Uranium Recovery Workshop, an NRC staff presentation explained how staff were implementing new license conditions to address the health physics issues that are the topic of the draft guidance.

II. Lost Creek Safety Evaluation Report (SER)

This section of this NMA letter identifies specific statements made in the Lost Creek Safety Evaluation Report (SER) (ML14289A148) and is followed by Industry views/concerns regarding that statement.

Statement: Therefore, staff does not have reasonable assurance that the licensee can determine the dose to the individual likely to receive the highest dose from its licensed operation using the measurement method it proposed. **AND** *With no other monitoring to enable the licensee to calculate the maximum public dose received throughout the*

facility, staff does not have reasonable assurance that the licensee's proposed measurement methodology will allow the licensee to demonstrate that annual public dose is within regulatory limits. **AND** *"In summary, staff does not have reasonable assurance that placing the radon detectors in the manner proposed by the licensee will be representative of radioactivity concentrations in effluents for reporting purposes or for the purpose of demonstrating that annual public dose is within regulatory limits."* **AND** *staff does not have reasonable assurance that the licensee's proposed measurement methodology will allow the licensee to demonstrate that annual public dose is within regulatory limits using the method allowed in 10 CFR 20.1302(b)(2)(i).*

Industry response:

- These statements call in to question whether there is the potential that the dose to the public is being exceeded. Such statements are irresponsible absent complete, compelling and verified data that exceedances are occurring as they expose (1) the licensee to actions by interveners and (2) NRC to accusations that it is not adequately protecting public health and safety. These statements are even more potentially inflammatory given the fact that operations at this site have already begun.

- The Lost Creek Project began operations on August 2, 2013. Yet, it was not until 15 months later that the agency sent the letter to Lost Creek that prompted this NMA response. The NRC letter raised perceived issues with the company's compliance methodology and the language used makes it clear that the agency had serious concerns with Lost Creek's approach. Industry does not understand why, If this problem is as serious as the agency implies in the letter, the agency did not take action sooner.

- NRC staffs' position ignores the clear language of 10 CFR 20.1302 which states that calculational methods, without reference to "verification by measurement" can be an acceptable method for demonstrating compliance with limits in 10 CFR 20.1301.

- Staff also ignore NUREG 1156, "Consolidated Guidance about Material Licenses (2001)' Vol. 11, Appendix Q—Methodology for Determining Public Dose, which provides detailed guidance for acceptable methods to demonstrate compliance both "by measurement" and "by calculation".

- Additionally, staff fail to consider NUREG-1501, "Background as a Residual Radioactivity Criterion for Decommissioning (1994)." This NUREG was an appendix to the Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for Decommissioning of NRC-Licensed Nuclear Facilities. The associated discussion recognized that in some circumstances, e.g., those involving residual contamination from naturally occurring radioactive materials, the ability to "measure" very low levels of residual

contamination relative to the natural background of these radionuclides, which can be several times higher, is not technically feasible and calculational methods must be used.

Statement: the NRC expects that radon progeny will be present with Rn-222 and that the licensee should be using the 10 CFR part 20, Appendix B, Table 2, value for Rn-222 with daughters present. Therefore, the NRC staff concludes that the appropriate value from 10 CFR Part 20, Appendix B, Table 2, for this licensee to use is the value for Rn-222 "With daughters present."

Industry response:

- NRC staffs' insistence on the use of Table 2 values with daughters present contravenes the preamble to 10 CFR Part 20 (May 21, 1991) that allows, upon approval, the use of site specific equilibrium factors. Specifically, the Statements of Consideration for the final revised 10 CFR Part 20 (Federal Register Volume 56, Number 98 - Tuesday, May 21, 1991 - Rules and Regulations - page 23375) states:

  The Commission is aware that some categories of licensees, such as uranium mills and in situ uranium mining facilities, may experience difficulties in determining compliance with the values in appendix B to Part 20.1001 – 20.2401, Table 2, for certain radionuclides, such as radon-222. Provision has been made for licensees to use air and water concentration limits for protection of members of the general public that are different from those in Appendix B to Part 20.1001 – 20.2401, table 2, if the licensee can demonstrate that the physiochemical properties of the effluent justify such modification and the revised value is approved by the NRC. For example, uranium mill licensees could, under this provision, adjust the table 2 value for radon (with daughters) to take into account the actual degree of equilibrium present in the environment.

This insistence also contravenes current policy in that in at least one case a current licensee is specifically allowed to use a site specific equilibrium factor. This also contravenes information presented in Analysis of Radiation Exposure on or Near Uranium Mill Tailings Piles (Schiager, K.J., July 1974) which states:

For typical tailings piles of several hundred meters in width and typical wind speeds of a few meters per second, the transit time over the tailings is rarely more than a few minutes. Thus, the ingrowth of radon progeny in the immediate vicinity of the pile can seldom exceed 10 percent of its equilibrium value, or 0.001 WL per pCi of radon per liter.

While this language is specific to tailings impoundments, the concept is applicable to any radon source including an in-situ uranium recovery facility.

Statement: Staff observes that SOPs may be revised many times during the lifetime of a facility, including their removal from use. Therefore, due to the non-permanent nature of the SOPs, staff is not considering the SOPs in its evaluation of the licensee's response to this license condition.

Industry response:

- Standard Operating Procedures (SOPs) are part of every radiation safety program. SOPs must be available, reviewed annually and are subject to inspection. As an example, Kennecott Uranium's license SUA-1350 states:
    - *License Condition 9.6 Standard operating procedures (SOPs) shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. These SOPs for operational activities shall enumerate pertinent radiation safety practices to be followed and will be available for the pre-operational inspection.*

      Additionally, written procedures shall be established for non-operational activities to include in-plant and environmental monitoring, bioassay analyses, and instrument calibrations. An up-to-date copy of each written procedure shall be kept in the mill area to which it applies.

      All SOPs (for both operational and non-operational activities) shall be reviewed and approved in writing by the RSO before implementation and whenever a change in procedure is proposed to ensure that proper radiation protection principles are being applied. In addition, the RSO shall perform a documented review of all existing operating procedures at least annually.

- Given that SOPs are inspected as part of routine site inspections, it is nonsensical that SOPs are not an acceptable means to document dose calculation procedures. If a procedure were inadequate or if one were removed when in fact it was required, a Notice of Violation (NOV) would be issued.

Statement: *In addition, for sources on or near buildings (e.g., the CPP), the concentrations of the effluent are difficult to predict due to complexities associated with curved streamlines, sharp velocity discontinuities, and highly non-homogeneous and non-isotropic turbulence (Slade, 1968). Aerodynamic effects due to buildings and other structures are reported to be significant, not only in the vicinity of the structures, but at considerable distances downwind (EPA, 2000). It is suggested that the best way to estimate concentrations near buildings and other structures is to obtain experimental data (Slade, 1968). Staff is not aware of any attempts by the licensee to characterize the flow of air, and thus expected concentrations of radioactive materials from its effluents, in the vicinity of the CPP and other structures. Therefore, due to the*

uncertainties associated with determining effluent concentrations near buildings and other structures, and in the absence of empirical data describing air flow characteristics in the vicinity of the CPP and other structures, staff concludes that the method proposed by the licensee does not provide a reasonable estimation of effluent from its licensed activities for demonstrating compliance with 10 CFR 40.65 or 10 CFR 20.1302(b)(2)(i).

Industry response:

- 10 CFR § 20.1301 Dose limits for individual members of the public states:

  (a) Each licensee shall conduct operations so that -

  (1) The total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem (1 mSv) in a year, exclusive of the dose contributions from background radiation, from any administration the individual has received, from exposure to individuals administered radioactive material and released under § 35.75, from voluntary participation in medical research programs, and from the licensee's disposal of radioactive material into sanitary sewerage in accordance with § 20.2003,

- NRC staffs' concern seems to ignore the regulatory language that indicates the dose to the public in question is a dose from the ***licensed operation*** as a whole. If looking at dose from licensed operations as a whole, it is unnecessary to specifically address air flow around buildings. Additionally, modeling that will account for air flows around buildings greatly increases the complexity of dose modeling for a facility, pushing modeling toward the use of computational fluid dynamics (CFD) which is not justified given the low risks posed by uranium recovery operations.[2]

Statement: Firstly, the licensee characterizes the source of radon as "fresh radon with negligible in-growth of daughters" (LCI, 2013b) with no technical justification. **AND** *For these reasons, the radon exiting the buildings can't be characterized as "fresh radon with negligible in-growth of daughters" (LCI, 2013b).*

Industry response:

- If Radon-222 from a uranium recovery facility is being measured by that facility it is by default fresh. This contravenes information presented in Analysis of Radiation Exposure on or Near Uranium Mill Tailings Piles (Schiager, K.J., July 1974) which states:

[2] These statements appear to potentially be an attempt to open the door to the use of computational fluid dynamics (CFD). These issues have been raised by the Environmental Protection Agency (EPA). Please see: Modeling Near-Road Air Quality Using a Computational Fluid Dynamics Model, CFD-VIT-RIT Y, Jason Wang and K. Maxzhang; A Framework For Fine-Scale Computational Fluid Dynamics Air Quality Modeling and Analysis, Alan H Huber; Using CFD to Study Air Quality in Urban Microenvironments, J.D. McAlpine and Michael Ruby.

> *For typical tailings piles of several hundred meters in width and typical wind speeds of a few meters per second, the transit time over the tailings is rarely more than a few minutes. Thus, the ingrowth of radon progeny in the immediate vicinity of the pile can seldom exceed 10 percent of its equilibrium value, or 0.001 WL per pCi of radon per liter.*

While this language is specific to tailings impoundments, the concept is applicable to any radon source including an in-situ uranium recovery facility.

Statement: However, for calculating annual public dose, short term variations (i.e., year to year or within a year) can have a more profound impact if, for example, a dominant sector is missed in any given year.

Industry response:

- How much monitoring will ultimately be required to account for small variations in wind direction within a year? This statement appears to address short term temporal variations, however spatial variations can occur as well. Is the Agency proposing that wind speeds and directions be measured at multiple locations around a site? Earlier in the letter, the Agency states:

    - *In addition, for sources on or near buildings (e.g., the CPP), the concentrations of the effluent are difficult to predict due to complexities associated with curved streamlines, sharp velocity discontinuities, and highly non-homogeneous and non-isotropic turbulence (Slade, 1968). Aerodynamic effects due to buildings and other structures are reported to be significant, not only in the vicinity of the structures, but at considerable distances downwind (EPA, 2000).*

  It appears as if the Agency is requesting both more detailed temporal and spatial meteorological monitoring neither of which is justified given the low risks posed by uranium recovery operations.

Statement: Since the dominant wind is from the west, the licensee proposed placing the radon detectors along the eastern fence in the manner described above. Staff observes that even if the radon detectors were arranged in such a manner as to accurately measure radon in the four dominant wind sectors (from the W, WSW, SW, and SSW, refer to Figure 2.2-3 of NRC, 2011a), they would capture less than approximately 50 percent of the total wind frequency (by compass direction) and thus measure less than approximately 50 percent of the total potential effluent of radioactive material.

Industry response:

- How much monitoring is enough and when does it become excessive and unreasonable?

Statement: The licensee did not provide any technical justification for rejecting uranium and other particulates as a potential effluent from its facility (LCI, 2013b).

Industry response:

- Lost Creek is a uranium recovery facility that uses a rotary vacuum dryer that does not have a stack to release emissions. It is considered a zero emission system. This statement shows a total lack of understanding of the process.
- Regarding dose the Generic Environmental Impact Statement (GEIS) (4.2.11.2.1 Radiological Impacts to Public and Occupational Health and Safety From Normal Operations) states: *Because a vacuum dryer system is assumed, the only releases are radon.*
- Table 4.2-2 (Section 4.2.11.2) of the Generic Environmental Impact Statement (GEIS) is included below:

Table 4.2-2. Dose to Offsite Receptors From *In-Situ* Leach Facilities

Facility	Offsite Maximum Dose (mSv/mrem)	Description of Receptor	Reference
Crow Butte	0.317/31.7	0.4 km [0.25 mi] northeast of Central Plant site	Crow Butte Resources, Inc.*
Crow Butte	0.058/5.8	Closest resident downwind of North Trend Satellite Plant	Crow Butte Resources, Inc.*
Smith Ranch/ Sunquest Ranch	0.175/17.5	Nearest resident	NRC, 2007†
Smith Ranch/ Vollman Ranch	0.135/13.5	Nearest resident	NRC, 2007†
Reynolds Ranch	0.04/4	Nearest resident at Reynolds Ranch	NRC, 2006‡
Reynolds Ranch	0.27/27	Unoccupied Mason House	NRC, 2006‡
Gas Hills	0.07/7	Hypothetical individual on eastern boundary	NRC, 2004§
Christensen Ranch	0.006/0.6	Adult nearest resident	NRC, 1998‖
Irigaray	0.004/0.4	Adult nearest resident	NRC, 1998‖

*Crow Butte Resources, Inc. "License Renewal Application: SUA–1534." Crawford, Nebraska: Crow Butte Resources, Inc. 2007.
†NRC. "Environmental Assessment Construction and Operation of *In-Situ* Leach SR–2 Amendment No. 12 to Source Materials License No. SUA–1548 Power Resources, Inc. Smith Ranch-Highland Uranium Project (SR_HUP) Converse County, Wyoming." Docket No. 40-8964. Washington, DC: NRC. 2007.
‡NRC. "Environmental Assessment for the Addition of the Reynolds Ranch Mining Area to Power Resources, Inc.'s Smith Ranch/Highlands Uranium Project Converse County, Wyoming." Source Material License No. SUA–1548. Docket No. 40-8964. Washington, DC: NRC. 2006.
§NRC. "Environmental Assessment for the Operation of the Gas Hills Project Satellite *In-Situ* Leach Uranium Recovery Facility." Docket No. 40-8857. Washington, DC: NRC. 2004.
‖NRC. "Environmental Assessment for Renewal of Source Material License No. SUA–1341. Docket No. 40-8502. Washington, DC: NRC. 1998.

None of the above doses approach 50% of the 100 millirem dose limit.

III. Risk

At heart, industry believes that NRC staffs' positions on these health physics issues are contrary to the risk-informed, risk-based approach to regulation mandated by the Commission. These issues were ones that industry believed were previously settled, either by guidance, policy or past agency practice but were now being "reopened" by NRC staff without any showing that reopening was necessitated by potential or actual risk.

Risk-informed performance based regulation is good public policy as it promotes efficient use of already limited agency, licensee and other stakeholder resources. Because it requires a focus on higher-risk Atomic Energy Act licensed activities, a risk-informed performance-based approach results in a more efficient and effective regulatory program that optimizes protections of public health, safety and the environment.

Risk-informed, performance based approaches have the potential to better educate and inform the public about risks associated with activities regulated by NRC. It is not the role of NRC to promote nuclear energy; however, the agency does have a duty to maintain a defensible regulatory oversight program that reassures the public regarding the protection of public health, safety and the environment. A regulatory oversight program that accurately portrays potential risks to the public can assist in clearing up misperceptions about potential risks related to radiation from AEA-licensed activities.

NMA has participated in and supported NRC's efforts to become more risk-informed, performance-based since NRC, in response to the 1993 Government Performance and Results Act (GPRA), developed a strategic plan in which the agency committed to move toward risk-informed, performance-based regulation. As a result of that strategic plan, when NRC proposes a new regulation, alternatives considered must include a performance-based alternative that enhances the focus on the effectiveness of the agency's regulatory programs. Over the years, NRC has continued to advance the risk-informed performance based regulation concept. See e.g., Staff Requirements - COMSECY-96-061 - *Risk Informed, Performance-Based Regulation* (DSI-12), April 15, 1997; *Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities; Final Policy Statement*, 60 Fed. Reg. 42622 (August 16, 1995); SECY-98-144, *White Paper on Risk-informed and Performance Based Regulation* (June 22, 1998)

- Application of Risk Informed Performance Based Approached in the Uranium Recovery Arena

The Atomic Energy Act of 1954, as amended (AEA) mandates consideration of risk for management of byproduct material such as is produced by UR facilities. Thus, Section 84(a)(1) of the Act specifically states management of 11e.(2) byproduct material, and by

implication, UR operations, is to be carried out in such a manner as the Commission deems appropriate to protect the public health and safety and the environment from radiological and non-radiological hazards associated with the processing and with the possession and transfer of such material **taking into account the risk to the public health, safety, and the environment,** with due consideration of the economic costs and such other factors as the Commission determines to be appropriate.

Additionally risk-informed, performance-based regulatory oversight approaches are well suited to the low risk nature of UR activities. If risk-informed, performance-based regulation is appropriate for licensed nuclear reactors, which pose the highest potential risk to public health, safety, and the environment in the nuclear fuel cycle, it is even more appropriate for the licensed fuel cycle facilities posing the lowest potential risks (i.e., conventional and ISR UR facilities). As explained in NUREG/CR-6733:

> Regulatory programs that are RIPB [risk-informed, performance-based] consider, among other factors, the degree of risk associated with specific operations in defining the nature of the applicable regulatory requirements. In general, operations that pose a high risk to public health and safety or the environment would be subject to more stringent regulatory requirements. Conversely, those operations that pose a low risk to public health and safety or the environment would be regulated less stringently. Risk considerations may also help determine which aspects of a facility should be regulated. RIPB regulatory programs typically identify performance measures as the basis for regulatory requirements.

The Commission itself has acknowledged the low risk nature of ISR facilities in NUREG-1910, the *Generic Environmental Impact Statement for In Situ Uranium Milling Facilities.* This programmatic assessment of ISR operations provides, in significant detail, an analysis of the potential impacts/risks associated with ISR facilities and concludes most are considered small.

Many of the concerns identified in this NMA letter are due to a failure of staff to narrow their focus to "significant risks" of harm contrary to the Supreme Court caution in the so-called 1980 *Benzene* decision (*Industrial Union Department, AFL-CIO v. American Petroleum Institute*) and the Commission-approved risk-informed regulatory program. Focusing on a large range of "insignificant risks," has significantly contributed to delays in the licensing process resulting in a waste of agency and company resources that should never have occurred in the first place.

IV. Conclusion

The fact that in the SER to Lost Creek the NRC staff must still reference a PowerPoint presentation from 2011 for an acceptable approach to address these issues is a clear

indication that the staff has lost focus on their priorities. If this issue deserves the NRC staff and licensee attention that it has attracted since 2008, the preparation of the guidance that staff mentioned would be a priority. Instead NRC staff and licensees continue to expend significant resources trying to meet moving goalposts. NMA urges NRC management to prevent staff from imposing new approaches on these health physics issues (or any new issues) until clear guidance on acceptable approaches are developed with public input as required by the Commission. In the meantime uranium recovery facilities should continue to estimate dose to the public using previously-accepted methods (i.e., MILDOS with operational inputs and measurement in certain cases if due to site specific circumstances it is a simpler approach) as allowed by the regulations and current guidance and approved practice.

Sincerely,

Katie Sweeney
General Counsel

Cc: Mark A Satorius, NRC Executive Director for Operations
Michael F. Weber, NRC Deputy Executive Director for Materials, Waste, Research, State, Tribal and Compliance Programs
Catherine Haney, NRC Director, Office of Nuclear Material Safety and Safeguards