Uranium Producers of America Comments on Docket ID Number EPAHQ-OAR-2012-0788; FRL-9909-20-OAR RIN 2060-AP43 *Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings Proposed Rule* Federal Register / Volume 80, Number 16 / Monday, January 26, 2015 / Proposed Rules

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I. Introduction

1. The Uranium Producers of America ("UPA") is a group of domestic uranium mining companies whose mission is to promote the viability of the front end of the nation's nuclear fuel industry. Member companies are listed below. UPA members conduct uranium exploration, development and mining operations in Arizona, Colorado, Nebraska, Texas, New Mexico, South Dakota, Utah and Wyoming. Many of their mining operations include *in situ* uranium recovery. UPA member companies are currently producing all of the 4.9 million pounds of uranium mined in the United States. Other UPA members are permitting new uranium production facilities in the United States. UPA members develop valuable uranium deposits and in doing so provide good, high paying jobs, tax revenues and produce clean energy for the citizens of the United States. Growth in domestic uranium mining and conversion will be required to support the U.S. government's plans to increase the use of nuclear power and to decrease release of greenhouse gases into the atmosphere. EPA has recognized that the domestic nuclear fleet continues to supply zero-carbon base load power which is a critical component to its strategy to shift our nation's reliance from carbon energy sources. Yet, this proposed rulemaking will result in making domestic sources of the only fuel that can be used for nuclear energy being non-competitive with foreign uranium suppliers.

   UPA members include:

   - AUC LLC
   - Cameco Resources
   - Uranium One Inc.
   - Ur-Energy Inc.
   - Uranerz Energy Corp.
   - Uranium Energy Corp.
   - Rio Grande Resources
   - Strata Energy Inc.
   - Energy Funds Resources (USA) Inc.

2. UPA's comments are submitted on behalf of its members in response to the Environmental Protection Agency's ("EPA") proposed revisions to 40 CFR Part 192 (the "§192 rule"). 80 Fed. Reg. 4156 (Jan. 26, 2015). UPA appreciates the opportunity to provide comments to the Proposed Rule. However, in providing these comments, UPA reserves all of its rights regarding challenge to the legality of the Proposed Rule and any ultimate rule in the appropriate court of law.

   UMTRCA establishes the jurisdictional boundaries between EPA and the NRC and Agreement States. EPA is authorized to set standards, while NRC and the Agreement

States have implementation and enforcement authority. The proposed rule requiring new prescriptive post-operational monitoring time and data requirements and new prescriptive post-restoration requirements exceed EPA's jurisdictional authority as set forth by UMTRCA. The proposed rule is an impermissible attempt by EPA to direct the compliance of ISR operations. These prescriptive proposals violate UMTRCA and are legally invalid on their face.

Section 192.53 of the proposed rule would require implementation of a groundwater monitoring program to establish pre-mining water quality, operational phase monitoring to detect excursions, restoration phase monitoring to monitor the progress of groundwater restoration, stability phase monitoring to monitor the stability of restored aquifers and long-term stability monitoring to confirm stable conditions. Proposed §192.53 creates an attempt by EPA to implement the groundwater protection standard set forth in §192.52 by establishing requirements for pre-operational, operational, restoration and stability monitoring. The proposed implementation of this section usurps the authority granted NRC and the Agreement States. NRC and the Agreement States, not EPA, are the proper regulatory authorities to address EPA's groundwater standards.

The existing NRC and Agreement State requirements already adequately address the prescriptive proposals raised by EPA's proposed rule. The NRC or Agreement State program should be allowed to continue to implement its own corrective action program requirements to enforce EPA's standards without interference from EPA. EPA's current attempt to promulgate requirements for a corrective action program exceeds EPA's authority to promulgate standards for groundwater protection and the proposed rule should be withdrawn.

3. EPA's proposed §192 rule is deficient in that EPA failed to follow its own Science Advisory Board's recommendation to consider the myriad of groundwater monitoring and restoration data that is available that would impact the underlying rationale that EPA suggests as supporting the basis for its proposed rule. UPA strongly urges EPA to put its proposed rulemaking in abeyance in order to consider the historical data which we believe will obviate the need for EPA's proposed rule. Given the serious consequences that will occur from the adoption of EPA's proposed rule, EPA's failure to consider historical data undercuts the agency's efforts to establish reasonable standards for the *in situ* recovery industry. In addition, UPA would urge EPA to consider the suggested sampling program proposed by the Texas Commission of Environmental Quality (TCEQ) which we believe will demonstrate that the proposed rule is ill-advised.

II. Reservation of Rights

4. In providing these comments, UPA reserves all of its rights regarding the legality of the Proposed Rule and hereby adopts the legal bases set forth in the comments of the National Mining Association (NMA) challenging the legality of the proposed §192 on multiple grounds (Exhibit 1) and UrEnergy challenging EPA's jurisdiction in this matter (Exhibit 2).

5. Specifically, UPA intends to preserve all of its legal rights to challenge the Proposed Rule, if finalized in its current form, in a form that does not address the groundwater deficiencies discussed in ¶3 or in a form that does not adequately support the Proposed Rule through a risk assessment under AEA Section 275(c)(1) or a cost-benefit analysis performed under AEA Section 275(c)(2) in an appropriate Federal Circuit Court of

Appeals. UPA supports the factual economic rebuttal analysis of Cameco Corp (Exhibit 3) in it challenge to the EPA cost impact of the proposed §192. Should the proposed §192 be finalized in this matter, UPA does not believe it will withstand legal scrutiny and will be struck down. For this reason and the reasons discussed below, UPA believes that EPA should strongly consider withdrawing the proposed §192 pending a full legal evaluation and a complete review of all available data and a realistic economic evaluation.

III. EPA's Coordination with the Regulated Entity and Agreement State Agencies has been Poor in Developing the §192 rule

6. Listed below, in the U.S. there have been 49 ISR projects with about 40 years of regulated ISR operations/restoration history. Many of these projects consist of two or more regulated production areas or mine units that are permitted, operated and restored separately and contain individual data histories (about 155 total sites). It is important to emphasize "regulated" because without exception these are regulated by State and/or Federal authorities under a verity of statutes. As such, these operations were generally conducted under state regulations, permits and licenses or in NRC agreement or non-agreement states a federal Atomic Energy Commission (AEC) or equivalent license. The baseline-restoration-stability data that has been developed during the life cycle of these projects is extensive, and should be vetted as part of this rulemaking for it to have a smidgeon of technical validity. To date EPA has not examined the materials available from these operations.

Project	Operator	State	Status (2014)
Alta Mesa	Mestena	TX	Standby/Restoration
Benavides	URI, Inc.	TX	Restored/Released
Boots/Brown	U.S. Steel	TX	Restored/Released
Brelum	Mobil Oil	TX	Restored/Released
Brevard	Signal Equities	TX	Licensed/Undeveloped
Bruni	Westinghouse	TX	Restored/Released
Burns	U.S. Steel	TX	Restored/Released
Christensen Ranch	Uranium 1	WY	Restoration/Stability
Church Rock	Hydro Resources	NM	Licensed/Undeveloped
Clay West	U.S.Steel	TX	Restored/Released
Crow Butte	Cameco	NE	Operating/Restoration/Stability
Crownpoint	Hydro Resources	NM	Licensed/Undeveloped
El Mesquite	Cogema	TX	Restored/Released
Goliad	Uranium Energy Corp	TX	Licensed/Undeveloped
Gruy	Everest Minerals	TX	Undeveloped/Released
Highland	Cameco	WY	Restoration/Stability
Hobson	Everest Minerals	TX	Restored/Released
Hobson/Tex-1	Everest Minerals	TX	Restored/Released
Holiday	Cogema	TX	Restored/Released
Irigaray	Uranium 1	WY	Restored/Released
Kingsville Dome	URI, Inc.	TX	Stability
Lamprecht	Inter. Energy Corp	TX	Restored/Released
Las Palmas	Everest Minerals	TX	Restored/Released
Lance	Strata	WY	Licensed/Undeveloped
Longoria	URI, Inc.	TX	Restored/Released
Lost Creek	UrEnergy	WY	Operating
Luenberger	Teton	WY	Restored/Released
McBride	Caithness	TX	Restored/Released
Mt Lucas	Everest Minerals	TX	Restored/Released
Mosier	U.S. Steel	TX	Restored/Released
Nell	Mobil Oil	TX	Restored/Released

Nichols Ranch	Uranerz	WY	Operating
North Butte	Cameco	WY	Operating
North Platte	URI, Inc.	WY	Restored/Released
O'Hern	Cogema	TX	Restored/Released
Palangana Dome 1	Chevron	TX	Restored/Released
Palangana Dome 2	Uranium Energy Corp	TX	Operating
Pawlik	U.S. Steel	TX	Restored/Released
Pawnee	Inter. Energy Corp	TX	Restored/Released
Reno Creek	Rocky Mt. Energy	WY	Restored/Released
Rosita	URI , Inc.	TX	Standby/Released
Ruth	Cameco	WY	Restored/Released
Section 9 Pilot	Mobil Oil	NM	Restored/Released
Smith Ranch	Cameco	WY	Operating/Restoration
Trevino	Conoco	TX	Restored/Released
Unit 1	Hydro Resources	NM	Licensed/Undeveloped
Vasquez	URI, Inc.	TX	Restored/Stability
West Cole	Cogema	TX	Restored/Released
Willow Creek	Uranium 1	WY	Operating
Zamzow	Inter. Energy Corp.	TX	Restored/Released

7. Testing of ISR technology started in the U.S. in the early 1960s. In Wyoming the first ISR uranium project was operated at the Shirley Basin site. Many of the same principles and techniques currently used, including ion exchange (IX) systems, pattern drilling, and the use of leach solutions with an oxidizer were used in this early project. Over the years there have been many commercial ISR developments in Wyoming, most notably, the Smith Ranch/Highland and Irigaray/Christensen (Willow Creek) projects with production and restoration spanning decades and ongoing to this day.

8. The first large test in Texas was the Clay West Project in 1975. During the same period of time many other ISR projects *were* developing in Texas testing various leaching systems, oxidants and ion exchange systems. In Texas, production rose to a maximum 3.77 mm lbs. in 1981 (Underhill 1992) with the addition of a number of small ISR projects. In the 2000s Texas production resumed at the Kingsville Dome, Rosita and Vasquez projects. Also in the 2000s, two new projects, the Alta Mesa and Palangana were commissioned.

9. In New Mexico, during the 1980's, Mobil Oil Corp conducted extensive ISR production and restoration testing at the Section 9 pilot site during the early 1980's using a sodium bicarbonate leaching system.

10. In Nebraska, commercial operations at the Crow Butte facility started in April 1991 and continue to this day.

11. In developing the proposed §192 rule, EPA made a variety of technical assumptions without soliciting or requesting information from outside sources such as the Wyoming, Texas, New Mexico or Nebraska UIC Agreement State regulatory agencies or companies who have had experience with groundwater restoration and stability.

12. The data available from these operations is extensive and their operational history is recorded in agency files and company records. Evidenced by the data summarized in Exhibit 4, the International Atomic Energy Agency (IAEA) has inventoried basic data on US ISR operations. Results from some of these operations will be addressed in detail throughout these technical comments. Additionally, reports and data from these operations are attached. Public information that is available to IAEA would obviously be

available to EPA. Rulemaking requirements for technical information and pure logic should lead the EPA to look to these technical resources in the states where operations were conducted before proposing rulemaking that is intended for the ISR industry and that will override established state and NRC programs.

13. The UPA has members in every Agreement State which have ISR operations and participate in state mining associations. Specifically, our members are active in the Colorado Mining Association, Texas Mining and Reclamation Association and Wyoming Mining Association. None of these state associations have been approached by EPA with requests from its members for Information.

14. UPA members work closely with Agreement State agency staff and have knowledge of the regulatory activities in their Agreement States. Similar to the lack of communication with the regulated entities, UPA members have been advised by state regulators that EPA did not solicit input from their respective agencies before developing the proposed §192 regulations. Both the TCEQ and Wyoming Department of Environmental Quality (WDEQ) have stated the same theme in comments to this proposed rulemaking. (Also see the letter from Texas Railroad Commission to EPA in Exhibit 5). This is unfortunate because in the case of Texas and Wyoming, nearly a half century of direct regulatory experience can be drawn upon.

15. From the email correspondence in Exhibit 6, it is not clear if EPA has coordinated with the federal BLM with regard to the §192 rule making proposal. That agency may have conflicting requirements regarding extended stability monitoring periods on federal land.

16. UPA members have worked with EPA in the past on rulemaking and are prepared to do so with the proposed §192 rule. The proposed §192 originates from the EPA Office of Radiation and Indoor Air. Recently a separate rule pursuant to Clean Air Act Subpart W relating to radon emissions from uranium recovery facilities was promulgated and originated from this same office. Early on in the Subpart W rulemaking process, EPA coordinated with industry with requests for information (RFI), establishing a stakeholder group which convened quarterly and created an online document repository to provide transparency even though the proposed rule had little protective value for protecting public health. Shown through extensive Q&A correspondence in Exhibit 7, industry was supportive and provided EPA with comments and data. For the §192 rulemaking this type of outreach was non-existent.

17. EPA's poor coordination with the regulated ISR uranium industry and Agreement State agencies in developing the §192 rule proposal, is reason alone that the proposed §192 rule proposal should be tabled and to allow proper fact finding to be conducted by USEPA. The UPA members stand ready to work with EPA to educate, review the existing database and develop a workable rule if necessary.

IV. The Proposed §192 Rule is Not Necessary

18. The EPA is proposing this regulation to protect groundwater from potential future contamination and in the event that any future contamination would occur, to not burden future generations of the public with paying for the remediation (80 Fed. Reg. 4171). EPA states that groundwater is becoming increasingly more important for domestic purposes in spite of the fact that water in aquifers exempted for ISR can never be used for a domestic purposes without making dramatic changes to the Safe Drinking Water

Act (SDWA). UPA fully agrees with this objective. Yet EPA has not produced any evidence that contamination from historic ISR operations is even an issue. Rather EPA has only speculated that a problem exists using terms such as "may increase," "may result," "may migrate," "may occur," "may cause" and "we believe" to defend or otherwise justify the need to add Subpart F to 40 CFR §192. Also, in the form that the current proposed rule is written, EPA has increased the likelihood of burdening future generations with paying for remediation or extensive monitoring, because, as written, the proposed rules do not provide a clear path to closure and license termination.

19. In contrast to EPA, Exhibit 8 contains a finding from TCEQ which administers the UIC Agreement State program in Texas that states "there have been no documented cases of offsite groundwater contamination in south Texas in over 30 years of in situ uranium mining at over 30 different sites." Similarly, shown in Exhibit 8 the Nuclear Regulatory Commission (NRC) acknowledged in a 2009 Report that no migration of recovery solutions to adjacent, non-exempt aquifers has occurred based on 40 plus years of ISR operations. These agencies have direct permitting/licensing, inspection and enforcement responsibilities over essentially all of the ISR operations that have been conducted in the U.S. since the 1970's, and are using the full range of historical data to support their conclusions. Again, EPA has not cited one example to support the assertion that ISR operations pose a risk to the public or environment, let alone a significant risk. And if EPA had reviewed these findings, it is troubling that EPA did nothing to refute these findings as part of the justification of the rule.

20. In the rulemaking preamble (80 Fed. Reg.) or draft report *Considerations Related to Post Closure Monitoring of Uranium In-Situ Leaching Sites* (EPA 2014b), EPA has not reviewed or even referenced existing Agreement State regulatory processes or baseline/restoration goal development, permitting, or utilized information that could be gathered from the extensive opportunities for stakeholder participation, and rigorous inspection programs would surely provide more than ample protections to the public and the environment and show that ISR operations are protective of the environment while providing a valuable clean energy source as well as economic benefits to rural communities not only in Texas, Wyoming and Nebraska but to the United States as a whole.

V. EPA Documents Biased

21. UPA is concerned that EPA "cherry picked" references to satisfy the objective of justifying the rule. The scores of restoration reports in Exhibit 9 from companies to Agreement State regulatory agencies or restoration certification in by TCEQ in Exhibit 10 were not reviewed or addressed by EPA. An extensive restoration pilot in New Mexico, the Section 9 pilot, did not appear to be reviewed by EPA at all. Technical information on the Section 9 pilot is presented in Exhibit 11. The important study contained in Exhibit 12 entitled *Aquifer Restoration at In-Situ Leach Uranium Mines: Evidence for Natural Restoration Processes* conducted by Battelle National Laboratories was not addressed. Contrary to the hypothesis expounded by EPA as the technical basis for the proposed §192 rule, this Battelle study found that redox sensitive species such as uranium are naturally attenuated and do not migrate out of the well field area. Of the 23 reports that UPA reviewed we find:

    - 7 of the 23 documents are NRC voting records or EPA redline documents of proposed rule.

- 2 of the 23 are “Final” documents (NRC SRP, EPA Statistical Report).

- 1 document is a review of a draft document (Science Advisory Board review of EPA draft Technical report).

- 1 document is 1991 EPA document regarding groundwater protection strategies.

- 1 document can be viewed at the USEPA Docket Center Public Reading Room in Washington, DC (Valuing Ground Water).

- 1 is a USGS Report (Hall).

- The remaining 10 documents are listed as “draft reports” or are authored by individuals/entities known to be biased in their opinions regarding the extractive industries or drafted for use in contested case hearings. Three are from outside sources. As stated above, no industry or state regulatory documents were referenced or cited. Rather these documents include drafts and non-peer reviewed papers by anti-ISR individuals or groups such as:

    - Draft Technical Report 40 CFR 192 final draft [EPA-402-D-14-001]
    - Draft Risk Modeling Report Final Draft [EPA-402-D-14-002]
    - Draft Risk Modeling Report Appendix A September 11 2013
    - Draft Risk Modeling Report Appendix B September 11 2013
    - Draft Risk Modeling Report Appendix C September 11 2013
    - Draft Risk Modeling Report Appendix D September 11 2013
    - Critical review of acid in situ leach uranium mining: USA and Australia, Mudd_2001
    - Fettus, G. and M.G. McKinzie. 2012 "Nuclear Fuel's Dirty Beginnings: Environmental Damage and Public Health Risks from Uranium Mining in the American West", Natural Resources Defense Council
    - Darling_2008

22. From the list above, UPA finds that the majority of the documents either add no real technical/scientific value or are a “Draft Report” with no peer review process outside of internal EPA review. EPA did not include published references to the contrary such as the NRC Generic Environmental Impact Statement or Supplementary Environmental Impact Statements, Separate Environmental Impact Statements, or Agreement State Environmental Assessments or many of the available guidance documents. TCEQ, WYDEQ, CDPHE, etc., regulatory documents on actual ISR facilities were conveniently omitted.

23. EPA’s proposed rule is completely deficient on its face value as it has failed to review existing data. No technical rule can stand without data. There is a large universe of data that is available to support successful restoration and successful stability. In addition to the contents of Exhibits 9 and 10, a detailed inventory of available information has been prepared by UPA and is presented in Exhibit 13.[1] These industry applications,

[1] The inventory in Exhibit 13 should be viewed a “work in progress”. The agency files on ISR activities are extensive and more information is available than listed on the inventory. The EPA mandated time

environmental assessments, permits, reports, while not peer reviewed, carry at least the same level of credibility as the unpublished NGO documents used in the §192 rulemaking. EPA must review them since the personnel involved were actually involved in the ISR process.

24. UPA is concerned that both the Darling and Fettus materials present a biased view of facts. The authors were an attorney and an expert witness that represented interveners in ISR permit/licensing contested case hearings[2]. No objectivity could be anticipated in their publications. The only reason that it appears that Hall's presentation was selectively included in EPA documentation was to add "gravitas" to the NRDC paper and to Darling 2008. The EPA purposefully used Hall and her association with the USGS to add academic weight to the other two references in spite of the fact that a careful reading of her paper does not support the broader conclusions proposed by Fettus/Darling. The Hall paper very clearly indicates that not "every" constituent was restored to baseline although many were. The report did not address whether the failure to restore every constituent to baseline decreased the usability of the water.

25. Another illustration of the prejudiced nature of the EPA's literature choices is illustrated in the use of the Darling (2008) report. Shown in Exhibit 14, the same author conducted another study that provides that basis for long term stability of the element uranium at a large Texas operation. In that case Darling studied an ISR site about two decades post restoration to find, "The conclusion to be drawn from this assessment is that ISR has not caused groundwater at the Brown Project site to have a major-ion fingerprint that is abnormal with respect to Oakville groundwater in other areas of Live Oak County."

VI. EPA's Economic Analysis is Fatally Flawed. This Impacts are Overly Burdensome on the Uranium Industry, Especially Small Business

26. Incorrect and incomplete inventory of costs. EPA's projected §192 rule compliance cost to the industry that were addressed in EPA's draft report *Economic Analysis: Proposed Revisions to the Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings Rule* (EPA 2014a) were simplistic; essentially considering only well sampling and lab costs. All references in this section apply to this report. Unaccounted costs integral to operations and overhead include, but are not limited to:

- Data evaluation, modeling, and analysis by technical staff and consultants for years and perhaps decades;
- General and administration costs in addition to technical staff;
- Three year additional upfront cost to establish baseline conditions for each mine unit or production area will delay production and the three years actually exceeds the production life expectancy of a mine unit or production area;
- Maintaining insurance on property and facilities;

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limitations associated with these Comments limited the review to what is currently indicated in the inventory.

[2] G. Fettus was the Interveners' attorney in the most significant administrative proceeding involving challenges to ISR operations in the HRI case. After review by the Atomic Safety and Licensing Board (ASLB) administrative/technical panel, the interveners lost every contention in the case. He also was in the Lance ISR project Subpart L contested licensing proceeding before the ASLB where, again, all of the interveners' technical challenges were overturned. Bruce Darling was the expert witness in the Goliad ISR UIC Permit contested case hearing before the Texas Water Commission. The Protestants technical contentions were denied in the Goliad case.

- Maintaining financial assurance for years and perhaps decades;
- Maintaining all well field and plant infrastructure in standby;
- Testing for mechanical integrity on all class III wells on a 5 year basis as well as to the repair and/or replacement cost over the long term;
- Land/lease holding costs. What were 5 to 10 year mining leases would need to be 10 to 40 year mining leases if the §192 rule was finalized in its current form. Land rentals, lease renewals, lease extension bonuses are not even considered in the EPA economic analysis;
- Road agreements that allow access into remote areas will need to be maintained and even renegotiated during this time;
- Utilities, taxes;
- Regulatory Permit/license fees at realistic rates. The EPA standards will have to be implemented by NRC. NRC recovers costs and review is based on an hourly rate.

27. The UPA does not understand if the authors of the draft supporting cost-benefit report either were not aware of other costs or omitted them from the assessment as not being pertinent to the economic analysis that EPA is using to support making changes to 40 CFR 192. The economic analysis is so deficient that it alone is a reason that the §192 rule proposal should be pulled and a proper analysis with industry input conducted.

28. The cost-benefit assumptions EPA used show the lack of detail or knowledge in the phased way ISR projects are permitted through the Life of Mine. A glaring example is the confusion of regional baseline monitoring during the permitting process which monitors the water quality of regional wells for a year and the requirements for baseline sampling of the individual production area or mine units which occurs over a little less than two months. EPA did not take the time to look at the phased approach to development described in NUREG 1569 let alone State or production area or mine unit sampling requirements when they developed the baseline for the economic model. Exhibit 15 describes the Texas production area authorization phased process in historic context. The mine unit approach to sequenced development in Wyoming and Nebraska is similar to the production area approach required by Texas regulations. EPA must take the time to research the actual cost to operations in developing numerous mine units or production areas at a single project to develop the economic model.

29. EPA used one mine unit at the Smith Ranch/Highland project as an example in their economic cost benefit model. Cameco, the operator of the Smith Ranch/Highland project independently modeled the cost of compliance using an in-house econometric model that was developed to establish holistic costs for commercial operations. The results of this model are contained in Exhibit 3. UPA supports the findings of the Cameco Model. When the entire scope of costs of the proposed §192 rule is applied to an ISR operation, EPA's cost benefit analysis falls short on the cost side by an order of magnitude. This is crucial because all of the ISR companies in Texas and most elsewhere are small businesses. So also are almost all of the dozens of service and supply companies to ISR facilities around the country. The realistic cost of the proposed EPA 192 regulations would have a disproportional cost impact to small business or small entities that exceeds EPA's own policy guidance. Additionally, EPA has failed to adequately quantify the benefits of the rule making, and thus rendering the cost/benefit analysis an exercise in proving the negative of which there is no solution.

30. Representation of industry structure is mischaracterized. EPA claims that the costs only affect a "few" small businesses. No attempt to show which producers are small

businesses or how many could come on-line in the rulemaking period, and what percentage of the domestic uranium recovery industry are small businesses. Also, EPA, as part of its small business analysis failed to consider long term independent contractors, such as drilling contractors that will be affected by this proposed rule and will be as significantly impacted as are the producers. There are over 20 different drilling contractors that derive more than 50% of their gross revenue from their work on regulated activities that are considered in this proposed rule and all meet the statutory definition of a "small business".

- There are 19 active operators in the U.S. Of those, Cameco, Uranium One, Cotter, and Rio Tinto/Kennecott are classified as large businesses. Thus ~79% of the corporate entities are small businesses.
- The stated planned or anticipated or actual production that could arise from the 19 companies could be as high as 15-18 million lbs./yr. Of that the four large companies could produce as much as 5-7 million lbs./yr. In other words 60-70% of potential production would come from small business.
- Because of the inordinately long permitting time period, that group of companies has spent hundreds of millions of dollars over the past 10 years, which effectively could be lost because of unnecessary and poorly conceived regulatory rulemaking on the part of EPA. Virtually everything invested by these small businesses is at risk.
- The effect of very the high cost of this regulation could therefore adversely affect the entire industry.

31. <u>EPA's discussion of purchased vs. produced uranium obfuscates economic impacts</u> In Section 2.5.3.1 EPA states that in 2012 9.8 million pounds of U_3O_8 was *purchased* in the U.S. Yet Table 2-6 lists total mine *production* in 2012 at 4.335 million pounds. This "purchase" volume drastically differs from what is "produced" by domestic mining. ("Produced by domestic ISR is even more different as will be addressed in ¶32 below). It is mined uranium production that is potentially impacted by this rulemaking and only actual mined production estimates should be used if a valid economic analysis is to be undertaken in projecting the likely economic impacts of the proposed rule. EPA does not identify the specific sources of purchased uranium or why purchased amounts are even included in the economic analysis, but the large discrepancy between purchased and production is likely due to EPA including surplus uranium placed into the market by the US DOE in 2012.[3] The Section 5.2 and 5.3 summary carries this same ambiguity but changes the year to 2015 and 2014 respectively. The DOE is not a uranium mining company, the §192 rule does not impact DOE sales so DOE sales should not be lumped with newly mined uranium as part of the economic analysis.

32. Table 2-6 of the EPA's Economic Analysis US production, as documented by DOEs Energy Information Administration, is 4.335 million pounds. But this amount over stated the production from ISR operations for the purpose of the economic analysis. DOE's production quantity includes ISR and conventional mine/mill production. The §192 rule impacts only ISR production so the conventionally mined uranium should be removed from the tally. Clearly, EPA must redo its economic analysis with accurate production metrics utilized.

33. The draft report also states with Section 5.2.4 that "domestic suppliers of uranium would have a limited ability to pass the costs of compliance to their customers through price

[3] Exhibit 29.

increases." Uranium sales are conducted as a contract sale or a spot market sale. Contracts set the price over a defined term and spot sales occur at the market price. The opportunity for a uranium supplier to pass the compliance cost onto the buyer is nonexistent in the spot market sales environment and since contract sales contain defined prices, the ability to pass compliance costs to the customer during the term of a contract is nonexistent as well. Costs of compliance of this regulation cannot be passed on to uranium utility customers.

34. Small businesses impact is relevant to the rule. EPA concludes that the proposed rule will not have a significant impact on a substantial number of small entities and therefore it is an acceptable cost on these small entities to comply. To justify this flawed conclusion, EPA cites the SBREFA criteria that if less than 10 small businesses are affected by the proposed rule, the impacts on these small businesses are not significant and considered acceptable. Under this decision making logic, EPA is purposely ignoring the federal statutes and regulations that were put in place to protect small businesses from burdensome laws and regulations. Just because an industry is small in numbers does not give the federal government license to extinguish it.

35. As stated by EPA, the ISR industry currently is comprised of a small number of companies and will always be a small community and because of that, EPA further states that there will never be more than 10 small entities affected by the proposed rule. The information in items 30 and 34, above indicate that there will be at least dozens of small businesses adversely affected. How can EPA say in sincerity that the impact of the proposed rule on small entities is not significant when 100% of small entities will be significantly impacted by the proposed rule? Regardless of EPA's rational, if an appropriate analysis was conducted the conclusion would be the rule making is not justified because of the impact on small entities.

36. The cost to sales ratio analysis fails because of bad assumptions. EPA's cost to sales ratios analysis (EPA 2014a, Table 5-3) is flawed on several counts in that either EPA takes a snapshot in time (i.e., 2015 estimated production and sales) to develop the ratios or EPA assumes that ISR operations will have consistent annual production throughout the life of the project, including during restoration. When reviewing this information and data, it becomes clear that EPA selected the 2015 estimates for annual production and sale price at a level that just so happens to generate a cost to sales ratio which would be below the 3% threshold value. EPA defends using these production and sale prices by simply stating "both production and the price of uranium in 2015 are uncertain."

37. EPA's incorrect use of estimates for annual production and sale price is demonstrated by Mestena Uranium. EPA correctly identifies Mestena Uranium as a small business. As there was no data available, EPA estimated the annual production at 500,000 lbs. and a projected sale price of $57 per pound. With respect to price, EPA states "baseline price is assumed to be $57 per pound." EPA provides no justification for a $57 per pound sale price in 2015? In fact the 2015 price is well below the $57 level. For example, in February 2015, TradeTech listed their current (spot) prices at $38.80, the price at which Mestena sells its uranium. With respect to sales volume, EPA provides no justification as to why 500,000 pounds was selected for Mestena. Mestena's annual average sales since 2012 have been less than half EPA annual sales estimate of 500,000 pounds. When using realistic sales volume data to perform the analysis, the cost to sales ratio greatly exceed the 3% threshold for the low, average and high cases across any sales price range. According to Mestena Uranium, LLC, EPA did not contact

them for accurate information, and as a private company, does not release this information. One can only conclude that EPA simply guessed and attributed the information without any attempt at validation.

38. A similar case to Mestena can be made for Uranium Energy Corporation and Ur-Energy, EPA's other two examples used in the EPA 2014a, Section 5.5. EPA accurately notes that they are small business, but in today's price environment, EPA's assumption that production and sales volume are not close to 500,000 or 1,000,000 pounds U_3O_8 is flat wrong. EPA should recalculate the costs to small business based on realistic market and production metrics. Doing so would result in cost increases well above the 3% threshold for significant impacts to small business.

39. 100 years of remediation is not substantiated. 100 years of pump and treat described in 80 Fed. Reg. 4180 (V.B) and EPA 2014a, p. 6-3 is not realistic at all. No attempt was made to quantify the scope or toxicity potential of contamination that would result in 100 years of restoration cost to the taxpayer. Uranium and related elements are naturally occurring in the vicinity of uranium deposits in similar concentrations that will be left behind after restoration. EPA has no cleanup effort underway for natural uranium in groundwater. What would the cleanup criteria be? No conventional mill has agreed to pump and treat for 100 years, since the EPA/NRC rules do not assume a licensee can be a viable entity for 100 years. Why is it reasonable to assume that an ISR operation would have to or could be?

VII. Aquifer Exemption - 40CFR146.4

40. In the vicinity of a uranium deposit the water is not potable because of the natural occurring uranium and radioactivity that stems from the uranium ore in the rock and other elevated harmful ions (arsenic and selenium). Given this fact, uranium ISR is authorized by Agreement States after undergoing an exhaustive transparent Underground Injection Control (UIC) permitting process that is open for public comment and an opportunity for a hearing. After acquiring the UIC Permit from the Primacy State agency the EPA then must review and then concur with an Aquifer Exemption according to their regulatory criteria as follows:

"(a) It does not currently serve as a source of drinking water; and
(b) It cannot now and will not in the future serve as a source of drinking water because:

> (1) It is mineral, hydrocarbon or geothermal energy producing, or can be demonstrated…as part of a permit application… that considering their quantity and location are expected to be commercially producible….
> (3) It is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption…"

41. EPA has ignored the historic intent of the Aquifer Exemption designation in the proposed §192 rule. In 1978 the Aquifer Exemption designation was conceived during a cooperative UIC rulemaking process which involved industry, states and the EPA. Then, as now, from data, it was known that the water near uranium deposits was mineralized and was unsuitable for human consumption. After all, fundamental to uranium exploration in general is existing well sampling to identify anomolous levels of uranium, radium, gross alpha and radon. It was the basis for the National Uranium Resource Evaluation that was conducted by USGS about 40 years ago. Exhibit 16 contains a brief

description of this program and its findings vis-à-vis uranium in the western U.S. That same uranium and its progeny made water unsuitable for human consumption. EPA does not require restoration because the water could not be used in the future as a drinking water source.

42. EPA, states and industry knew there would be impacts to water after restoration. In the early days of ISR harsher lixiviants were employed and a high level of restoration was doubtful. In response to the concern over restoration issues, leach solutions have become more and more benign. Acid lixiviants were eliminated. Ammonia carbonate was eliminated. With the more benign nature of lixiviants, restoration has been achieved to much cleaner standards than had been anticipated. Restoration has been routinely approved and conducted to a standard that had not been thought possible in the early days of the UIC program. The UIC program does not incorporate any requirement for restoration, because it never was expected that there would be "no change" to ground water quality. In fact, a change to ground water quality was deemed acceptable. The only issue was that the operation of the exempted aquifer was to be protective of down gradient USDWs. This is a newfound and somewhat confused concern to EPA and seems to suggest treatment of exempted aquifer water for domestic purposes which would require modification of the SDWA to be legally viable.

43. The exemption process was developed so the ISR uranium industry could exist given the new UIC rules which prohibited injection into a USDW. Qualitatively, a USDW was defined by total dissolved solids (TDS) alone. Even though the water met the USDW TDS criteria, it was determined that the water around uranium deposits was suitable for the ISR process but not drinking water because of uranium mineralization (uranium and its progeny). The summary tables in Exhibit 17 demonstrate that the background data collected by industry for decades validates this determination.

44. It is important to emphasize that there has been no documented impact of a USDW as a result of underground injection control activities authorized within an exempted portion of a USDW as approved under 40 CFR §146.4

VIII. EPA Desired Method for Determination of Background/Stability is Unclear

45. EPA is unclear if it will require baseline, stability and finally long term stability (point of compliance wells) to be established well by well or averaged or if it is discretionary to the operator. The discussion of this topic in 80 Fed. Reg. 4175[4] vs. 80 Fed. Reg. 4179[5] is highly ambiguous on this point. Moreover, the requirements in 10CFR192.53 are equally ambiguous. It is fundamental that during the ISR process that water be circulated through a well field, over and over, through high grade ore to low grade ore and vice versa. This type of homogenization necessitates averaging of baseline values. Moreover, averaging value from baseline wells by definition means that about half the production area exceeds the restoration goal before any mining begins. EPA should acknowledge averaging as an acceptable method for determining baseline and that significantly higher values exist that affect water quality in the exempted portion of the aquifer at issue.

[4] "As appropriate goals may be developed for individual wells, groups of wells, or the entire well field."
[5] "Today we are proposing that each well within the well field be considered for use as a point of compliance for the purpose of determining stability after restoration is determined to be completed…"

46. Any methodology/technique that is used to establish background that does not correspond to the maximum full range of pre-mining concentrations existing across the permit area places the operator in a failure situation with no end game as this forces the operator to have to restore water quality in portions of the production area to a condition that is better than what nature created and better than the water quality that was present prior to mining. This should not and cannot be the intent of any environmental protection goal.

47. In 2014 the TCEQ amended its ISR groundwater restoration rules at 30TAC331 to allow for amendments to restoration tables for individual production areas if the post restoration values averaged across the production area fell within a range of naturally occurring background values within the exempted area. The range of values is provided for in the area permit and subject to public comment and a contested case hearing. The methodology is designed to provide operators numeric flexibility by providing for a range not a single value, to require restoration in the exempted area that was "consistent with baseline" and to conserve groundwater.

48. EPA appears to be proposing to have each well serve as a point of compliance (POC) well. EPA should clarify if every well or just the baseline wells are POC wells? Additionally, EPA designates some of the wells as POC wells that are clearly either background or at best points of exposure since they are expected to be located in areas outside of the portion of the USDW that is exempted. This lack of clarity in definition of role and purpose creates significant confusion. If the intent to designate every well (whether injection, baseline monitor, or background well) as a POC well, the concept and purpose of a representative baseline well is eliminated. A typical well field has hundreds of wells and assigning each as a POC well is impractical and burdensome on any operator. Moreover, the concept of hundreds of POC wells is not consistent with EPA's economic impact analysis. EPA must clarify that baseline wells are point of compliance wells. Depending on interpretation, EPA may be proposing a restoration requirement that is impossible to achieve and, therefore, by definition is legally invalid.

49. Additionally, EPA in §192.53 effectively considers all wells installed by the operator as potential POC well. However, EPA fails to acknowledge that there are long term maintenance costs created by this lack of clarity as operators are also required to demonstrate mechanical integrity under 40 CFR §144.28(f)(2) and §146.8. Under the delegated programs in Wyoming and Nebraska, this is tested every five (5) years on all Class III injection wells, which would include all of the POC wells described in the proposed §192.53.

IX. EPA Downplays Known Poor Background Water Quality

50. EPA at 80 Fed. Reg. 4170 (IV) states the case that radioactive water is toxic because it presents an exposure pathway for people.

51. On the very next page of the preamble EPA is dismissive of the relevance of poor water natural water quality at ISR sites (80 Fed. Reg. 4173). EPA's articulated concerns regarding health risk are understood by UPA, but the elements contributing to EPA water quality health risks at ISR sites are present in groundwater near uranium deposits even with no ISR activity due to the naturally occurring elevated concentrations. Uranium and

its far more toxic radioactive decay products are a naturally occurring mineralogical anomaly[6]. That is why the mine is there and why the aquifer is exempted[7].

52. EPA claims that contaminated water at ISR projects should not be further degraded because even though the water may be non-potable, it may be treated using advanced treatment technologies. This line of reasoning cannot be supported by factual evidence. Described in these UPA comments, the small changes that occur to water post restoration are changes to the very same elements that impacted water quality naturally before mining was conducted. Yes, treatment would be required for future use but the very same ground water treatment methodologies would be needed mining or not, amended restoration tables or not. Again, it is the natural uranium and its elements that impart toxicity to the water, before and after, and the slight variability of these elements (sometimes higher and sometimes lower) will make no difference in the treatment that is required. If EPA has evidence to indicate the contrary it should be provided. And, as noted above several times, treatment for domestic usage would require modification of the SDWA.

53. Statistically, U minerals are either non-parametrically or log-normally distributed in or deposits compared to other non-uranium related mineral assemblages in the broader region. The area is small and the grades are high. This is why there is an exploitable resource. The same can be said for U's presence in the water that is contained within the pore space of that rock. It is why geologists conducted groundwater sampling campaigns as one method of regional exploration[8].

54. EPA's focus is on detailed statistics to document water quality background for each mine unit. But the nature of background vis-à-vis uranium mineralization is well known. There is a large universe of water quality that has existed for ISR operations for many years[9]. Statistically this is a large population of data from similar geochemical environments. EPA has not considered the statistical significance of this data set at all in their technical documentation. This is real data that demonstrates that water quality in the vicinity of uranium deposits is not fit for human consumption without substantial treatment. Specifically, of 155 mine units tested, over 80% exceeded MCL's for U, and essentially all for ^{226}Ra, gross alpha and radon. This data represents a very large population and such a strong showing is statistically unquestionable. EPA does not recognize this data in its technical analysis.

55. EPA cites radon as the most serious environmental carcinogen[10] yet dissolved radon concentrations in water surrounding ISR projects is barely addressed in the §192 rule technical documentation. Shown in Exhibit 17, radon may exceed 1,000,000 pCi/l in ground water in the uranium orebody (uranium is the primordial source of radon) vs. EPA's proposed MCL of 300 pCi/l.

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[6] Exhibit 17

[7] For example the radioactive uranium decay product radon is completed ignored in EPA's §192 rule proposal. EPA is considering a radon MCL as low as 300 pCi/l. Yet as shown in Exhibit 17, radon in the groundwater associated with uranium deposits may contain dissolved radon concentrations in excess of 1,000,000 pCi/l. EPA should square the health risks of using water in the vicinity of ISR well fields against radon, ISR conducted or not and then determine the necessity of rules that require a higher level of groundwater restoration.

[8] Exhibit 16

[9] Exhibit 17

[10] http://www.epa.gov/radon/healthrisks.html

56. EPA's restoration experience appears to be derived from a 2009 USGS Report titled "Groundwater Restoration at Uranium In-Situ Recovery Mines, South Texas Coastal Plain" authored by Susan Hall and two other individuals Bruce Darling and G. Fettus (80 Fed. Reg. 4172). As stated in ¶ 24 above, UPA believes that objectivity from Darling and Fettus is dubious at best. Neither of the reports was subjected to any level of peer review. Susan Hall is cited numerous times in the EPA documents that restoration to precise baseline numeric values have not been achieved. But as Halls report Table 4 in Exhibit 18 shows, in the very same reference Hall notes that pre-mining water at ISR sites was not potable If Hall's observation that precise parameter by parameter restoration is used as fact material to support this rulemaking, her observation that water quality is unsuitable for drinking in the same presentation deserves similar weight and she reports that not "every" constituent was returned to baseline but many were. Ms. Hall's report did not consider the public health or environmental impacts of any elevated constituent levels post-restoration.

57. Based on uranium and its radioactive decay products, the EPA concerns of health risk and water quality impacts at ISR sites would be similar even if there were no ISR activity in the orebody. If the water is to be preserved for future use as desired by EPA, either domestic or agricultural or stock watering, that future use of the water in a uranium deposit would require the same exact same treatment to remove uranium and uranium related elements after mining/restoration or naturally as in a situation with no ISR activity ever occurring.

X. EPA Analysis of Ground Water Restoration Result History is Superficial and Incomplete as it Ignores Vast Amounts of Publicly Available Data

58. EPA appears to blame their superficial analysis that was performed to support the §192 rule proposal by the statement that there is only very limited information in the open literature. (80Fed. Reg. 4165.) That is a patently false assertion, because the NRC maintains active public records on its ADAMS public document room. Additionally, the States of Texas, Nebraska, Wyoming and New Mexico maintain extensive public documents that are readily available to the public. Further in defiance of the SAB recommended actions the agency makes no effort to access available data. It is incorrect that there is a lack of information. "Open literature" is no prerequisite to availability because EPA has the ability to solicit from Agreement State agencies, state agencies with primacy of UIC activities, and the regulated entities themselves. This is what the SAB instructed EPA to do.

59. EPA has demonstrated no independent analysis or critique of actual restoration results or Agreement State restoration policy or technical criteria in the rule preamble or the technical support documents. For example, rules promulgated by TCEQ, WDEQ, NMED, and NDEQ are not cited or referenced.

60. The Hall report cited above, described examples from 22 Texas projects where a few individual ions were not returned exactly to their baseline values; most of these ions have no health implications or are subject to EPA Secondary "aesthetic" regulations.

61. The elements with Primary Drinking Water Standards described by EPA are uranium, selenium, arsenic, radium 226, nitrate, cadmium, fluoride and mercury. The latter four

ions are never introduced or mobilized during ISR mining in Texas. That leaves the remaining four (4) Primary Drinking Water ions U, ^{226}Ra, Se, As at issue.

62. Using the same dataset from the 2009 Hall report, Exhibit 19 is a study by Anthony & Holmes that revealed that for 22 sites making up the database restoration was achieved to a high level. This report was provided to EPA Headquarter Staff and Region 6 staff in July, 2014 and was presented at the 2014 NRC/NMA Radiation Workshop Conference, but it was never referenced in the rulemaking.

63. The Anthony & Holmes report illustrated that 21 out of 22 sites studied by Hall were restored to below EPA's Drinking Water Standards for arsenic. 21 of 22 sites restored radium to below baseline although all sites exceeded Primary Drinking Water Standards for radium before ISR began. Finally, according to Hall, every site had restored selenium to levels better than those mandated by EPA for drinking water.

64. The remaining element of concern was uranium. The Hall study found that of the 22 sites reported as being restored, 8 were restored to below baseline values for uranium. Uranium concentrations for 9 projects were less than one part per million above baseline. The remaining 5 projects reviewed disclosed that 4 were restored to less than two (2) parts per million above baseline while the last site was restored to a value less than three (3) parts per million above the baseline value. The remaining U in groundwater does not alter the usability of the groundwater compared to its original, pre-mining condition. The fact is that the overall groundwater quality was not degraded.

65. The variances in most ions reported by Hall do not justify the measures to protect surrounding groundwater that the §192 rulemaking is proposing particularly when there is no evidence that unregulated excursions to adjacent non-exempt aquifers have occurred. It is evident that EPA has not considered information that industry or Primacy States maintain in their files which justified the rationale for restoration to the levels reported by Hall.

66. Post ISR restoration uranium concentrations are the primary focus in the EPA-402-D-14-001 Technical Report and will be discussed further by UPA below.

67. UPA has expanded the review of uranium impacts to groundwater beyond that of Hall and Anthony and Holmes with additional information from TCEQ records and company files. Exhibit 20 contains a table with data for 51 individual ISR production areas in Texas[11]. Listed are the project permit number, the restoration timing, water consumption, stability duration and results, final restoration average or value and source of data. Represented is the information from hundreds of baseline wells, an excellent representation of actual restoration results.

68. On the Exhibit 20 table, the average uranium value at all Texas sites after restoration and stability has been completed is 1.1 mg/l. These are actual uranium restoration results at Texas ISR projects.

69. Next from Exhibit 17 is the inventory of background uranium results from the ISR industry over the past 40 years. The Texas data is representative of the same projects

[11] Hall report was limited to data for 22 production areas.

that described in the restoration summary above. For the Texas data only, the average background uranium at 92 production areas is 0.33 mg/l.

70. The average difference in background vs. post restoration uranium concentrations in Texas is about 0.8 mg/l; less than 1 mg/l, a small concentration. This is an actual metric that can be, and should be, used in impact analysis.

71. EPA should justify the proposed §192 rule against the fact that uranium will be impacted in the mine zone at the average level of ~1 mg/l. EPA hypothesizes that significant uranium potentially may migrate down gradient to justify a 30 year post stability monitoring period (e.g. 80 Fed. Reg.4164). For this hypothesis to be even plausible, the uranium concentration must be at the source to start. Yet the Texas restoration data shows that post restoration uranium has been reduced to concentrations that are very close to background after restoration and state mandated stability are complete. This raises the pertinent question - what is the potential for significant uranium transport? EPA fails to address this factor in its proposal.

72. Uranium stability values also are shown in the Exhibit 20 summary Table. Stability periods vary from 3 months to 60 months. Short of minor variations, there has been little change in the uranium trends at these projects over the observed stability periods. What is it about stability data in Exhibit 20 that leads EPA to believe that the period should be extended? This question must be answered as a prerequisite for any rule proposal dealing with extended stability periods.

73. UPA only presents the results for the uranium parameter in this discussion and data review. However, shown in Exhibits 9 and 10, the TCEQ data contains results for 25 other parameters for additional analysis. UPA comments on uranium because it is the primary focus in the §192 rulemaking. Uranium is also the most significant element that is impacted during ISR operations and is residually most present after restoration is complete. It represents the worst case water quality impact according available data.

XI. Restoration Beyond Diminishing Returns is Waste

74. Groundwater restoration is the most consumptive phase of the ISR cycle. For every gallon of water consumed and disposed during restoration of the exempted portion of the aquifer a gallon of fresh water flows in from the regional aquifer. Balancing the groundwater quality issues against excess groundwater consumption has been one of, if not the most, fundamental criteria in developing the Agreement State ISR restoration regulations. After all, groundwater availability can be impacted for future generations either way.

75. EPA has not balanced consumption issues against their more demanding quality measures in the proposed rule, in the preamble or in EPA 2014b. The proposed §192 rule should be withdrawn until a proper analysis of the impact on consumption has been conducted.

76. UPA notes that attempting to remove the remaining less than one (1) part per million of uranium from a mine area would require the disposal of vast quantities of the groundwater that EPA allegedly is trying to protect. In Texas, TCEQ agreed over and over again for each production area that has been restored that further restoration would have been wasteful as one reason that the level of restoration was considered adequate.

77. It is fundamental that when restoring groundwater, parameter values generally reduce quickly at the beginning of the restoration process and then more slowly as restoration proceeds, and eventually become asymptotic beyond which restoration cannot satisfy the ALARA standard. This is a provision that weighs heavily in the justifications for Alternate Concentration Limits as described in 40 CFR §40 Appendix A, Criterion 5(b)(5). Restoration of uranium is a case in point of this phenomenon.

78. Exhibit 20 lists the quantity of groundwater that is utilized during the restoration process. With the groundwater sweep method of restoration 100% of this water is consumed (disposed of). With the reverse osmosis or RO method of groundwater restoration approximately 2/3 of the water volume is recirculated and 1/3 is consumed. The gallons listed in Exhibit 20 are undivided with respect to restoration method so actual consumption is not specific. A good estimate is that 50% of the listed quantity was consumed and disposed of; a very large quantity of water representing hundreds of millions of gallons in a given production area. After deep well injection this water is no longer available for future use.

79. The Texas groundwater restoration rules carefully consider a number of factors to avoid waste. TCEQ regulations require a permittee to address groundwater consumption when requesting an amendment to a restoration table. Specifically 30TAC331.107(g) allows for the TCEQ to amend the restoration table or range table if it finds that:

    - reasonable restoration efforts have been undertaken;
    - the values for the parameters describing water quality have stabilized for a period of one year;
    - the formation water present in the exempted portion of the aquifer would be suitable for any use to which it was reasonably suited prior to mining; and
    - further restoration efforts would consume energy, water, or other natural resources of the state without providing a corresponding benefit to the state (i.e. would not satisfy ALARA).

80. There is no indication that EPA has considered the provisions of the Texas, Wyoming or Nebraska Class III UIC Programs in the proposed §192 rulemaking preamble or supporting documents. There is no indication that EPA has reviewed the technical reports that have been filed with TCEQ in support of restoration or the amendment of restoration tables in the technical evaluation that has led to the proposed §192 rule development or the documents that supported restoration approval for the Irigaray project in Wyoming. EPA failed to evaluate the impact of any of the past restoration decisions in Texas or Wyoming on water quality in the mine zone or any impact on adjacent groundwater. EPA based the §192 rulemaking decisions solely on a finding in the Hall report without reviewing the decision making process that led to the approval of restoration at the sites or the state groundwater conservation policy that lead to the Texas programmatic requirements.

81. EPA at 80 Fed. Reg. 4173 referencing Darling and Fettus stated that “some instances where ACL’s have been identified and approved by the regulator before restoration

efforts have been initiated and/or completed". UPA knows of none[12]. Rather, in Texas where the majority of restoration has been completed we describe the rule criteria and reports that have led to ACL determinations. Moreover, applying for an ACL to NRC is not permitted without active corrective action (at conventional mills) since NRC has never granted an ACL for ISR licensees. EPA either should specifically state examples where ACL have been erroneously approved or discredit the Darling and Fettus innuendo.

82. Exhibit 9 contains the reports from 33 production areas that have led to amendments to restoration tables. Generally each report includes, as required by TCEQ rules, an analysis of:

- uses for which the groundwater in the production area was suitable at baseline water quality levels;
- actual existing use of groundwater in the production area prior to and during mining;
- potential future use of groundwater of baseline quality and of proposed restoration quality;
- the effort made by the permittee to restore the groundwater to baseline;
- technology available to restore groundwater for particular parameters;
- the ability of existing technology to restore groundwater to baseline quality in the area under consideration;
- the cost of further restoration efforts;
- the consumption of groundwater resources during further restoration; and
- the harmful effects of levels of particular parameter.

83. The waste consumption of groundwater with diminishing quality returns is central to TCEQ's approval of restoration at a certain point and it is addressed in each report according to the rule at 30TAC331.107. For example, Exhibit 9f provides a detailed analysis of water consumption at the COGEMA H-1 Extension restoration. There it was projected that an additional 210 million gallons of water would be required to be treated and circulated to achieve restoration from 1.13 mg/l to the restoration value of 0.4 mg/l for uranium (a 0.73 mg/l decrease). COGEMA noted that 210 million gallons of water was a conservative estimate because uranium restoration progress had become asymptotic. In other words, results diminish and require more effort as the decline in progress proceeds (asymptotic). TCEQ agreed to amend the restoration table for this production area based on COGEMA's justification. TCEQ, like COGEMA, saw no benefit in consuming 210 million gallons of water to reduce uranium ~ 0.73 mg/l when the water would remain non-potable afterwards because of remaining concentrations of the same element - uranium. A similar analysis is conducted for every amendment approved by TCEQ. Again, many of these reports are within Exhibit 9 for EPA's to review.

84. No attempt was made by EPA to address resource consumption cost using a purely statistical restoration approach to 95% confidence. EPA should perform this analysis vis-à-vis the successful restoration results under the requirements existing State uranium regulations when evaluating the benefit of the proposed §192 rule.

[12] EPA cited concerns related to UMTRA sites and the natural flushing expectations as a root cause of the concern. Those are entirely different because DOE did not conduct any corrective actions and are not required to seek the same standards as Title II sites. No background, MCL, or ACL requirements.

85. EPA is correct that water is valuable and must be preserved (80 Fed. Reg. 4164 "…it is important to protect groundwater to ensure the preservation of the nation's currently used and potential underground sources of drinking water for present and future generations".), but if quality water is being consumed to achieve an arbitrary statistical result, without any incremental future use value in the well field being restored, then the use of the fresh water amounts to waste, particularly in a portion of an aquifer that can never be used for drinking water per the SDWA/UIC program.

86. The §192 rule has the potential to be wasteful of water and to defeat the purpose for which it is intended, to protect ground water for the future.

XII. EPA's Surrounding Groundwater Concerns are not Risk Based. EPA Should Provide Factual Evidence that a Risk Exists, Conduct a Valid Risk Assessment or Seek and Collect Data if Necessary.

87. Primacy State UIC program requirements have been successful for over 40 years in mitigating the risk to water resources surrounding the exempted area.

88. In EPA's §192 rulemaking the NRC and Agreement State experience is ignored and EPA presents no data demonstrating migration of mining solutions from ISR well fields post restoration.

89. EPA discussed "in" well field restoration results but cited no examples of offsite migration to an adjacent non-exempted portion of the aquifer. The entire technical discussion is speculation with use of the terms "potentially could migrate" and "may" cause increased human health risks. EPA's down gradient risk analysis amounts to no more than speculation based on no specific data or scientific information.

90. In fact EPA doesn't seem to understand the geochemical process by which ISR deposits occur and thus how to use its own modeling tools to evaluate the potential for down gradient migration after restoration is completed.

91. EPA failed to reference a 2009 Nuclear Regulatory Commission report which determined no migration of recovery solutions to adjacent, non-exempt aquifers based on 40 plus years of ISR operations, nor TCEQ written findings with similar conclusions[13]. These agencies have validated that 40 years of monitoring results at numerous commercial scale sites showing that there has been no impact to down gradient water.

92. Uranium mineralization and radiation in well field ground water is similar before and after mining. A single mg/l of uranium or pCi/l of radium in a well field is not relevant to down gradient water after mining any more than it was before mining. Stated in ¶70 above, about a single mg/l uranium is the issue in the §192 rule.

93. EPA correctly noted (Fed. Reg. 4162) that during mining, operations are conducted with a negative bleed and during restoration negative inflow is increased substantially. Shown in Exhibit 20 the extraction of water during restoration amounts to hundreds of millions of gallons. Down gradient water, or more important the rock containing the ground water, after mining is no different than before because it is only contacted by native groundwater inflow, not lixiviant outflow.

[13] Exhibit 8.

94. EPA ignores the natural mechanisms that placed uranium initially. It is the redox contact that traps uranium and allows for the formation of a commercial uranium deposit. This contact may be affected in the area where ISR is conducted but not outside of the well field area. Down gradient reduction is not impacted by oxidation because leach solutions are maintained inside of the monitored area as required by UIC permit requirements. EPA has not addressed the results of state UIC programs in achieving their fundamental objective - lixiviant control. An analysis of long standing NRC and Agreement State regulatory programs should be a prerequisite to the §192 rulemaking; especially when EPA is attempting to prescribe more stringent standards.

95. The reason why an ore body is present at a specific location is because the hydrologic and geochemical conditions exist to allow for the accumulation of the solubilized minerals within the groundwater at a specific location and down gradient from this location as well. Residual uranium in the mine zone will not impact surrounding groundwater resources because absent oxygenated conditions uranium is not soluble or mobile in groundwater. Per Section VII above, ISR and subsequent restoration activity is performed only in the mineralized zone of the aquifer which is local, not regional, so the aquifer is not oxygenated regionally. When considering the local aquifer uses when present with uranium mineralization, the only reasonable use of the water is commercial uranium recovery. But when analyzing restoration results, and a request to increase uranium concentrations in a restoration table, it is necessary to analyze the potential harm to surrounding groundwater resources[14].

96. Before mining and after restoration, all soluble uranium found in baseline wells in the mine zone was oxidized (+6 valence). In geologic time, affected groundwater migrated through the now ISR permit area, oxygen was consumed, and precipitation mitigated uranium (+4) concentrations to obscurity. In other words the accumulation of the uranium deposit. The very same geochemical regime is present today and will be present in the future and uranium will continue to precipitate locally with regional groundwater flow.

97. A typical uranium ore deposit is hundreds of thousands of years old with billions of gallons of groundwater having moved through it, but off site water analysis shows that because of attenuation the uranium is confined to the oxidation/reduction interface. Moreover, after ISR and restoration, the area affected by mineral recovery is extremely small compared to the size of the regional aquifer, so it is logical that the regional reducing capacity of the aquifer will prevail over any small pockets of residual oxidation that may persist. For example, the south Texas uranium trend in the gulf coast aquifer system encompasses tens of thousands of square miles, or hundreds of million acres. By comparison, production area well field patterns, when fully developed encompasses 30 acres or so. These well fields are completed in a small fraction of the regional aquifer and have been restored so that uranium is consistent with, albeit slightly higher than, pre-mining values. So it is logical that the regional reducing capacity of the aquifer will prevail over any small pockets of residual oxidation that may persist; just as was the case before mining.

98. EPA at 80 Fed. Reg. 4164 characterizes ISR operations as “large subsurface areas…has the potential to cause changes in groundwater at significant distances down

[14] Exhibit 25.

gradient". This characterization is clearly an exaggeration based the on the technical reasons described in ¶¶87-97 above.

99. There is limited evidence of down gradient changes in water quality available. But the data that does exist does supports the statements above because they do not indicate that groundwater impacts have occurred at all. Examples that are available from ISR project experience include:

- Exhibit 21. Presented here is water quality (primarily uranium) data from the Irigaray/Willow #2 well that is located down gradient from the restored Irigaray well fields, between the well fields and the nearest residence is presented. The well is about a mile down gradient from the well fields and completed in the same sand as the well fields. No changes (maybe a slight reduction) in uranium values have occurred in this well since 1977 - 37 years.
- Exhibit 23. As stated in ¶21 Mobil Oil Corp conducted a uranium pilot operation east of the Town of Crownpoint NM in the early 1980's. Shown is water quality from the town water wells developed in the same Westwater formation, some 20 years later in the same zone where uranium development occurred. There is no evidence of uranium contamination in these water wells.
- Exhibit 14. US Steel completed restoration at the Boots/Brown property in 1997. Down gradient samples taken from production zone monitor wells in this area in 2012 by Darling and the accompanying analysis indicated that that ISR has not caused groundwater at the Brown Project site to have a major-ion fingerprint that is abnormal with respect to Oakville groundwater in other areas of Live Oak County.

100. Other sources of long term data either exist or can be readily developed. This will take time, but the documentation is necessary to determine if the requirements in the proposed §192 rule is necessary or not. Examples where additional data can be developed include:

- Analysis from monitor well samples from production zone monitor wells encircling well fields after restoration is complete and during stability periods. This data exists for a number of projects but has not been evaluated. TCEQ has decades of monitor well information archived in their central records for all of the ISR projects. Monitoring, in the production zone encircling the well fields was conducted at some sites for a period of time after stability was complete. For example the Holiday/El Mesquite, Rosita, Kingsville Dome projects in Texas had routine monitoring conducted during extended stability periods. In Wyoming this data exists for certain well fields at the Highland and Irigaray Projects.
- Additional sampling of area water wells around historic projects. Permit and license application procedures have required an inventory of water wells within an area of review of proposed ISR operations that are listed in ¶6 above. This information was commonly published by regulatory agencies in formal Environmental Assessments during licensing for NEPA compliance. Exhibit 24 contains examples of location maps, well inventory and baseline data set for several of these projects. The area of review have always been at least ¼ of a mile but often 2 ½ miles. These inventories generally document the depth of the well, its location, and ownership. Moreover in most instances baseline water quality sampling was conducted. Many of these baseline reviews were conducted 30 years ago or more before ISR operations. Since then restoration has been completed. If migration to offsite wells was an issue, some

of these wells would be impacted. Now, decades later, these wells can be sampled again to document current water quality.

The EPA's failure to review the above cited information and to develop and consider well samples from production zones and area water wells around historic projects established that the proposed rule making process is arbitrary and capricious.

101. EPA should table the current §192 rule proposal and evaluate the existing data. EPA should determine if existing data documents if off-site migration has or has not been indicated. If that review is inconclusive, EPA should conduct additional analysis of existing wells in the area of review that were baseline sampled in the past as part of licensing the projects that can readily be accessed to determine if off-site migration has or has not been indicated. This would provide a real world basis for the need of the §192 rule since the agency made no attempt to evaluate any relevant data.

XIII. Academia and the National Labs are Currently Completing Multiyear Studies on Natural Attenuation.

102. There is currently research underway that is highly relevant to the proposed §192 rule by scientists and investigators from the US Geological Survey, Los Alamos National Laboratory, the University of Wyoming, Colorado State University and other leading institutions. In fact, the US Environmental Protection Agency provided some of the funding for these studies. Topics include without limitation:

- Natural attenuation of uranium down-gradient (Los Alamos/UC-Berkeley/Stanford)
- Ways to minimize uranium concentrations in restored zones after mining (USGS/Stanford/Los Alamos)
- Improvements in bio-stimulation techniques for removing uranium from groundwater (University of Wyoming)
- Sophisticated multi-tracer studies have been conducted at SRH to examine the efficiency of hydraulic flow through mine units (Los Alamos)
- Laboratory column studies using core and water samples taken from SRH mine units are being used to calibrate and construct improved reactive transport models for predicting uranium migration down-gradient (South Dakota School of Mines and Technology, Stoller Newport News Nuclear)
- Field natural attenuation studies using push-pull injections-withdrawals of raw lixiviate from unmined aquifer have been undertaken to gauge in the field how much dissolved uranium is immobilized by interactions with aquifer solids. (Los Alamos and this work is also being funded in part by the EPA)
- Studies of the genesis of uranium roll fronts in the Powder River Basin (Colorado State University)
- Further core mineralogy studies are being conducted at the Canadian Light Source using synchrotron radiation to investigate the carbon content and mineralogy of core taken at SRH. (University of Saskatchewan)
- Studies to characterize the microbes that may remove uranium from groundwater are being conducted using SRH core and water samples. This work includes DNA and phospholipid fatty acid analyses. (University of Wyoming/USGS/Colorado State University/Lawrence Berkeley National Laboratory)
- An assessment of the health risks at the site of an ISR mine both before mining occurs and after restoration and reclamation activities are complete. (Colorado State University)

103. Two studies have recently been peer reviewed and released (Exhibit 25). The paper *Isotopic and Geochemical Tracers for U(VI)Reduction and U Mobility at an in Situ Recovery U Mine* is the culmination of ongoing research by University of California, Berkeley, Lawrence Berkeley National Laboratory, Los Alamos National Laboratory and others that addresses natural attenuation at ISR facilities and provides strong scientific evidence that the uranium migration issue that is fundamental to the §192 rule is not scientifically valid. The paper Field Evaluation of the *Restorative Capacity of the Aquifer Down Gradient of a Uranium In-Situ Recovery Mining Site* is the culmination of ongoing research by Los Alamos National Laboratory and University of Wyoming that also provides strong scientific evidence of natural attenuation and that the uranium migration issue that is fundamental to the §192 rule proposal is not scientifically valid.

104. In light of the strong scientific evidence that these two papers provide, and in anticipation of the results of ongoing studies, EPA should table this rulemaking proposal.

XIV. ISR Does Not Change Aquifer Hydrologic Properties

105. In the preamble to the §192 rule proposal, EPA states that the ISR extraction process affects the hydrologic properties (i.e., porosity and permeability) of the host rock (80 Fed. Reg. 4165). There EPA describes how the change in hydrologic properties changes flow paths and fundamentally makes restoration more difficult. UPA believe that this hypothesis by EPA is unsupported and illogical and requests that any data that EPA utilized to come to this conclusion be provided.

106. Uranium minerals makes up a very small fraction, only 0.025% to 0.25 % by weight, of the host rock of a sand stone type uranium ore deposit that will be subject to ISR. Yet typical porosity of this same type of sandstone is 25% to 30%. In other words the porosity volume exceeds the mineral volume by many times. It is not logical that the removal of a very small fraction of the host rock mass would impact such a large porosity volume.

107. UPA members know of no evidence where ISR operations have impacted hydrologic properties. Our member companies have not experienced changes in hydrological properties at their operations. EPA presents no data for the assertion. Unless there is supporting data EPA should redact this material from the justification for the rule.

108. EPA then states that the ISR restoration process cannot be assumed to fully restore these hydrologic properties to the exact pre-mining conditions and then asserts that "...Such largely unavoidable, incomplete restoration efforts…" Again, EPA equates restoration of hydrologic properties with incomplete restoration efforts. There is no evidence for the assertion.

109. It appears that EPA is implying that licensees must restore not only water quality, but also the hydrologic properties of the subsurface. UPA knows of no instance where hydrologic properties warrant restoration and EPA has presented none in the record.

110. EPA appears to be confusing permeability and porosity with Redox. The two are not related. That misunderstanding on EPA's part underscores the need to do a more complete review of the technical basis for this rule. Involving industry and state

regulators in the rule making process would assist EPA in its technical efforts concerning the §192 rule.

XV. EPA Ignored the Recommendations of the Science Advisory Board (SAB)

111. The SAB recommended that EPA collect more data before proceeding with the §192 rule. It is well documented in these comments that extensive ground water-quality data, within exempted areas and the area of review outside the exempted areas, is available.

112. In particular, the SAB letter to EPA, dated February 17, 2012, encouraged EPA to *"Survey the extensive monitoring data available for ISL uranium mines to identify data sets suitable for building an evidence base that could inform EPA's regulations."* The SAB acknowledged that a substantial amount of data is available to EPA and encouraged the agency to review the data. However, there is no evidence EPA reviewed any meaningful data to determine if a potential hazard exists and, if so, how it could be mitigated. Below are the six recommendations SAB made to EPA in their February 17, 2012 letter found in Exhibit 26.
    - "Survey the extensive monitoring data available for ISL uranium mines to identify data sets suitable for building an evidence base that could inform EPA's regulations.
    - Compile and systematically analyze these data sets to define the geology and hydrology of the site and support modeling of the interactions between pertinent groundwater constituents and associated geologic media.
    - Apply environmental models to provide realistic predictions of the rates at which groundwater constituents approach stable conditions following the cessation of mining operations, for a range of realistic bounding conditions.
    - Describe systematic approaches for determining the optimal number, location, and sampling frequency of monitoring wells.
    - Specify criteria for selecting groundwater analytes of primary and secondary importance for monitoring by emphasizing the linkages between analytes and monitoring objectives.
    - Consider some alternative approaches to the described statistical treatment of differences between pre- and post-mining groundwater quality, and recognize that other factors may have more influence than statistical uncertainty on the reliability of these differences."

113. UPA has not found evidence that EPA followed up on the six recommendations, especially data collection which should on its face obviate the §192 rule as proposed. If EPA did establish the full database, it should be made available for all stakeholders to review and evaluate prior to finalizing the regulation. EPA should implement all of SAB's recommendations and then re-evaluate the need for the Proposed Rule.

XVI. Business, Especially Small Business with Limited Capital, Requires Regulatory Certainty

114. Regulatory certainty is a hinge pin for any successful business. In the case of the §192 rule, the domestic ISR uranium industry will disappear with the uncertainty of 30 year monitoring; it is based on speculation and perceived not real risk. There is no professional risk assessment effort at all in evidence in the proposed §192 rulemaking rendering any professional risk management decisions impossible and risk/cost balancing equally impossible.

115. The proposed §192 rule assures regulatory uncertainty. EPA provides no justification for increasing stability to 3 years or post stability to 30 other than citing a reference from RCRA guidance. But mineral production from natural systems is not the same as waste disposal in an engineered facility. EPA proposed stability and post stability period is arbitrary and is not based on any reasoned rationale other than a transparent attempt to utilize RCRA's post-closure time frame by an artifice.

116. EPA's described potential for exceptions from 30 year post operational periods using geochemical modeling are vague. Even EPA (EPA 2012b, p70-71) notes that many of the variables that may be used in geochemical analysis do not exist and need to be developed. As such EPA is offering the industry the potential for excepting the 30 year post stability period based on geochemical modeling, yet current science indicates that there is no certainty that geochemical modeling would provide conclusive results nor does the proposed rule provide any assurance that groundwater modeling will provide the "off ramp" from long term stability monitoring as advertised.

117. Perhaps the best statement at to the impact of business risk came from Uranium 1 at EPA sponsored public comment session in Casper Wyoming on May 14, 2014 as follows:

"All uranium producers have long term forecasts of mine plans, production and revenue, restoration and decommissioning schedules and the associated costs. In our company, we call this our Life of Mine Plan (LOM). Our current LOM includes the permitting, mining, groundwater restoration and decommissioning plan and costs for 5 large projects in Wyoming. Associated with those projects are the mining areas, or well fields. Our LOM, today, includes the mining and restoration of 46 well fields over a 30 year period. This includes an estimate of 2 years of mining, 3 years of restoration and stabilization monitoring, then another year for decommissioning of the well fields. If this rule is promulgated and the 3 years of stability monitoring plus an additional 30 years of long term stability monitoring is imposed, this will result in our LOM going from a 30 year plan with a positive Net Present Value (NPV) and Internal Rate of Return (IRR) to potentially a 300 year plan with an unrealistically negative NPV and IRR. During these 300 years, we will have only 20 years of production and revenues and 280 years of simply spending money. The cost of extended long term monitoring is devastating; we cannot decommission the well fields so the groundwater and decommissioning financial sureties must remain in place, we must pay lease fees to our landowners, we must keep facilities operational and maintain some personnel during this period, and EPA has not even considered these issues. And how will our landowners feel about losing their land for their lifetime and their future family's lifetimes? EPA's estimated cost for long term monitoring at ISR facilities is grossly inadequate and does not address the full complement of legal issues, loss of land use issues, and regulatory issues. As a member of the Uranium One Americas Board, I can tell you that our company will not *even* consider investing one more penny in ISR operations in the U.S. if this rule is promulgated. Why should they? It is too risky, and is obviously a money losing proposition. They will take their capital investment to other countries. So my point about risk: There is a huge and inevitable risk that this rule will devastate the domestic uranium industry in the United States."

No business can withstand the specter of risk created by the §192 rule.

XVII. Property Owners Have Been Ignored

118. If the rules of the EPA kill industry arbitrarily, property owners will effectively lose the value of their mineral estate. This may be viewed as regulatory takings by private property owners.

119. Property owners in Texas and often in Wyoming, Nebraska, New Mexico and South Dakota own the land and mineral. In Texas water is owned by the landowner and is subject to capture. In other western states, such as Wyoming, Nebraska, and New Mexico, water is owned by the State and subject to adjudication by a State Engineer. Companies may access these only by lease or water right. EPA has not considered the rights of any of these entities in the event that the §192 rule prohibits development or the rule results in the excess consumption of groundwater. Wells will be impacted and water rights appropriations may be impacted, creating a potential conflict between the States and Federal Government.

120. EPA has not considered the ramifications of extended lease periods. A model uranium lease used in Texas is shown in Exhibit 28. Here the Term is generally 5 years primary and 5 years secondary. There are bonuses associated with terms and rentals and damage payment associated with annual land usage. EPA has not considered the cost of extending these leases three times or more beyond the intended terms. Nor has EPA considered the ability of licensees/operators to obtain lease agreements that would require timing up leasehold estates for extended periods of time.

121. EPA has not considered the water usage and quantity impacts to surrounding waters by required restoration to a statistical 95% confidence. In Texas water is owned by the property owner. This may impact a ranchers or farmers aquifer water levels, water supplies and pumping costs for agricultural production.

122. In many Western States water is owned by the State and appropriated for beneficial use. Excess water usage may not be considered a beneficial use and contrary to State water law. More significant is if it is determined that EPA's restoration standard is found to be waste. Waste is typically prohibited in western water law.

123. Land owners may not wish to encumber their property (surface and/or mineral) for the time frame proposed by §192 rules. Nor has EPA answered numerous questions regarding property rights. How does extended monitoring impact the sales value during a 30 year monitoring period? Can a landowner enjoy his property for its historic land used during a 30 year monitoring period? Will a mineral estate become effectively condemned because of the regulatory burden? What would happen if the landowner dies during the 30 years? Could the property be sold? What if the estate tax required property sales? This is a real property mess that EPA has not even considered. EPA presents no data or analysis that demonstrates that necessary financial resources will be available or if so economically feasible for these time frames.

XVIII. ISR Mineral Recovery ≠ RCRA Waste Disposal

124. RCRA regulated, engineered hazardous <u>waste</u> disposal facilities are not an ISR well fields – period. Vice versa, ISR well fields, at any stage of the production/restoration cycle, are not waste. With legal and practical differences, trying to regulate one like the other cannot work.

125. Uranium deposits are natural mineral deposits where the uranium anomaly is high because of natural deposition, not anthropogenic waste disposal. ISR restoration results in the elimination of most current or future waste source while the waste source at a RCRA site will always exist and will always pose a potential risk to the environment. Every constituent that is considered for groundwater protection at an ISR well field, pre mining, during mining or post mining, are constituents that occur in the groundwater and the host rock naturally at various concentrations.

126. A RCRA hazardous waste disposal unit is an engineered structure designed to contain hazardous waste generated by human activity. As noted by TCEQ[15], the overwhelming number of hazardous waste constituents are synthetic organic compounds that are foreign to the natural environment and neither the natural conditions that result in a uranium ore body nor the effect of ISR bear any resemblance to disposal and containment of human generated synthetic organic compounds in a RCRA landfill.

127. EPA RCRA regulations are designed for "disposal" facilities with ongoing *active* management of highly hazardous wastes, many of which are manufactured or synthetic (or natural materials at highly toxic levels).

128. ISR facilities selectively produce a product (i.e., yellowcake) and deal with materials that are natural, in all stages of operations and restoration, and/or remain in the ore zone; source and byproduct material exempt from RCRA. There is not a single constituent that EPA identifies as a post restoration concern that is not present in ground water in the uranium deposit before ISR activity.

129. RCRA waste sites are sites where the property is purchased for the purpose of permanently disposing of a waste. This makes the property available for long term occupation. In many instances, and always in Texas, ISR sites are on land that is leased to extract a land owner's mineral for a limited period of time and then returned to the lessor. The ISR operator is effectively a contractor for the property owner. With ISR, there is no right to stay for 30 years without the landowner's concurrence. As an owner of a RCRA facility, the operator has the right and responsibility to remain there for years of monitoring.

130. EPA does not offer any data or information showing how monitoring at a RCRA facility is similar to an ISR well field. The difference is why this and other methods of mining are exempt from RCRA.

131. Aside from legal complications, EPA inappropriately categorizes a restored well field at an ISR facility the same as a RCRA hazardous waste facility. Even EPA should be able to recognize that the two are polar opposites. ISR restoration results in the elimination of any current or future waste source while the waste source at a RCRA site will always exist and will always pose a potential risk to the environment. The risk level at a closed ISR site as compared to a closed RCRA facility are not even remotely comparable and a such there is no justifiable argument that can be put forward that the monitoring periods should be comparable. Again, EPA has provided no concrete evidence to support its proposed 30 year monitoring period and has failed to consider the existing data that demonstrates the contrary result.

[15] TCEQ comments on Docket ID No. EPA-HQ-OAR-2012-0788. Pp. 11&12.

XIX. Existing UIC Primacy State Programs Have Been Ignored by EPA

132. The existing regulatory framework has demonstrated that ISR sites more than adequately protect the public and the environment now and in the future, and no changes to the existing regulatory programs are justified or necessary.

133. Every state where ISR uranium recovery operations are conducted have a long standing UIC primacy program that is more stringent than EPA's federal program. They are more stringent than EPA's UIC program because they do require restoration and stability monitoring of ISR well fields where the federal UIC regulations do not.

134. EPA has provided no evaluation of the quality of, or even reference to, the ISR related UIC programs for the States of Colorado, Nebraska, New Mexico, Texas or Wyoming. As such EPA has not provided any evidence that these programs do or do not meet the objectives of the §192 rule.

135. EPA's proposed rule ignores the SDWA requirements implemented by primacy states such as Texas and Wyoming for groundwater restoration much less the NRC's. The proposed rule would unnecessarily create duplicate regulation under multiple statues, AEA requirements of NRC or Agreement States.

136. Geology, hydrology, natural systems, are all variable from place to place. As such, regulation by States, who are in charge and closer to the activity, are more effective. Fundamentally the problem with the "one size fits all" §192 rule is EPA's attempt to create an inappropriate federal program to regulate an activity that is more affectively regulated at the state level.

137. The §192 rulemaking should be withdrawn and EPA should conduct a proper evaluation of State regulation in consultation with State regulatory agencies. EPA should specify why the components of the state programs have not met the purported objective of the §192 rulemaking; to protect groundwater for future use and do so with data to support what for now are mere suppositions and speculation.

XX. LIST OF REFERENCED EXHIBITS

Number	Subdivision	Title
1		NMA's Legal Challenge
2		Ur Energy's Jurisdictional Challenge
3		Cameco Corp.'s Economic Analysis
4		IAEA Summary Sheets on U.S. ISR Projects
5		Letter from Christi Craddock to EPA
6		Email on BLM's review
7	a	Correspondence and data exchange between EPA and Cameco Corp. pertaining to the Subpart W Rulemaking
	b	Correspondence and data exchange between EPA and Uranium 1 pertaining to the Subpart W Rulemaking
8	a	TCEQ Executive Directors Response to Public Comment UEC Palangana Operation
	b	NRC Staff Assessment of Groundwater Impacts from Previously Licensed In Situ Uranium Recovery Facilities
9	a	UR01890-21 & UR01890-031 Burns/Mosier Restoration Reports
	b	UR01941-040 O'Hern Restoration Table Amendment Report
	c	UR02155-021 El Mesquite Restoration Table Amendment Report
	d	UR02155-041 El Mesquite Restoration Table Amendment Report
	e	UR02156-011 Holiday Restoration Table Amendment Report
	f	UR02156-011 Holiday H-1 (EXT) Restoration Table Amendment Report
	g	UR02156-021 Holiday Restoration Table Amendment Report
	h	UR02156-041 Restoration Table Amendment Report
	i	UR02156-051 ext. Holiday Restoration Table Amendment Report
	j	UR02156-051 Holiday Restoration Table Amendment Report
	k	UR02156-061 Holiday Restoration Table Amendment Report
	l	UR02156-071 Holiday Restoration Table Amendment Report
	m	UR02208-011 Hobson Amendment Stabilization Report
	n	URO2381-021 Mt Lucas Restoration Table Amendment Report
	o	URO2381-041 Mt Lucas Restoration Table Amendment Report
	p	URO2381-051 Mt Lucas Restoration Table Amendment Report
	q	URO2381-061 Mt Lucas Restoration Table Amendment Report
	r	URO2381-071 Mt Lucas Restoration Table Amendment Report
	s	URO2381-081 Mt Lucas Restoration Table Amendment Report
	t	UR02407PAA021a Trevino Restoration Report 1988-07-29
	u	UR02407PAA021b Trevino Restoration Report 1986-07-25
	v	UR02441-011 Las Palmas Restoration Table Amendment Report & Data
	w	UR02441-021 Las Palmas Restoration Table Amendment Report & Data
	x	UR02441-031 Las Palmas Restoration Table Amendment Report & Data
	y	UR02463-011 West Cole Restoration Table Amendment Report
	z	UR02463-031 West Cole Restoration Table Amendment Report
	za	UR02827-011 Kingsville Dome Restoration Justification Report
	zb	UR02827-021 Kingsville Dome Restoration Justification Report
	zc	UR02880-011 Rosita Restoration Table Amendment Reports
	zd	UR02880-021 Rosita RT Restoration Table Reports

	ze	UR02155PAA-031 RT Amendment Report
	zf	UR02155PAA-071 RT Amendment Report
	zg	UR02493-011 Restoration Report
	zh	Christensen Ranch Restoration Report
	zi	Irigaray Restoration Report
10	a	UR01941-021 OHern TCEQ Restoration Certificate
	b	UR01942-051-1 Bruni TCEQ Restoration Certificate
	c	UR01942-051-2 Bruni TCEQ Restoration Certificate
	d	UR02050-011 Pawnee TCES Stability File
	e	UR02151-011 Brelum TCEQ Restoration Certificate
	f	UR02151-021 Brelum TCEQ Restoration Certificate
	g	UR02155-011 El Mesquite TCEQ Restoration Certificate
	h	UR02156-031 Holiday TCEQ Restoration Certificate
	i	UR02202-011 Nell TCEQ Restoration Certificate
	j	UR02208-011 Hobson TCEQ Restoration Certificate
	k	UR02222-011 Longoria TCEQ Restoration Certificate
	l	UR02222-021 Longoria TCEQ Restoration Certificate
	m	UR02312-011 Benavides TCEQ Restoration Certificate
	n	UR02312-021 Benavides TCEQ Restoration File
	o	UR02312-031 Benavides TCEQ Restoration Certificate
	p	UR02312-031 Benavides TCEQ Restoration File
	q	UR02407-011 Trevino TCEQ Restoration Certificate
	r	UR02407-021a Trevino TCEQ Restoration Certificate
	s	UR02407-021b Trevino TCEQ Restoration Certificate
	t	UR02420-011 McBride TCEQ Restoration Certificate
11	a	Mobil Section 9 Summary Report
	b	In-Situ Leaching of Crownpoint, New Mexico, Uranium Ore: Part 1-Mineralogical Frame of Reference. Vogt et. al. SPE Journal
		In-Situ Leaching of Crownpoint, New Mexico, Uranium Ore: Part 2-Laboratory Study of a Mild Leaching System. Vogt et. al. SPE Journal
		In-Situ Leaching of Crownpoint, NM, Uranium Ore: Part 3-Laboratory Study of Strong Leaching Systems: Sodium Hypochlorite. Vogt et. al. SPE Journal
		In-Situ Leaching of Crownpoint, NM, Uranium Ore: Part 4-Laboratory Study of Strong Leaching Systems: Oxidant/Sulfuric Acid. Vogt et. al. SPE Journal
		In-Situ Leaching of Crownpoint, New Mexico, Uranium Ore: Part 5-Laboratory Study of Strong Leaching Systems: Oxidant-Heat. Vogt et. al. SPE Journal
		In-Situ Leaching of Crownpoint, New Mexico, Uranium Ore: Part 6-Section 9 Pilot Test. Vogt et. al. SPE Journal
	c	Annual Restoration Reports w/data to NMED - 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988. Mobil Oil Corp.
12		Aquifer Restoration at In-Situ Leach Uranium Mines: Evidence for Natural Restoration Processes
13		UPA Inventory of Restoration and Stability Related Data in State Agency Files
14		Report on Findings Related to the Geochemistry of Groundwater

		at a Former In-Situ Uranium Mine: Evidence of Natural Attenuation and the Potential for Accelerated Groundwater Restoration by the Use of Reductants
15		Historic Administration of the Area UIC Permit/Production Area Authorization Process in Texas
16		Texas Mining and Reclamation Association NURE Narrative and Maps
17		Tables Illustrating Background Uranium and Uranium Progeny Concentrations at US ISR Facilities
18		Groundwater Restoration at Uranium In-Situ Recovery Mines, South Texas Coastal Plain
19		Groundwater Restoration at In Situ Uranium Recovery Operations (ISR) in Texas: A Regulatory Perspective on its Success
20		Summary of Post Restoration U and Water Consumption
21		Irigaray Water Well – 37 Years of Down Gradient Monitoring
23		Crownpoint Historic Water Quality Data
24	a	UR02154. Re-permitting/licensing of the Clay West ISR Project. Baseline/AOR well resampling information.
	b	UR02312 & UR02463. Background maps, water well inventory and analytical data for AOR wells for the West Cole Project (Benavides)
	c	UR02381. Background maps, water well inventory and analytical data for AOR wells for the Mt Lucas Project. Baseline well turned over to landowner.
	d	UR02155 & UR02156. Background maps, water well inventory and analytical data for AOR wells for the – Holiday/El Mesquite Project
	e	UR02208. Background maps, water well inventory and analytical data for AOR wells for the Hobson Project
	f	UR02020, UR02407 & UR02914. Background maps, water well inventory and analytical data for AOR wells for the Trevino/Gruy/McBride Projects
25	a	Isotopic and Geochemical Tracers for U(VI) Reduction and U Mobility at an in Situ Recovery U Mine
	b	Field Evaluation of the Restorative Capacity of the Aquifer Down Gradient of a Uranium In-Situ Recovery Mining Site
26		SAB Letter to EPA Recommending EPA Look at Data
27	a	DB Stephens Report to NMED Review of Geochemical Model Provided in Support of Discharge Permit 558Hydro Resources Inc. Section 8 ISR Facility
	b	DB Stephens Report to City of Gallup Conjunctive Use Groundwater Evaluation
28		Model In Situ Uranium Lease
29		UPA letter to Sec. Chu - U transfers