TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

May 12, 2015

Attn: Docket ID No. EPA-HW-OAR-2012-0788
Health and Environmental Protection Standards
for Uranium and Thorium Mill Tailings
Air and Radiation Docket
U.S. Environmental Protection Agency, Mail Code: 2822T
1200 Pennsylvania Ave., NW
Washington, D.C. 20460

Re: 40 Code of Federal Regulations (CFR) Part 192; Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings; Proposed Rule

Dear Sir or Madam:

The Texas Commission on Environmental Quality (TCEQ) appreciates the opportunity to respond to the U.S. Environmental Protection Agency's request for comments in the notice of proposed rulemaking published in the January 26, 2015 edition of the *Federal Register*, entitled "40 CFR Part 192 Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings."

Enclosed, please find TCEQ's detailed comments relating to EPA's action referenced above. If you have comments or questions concerning the enclosed comments, please contact Mr. Charles Maguire, Director of the Radioactive Materials Division, Office of Waste, (512) 239-5308 or Charles.Maguire@tceq.texas.gov.

Sincerely,

Richard A. Hyde, P.E.
Executive Director

Enclosure

TCEQ Comments on Docket ID No. EPA-HQ-OAR-2012-0788

On behalf of the State of Texas, the Texas Commission on Environmental Quality (TCEQ) submits these comments on the proposed rules in 40 Code of Federal Regulations Part 192. The State of Texas is uniquely affected by the proposed rules because: 1) there is an active *in situ* uranium mining industry in the state; 2) Texas has primacy for the Underground Injection Control program under the Safe Drinking Water Act; and 3) Texas is an Agreement State under the Atomic Energy Act for the licensing of uranium recovery facilities.

I. EPA should withdraw the proposed rules; study historic uranium mining sites and review existing data; and if necessary, re-propose any rules under the Underground Injection Control program under the authority of the Safe Drinking Water Act.

EPA has previously determined that protection of groundwater from the underground operation of *in situ* uranium mining is regulated under the UIC program of the SDWA and not under EPA's UMTRCA authority.

TCEQ is particularly concerned that EPA's proposed rules impose an unnecessary jurisdictional reorganization in the regulation of the *in situ* uranium mining industry. On page 4167, EPA states: "EPA has always held the position that UMTRCA is the controlling legal authority for protection of groundwater and NRC is obligated to implement the 40 CFR Part 192 standards to carry out that function at ISR sites." EPA has not always held this position as this statement contradicts a previous EPA determination that groundwater from ISR sites is protected by the Underground Injection Control (UIC) program under the Safe Drinking Water Act. When first implementing new rules under UMTRCA, EPA previously determined that "rules for the protection of groundwater from the underground operations of *in situ* mining are provided by the underground injection control program promulgated under Sections 1421 and 1422 of the Safe Drinking Water Act."[1] EPA stated that the Part 192 regulations "are not intended to apply to the underground ore bodies depleted by *in situ* uranium mining operations."[2] Following EPA's 1983 directions, the State of Texas structured its regulatory program for *in situ* mining so that the protection of groundwater from *in situ* uranium operations is regulated under the authority of the Underground Injection Control program. Since the time of receiving UIC primacy and entering an agreement with the NRC for the licensing of uranium recovery in the early 1980s, the State of Texas has protected groundwater from the underground operations at *in situ* facilities under the UIC program. The state UIC program and the state radioactive licensing program work closely together to assure that an injection well permittee and radioactive materials licensee at *in situ* uranium mining sites comply with all applicable requirements and that the sites are sited, designed, operated, monitored,

[1] 48 Fed. Reg. 45932. October 7, 1983
[2] 48 Fed. Reg. 45933. October 7, 1983

restored, and decommissioned so that human health, radiation safety, and the environment are protected.

TCEQ's UIC rules in 30 Texas Administrative Code Chapter 331 already contain requirements for establishing pre-mining baseline water quality, establishing monitor wells for excursion detection, establishing excursion corrective action, establishing groundwater restoration water quality goals, establishing post-restoration stability, and considerations for changing restoration goals. EPA has approved these rules as the UIC program for the state of Texas under the Safe Drinking Water Act (SDWA). EPA has never indicated that TCEQ's underground injection control rules for the protection of groundwater at *in situ* uranium mining operations are inadequate.

Furthermore, the proposed rules under Part 192 are more suited to the injection operations than the management and disposal of by-product material. It is the underground injection that changes existing groundwater chemistry. It is the injected fluids that must be monitored for excursion. And, it is the changed groundwater from the injection operations that must be restored. As discussed below, the proposed regulations in Part 192 have nothing to do with the processing, possession, transfer and disposal of byproduct material. If EPA intends to move forward with these types of regulations, TCEQ requests that EPA withdraw the proposed rules in Part 192 promulgated under UMTRCA and re-propose under the UIC requirements in 40 CFR Parts 144-148 under SDWA.

EPA does not correctly characterize the authority of the Underground Injection Control (UIC) program under SDWA or what an aquifer exemption does.

EPA's UIC rules are inadequate for addressing groundwater at *in situ* uranium mining operations. As discussed above, EPA has previously determined that rules for the protection of groundwater from the underground operations of *in situ* mining are provided by the UIC program promulgated under SDWA. The current proposal now characterizes the UIC program protections as inadequate. On page 4167, EPA states, "Reliance on the requirements of the UIC program alone would not adequately address groundwater protection at ISR facilities, given that the purpose of the UIC program is to prevent endangerment of underground sources of drinking water (USDWs), not to address the restoration of groundwater. Moreover, if the groundwater is not considered a USDW, as is typically the case at ISR sites, it is not protected under the Safe Drinking Water Act."

TCEQ is surprised that EPA summarily dismisses the protections afforded under the UIC program requirements. Groundwater is still protected even though the groundwater in the injection zone does not meet the definition of a USDW (because it naturally contains total dissolved solids in excess of 10,000 mg/l or is situated within an exempted aquifer). For example, a Class I injection well does not inject fluids into a USDW, but there are numerous requirements for the siting, design, construction, operation, monitoring, and closure of Class I injection wells for the protection of groundwater. The TCEQ's Class III injection well program has similar requirements for siting, design, construction, operation, monitoring and closure for Class III injection

wells, even though the injection zone may be within an exempted aquifer. And further, the TCEQ's Class III injection well program includes requirements for determining baseline water quality, excursion monitoring, corrective action, groundwater restoration, and stability demonstration.

TCEQ is not aware of any instance where the EPA has permitted *in situ* uranium mining in a direct-implementation state, so it may be correct that EPA's own UIC regulations in 40 CFR Parts 144-148 are inadequate. However, in Texas, the UIC program implemented under the Safe Drinking Water Act is the TCEQ's program under Title 30 of the Texas Administrative Code that EPA has approved as provided in 40 CFR §147.2200. TCEQ's approved UIC program already addresses the groundwater issues that EPA now attempts to address under its UMTRCA authority. EPA has never informed the State of Texas that its approved UIC program is inadequate for protecting groundwater at *in situ* uranium mining operations. If EPA is concerned that UIC primacy states, like Texas, Wyoming and Nebraska, have UIC programs that are not consistent with each other as indicated on p. 4167, then EPA should revise the minimum requirements for Class III injection wells in 40 CFR Parts 144-148. TCEQ recommends that EPA propose these rules for the UIC program under SDWA instead of Part 192 under UMTRCA.

Byproduct material is not generated from the underground operations at *in situ* uranium mining sites.

EPA's authority under UMTRCA does not extend to the underground operations at *in situ* uranium operations because byproduct material is not yet generated in the uranium recovery process in the subsurface. EPA cites its authority under Section 275 of the Atomic Energy Act, as amended by Section 206 of UMTRCA. Under Section 275(b), the administrator is required to promulgate standards of general application for the protection of public health, safety and the environment from radiological and nonradiological hazards associated with *the processing and with the possession, transfer, and disposal of byproduct*, as defined in Section 11(e)(2), at sites where ores are processed primarily for their source material content or which are used for the disposal of such byproduct material. Under Section 11(e)(2), byproduct material means the *tailings or wastes* produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content. EPA's own definition of byproduct material further states that "the ore bodies depleted by uranium ISR operations and which remain underground do not constitute uranium byproduct material."

Section 11(e)(2) byproduct material is the waste generated from the uranium recovery operations. UMTRCA was enacted to provide EPA with legal authority to develop standards associated with the processing and the possession, transfer and disposal of byproduct material for inactive and active uranium recovery operations.

On page 4171 in the preamble of the proposed rules, EPA states, "With ISR, the 'milling' of uranium ore is performed within the ore zone aquifer by injection of lixiviants." EPA obviously recognizes the stretch in regulatory interpretation by using the quotation marks to describe the subsurface injection process as a "milling" operation. The NRC's

regulation in 10 CFR Section 40.4 defines "uranium milling" as any activity that generates byproduct material. In the stage of operations that EPA now tries to regulate in the new rules in Subpart F, there is no byproduct material that has been generated. As defined, byproduct is the tailings or wastes. Tailings are waste materials from processing ore for their mineral content. Tailings are the portion of the extracted and processed ore that are regarded as too poor to be treated further. Wastes are materials that are unwanted or discarded. UMTRCA was enacted to address problems associated with historic and ongoing operations where surface impoundments holding vast quantities of tailings were leaching contaminants or emitting pollutants into the environment. Because byproduct material is not yet generated in the subsurface process, EPA's authority under UMTRCA does not extend to the underground operations at *in situ* recovery sites as EPA recognized in the 1983 UMTRCA rulemaking.

Byproduct material is generated at *in situ* mining operations; it just isn't generated in the subsurface arising from the injection activity. Byproduct material in liquid forms is generally processed and disposed in a Class I injection well: this can include reject wastewaters from reverse osmosis treatment, wastewater withdrawn from the aquifer to maintain a hydraulic sink, wastewaters from the processing of ion-exchange resins and wastewaters from the processing of the extracted uranium. Byproduct material in solid forms is generally removed for offsite disposal and can include contaminated soils, solids filtered and removed from mining solutions in the associated surface facilities, piping, well components and other equipment that becomes contaminated in connection with the extraction of the uranium.

EPA's proposed rules in Sections 192.53 and 192.54 exceed its authority under UMTRCA to promulgate *standards* of general application for the protection of the public health, safety and the environment.

EPA should withdraw proposed Sections 192.53 and 192.54 because they exceed EPA's authority to promulgate standards. UMTRCA confers the NRC and Agreement State programs in Section 206(d), not EPA, with authority to implement and enforce EPA's standards. EPA's proposed rules in new Subpart F go beyond the promulgation of standards and address how those standards should be implemented and enforced.

The proposed rule in new §192.53 requires a groundwater monitoring program to establish pre-mining water quality, operational phase monitoring to detect excursions, restoration phase monitoring to monitor groundwater restoration progress, stability phase monitoring to monitor the stability of restored aquifers, and long-term stability monitoring to confirm stable conditions. Proposed §192.53 reflects EPA's attempt to implement the groundwater protection standard it established in §192.52 by establishing requirements for pre-operational, operational, restoration, and stability monitoring. The NRC or Agreement State program should be able to implement its own groundwater monitoring program requirements to address EPA's standards without regard to §192.53. In fact, the TCEQ's UIC program already addresses these requirements through the issuance of a Production Area Authorization and enforcement of rules in 30 Texas Administrative Code Chapter 331. The promulgation of requirements for a groundwater monitoring program exceeds EPA's authority to promulgate standards for groundwater protection.

Proposed §192.54 requires a licensee to develop and implement a corrective action program to respond to excursion and exceedance scenarios detected during operation, restoration or stability phases at a site. Proposed §192.54 reflects EPA's attempt to enforce the groundwater protection standard it established in §192.52. Proposed §192.54 establishes requirements for when corrective action must be implemented, where it should occur, and the duration of the program. The TCEQ's UIC program already addresses corrective action required for detected excursions and restoration requirements in 30 Texas Administrative Code Chapter 331. The NRC or Agreement State program should be able to implement its own corrective action program requirements to enforce EPA's standards without regard to §192.54. The promulgation of requirements for a corrective action program exceeds EPA's authority to promulgate standards for groundwater protection.

EPA should study current and historic *in situ* uranium mining sites before promulgating any rules.

EPA states (p. 4165) that the behavior of a restored wellfield in the long-term, i.e. decades or longer after the ISR operations end, has not been examined. As discussed below, EPA's explanation of the proposed rules is based on conjecture and contradictory information. TCEQ recommends that EPA conduct actual studies or investigations on historic or ongoing operations before proposing any rules. There are sites in Texas that can be studied and TCEQ is available to assist EPA in reviewing information about particular former licensed and permitted *in situ* uranium mines.

There is no evidence that *in situ* mining uranium operations in Texas have contaminated underground sources of drinking water.

On page 4164, EPA states, "the alteration of large subsurface areas through injection of chemical solutions also has the potential to cause changes in groundwater at significant distances downgradient." EPA offers no information to substantiate this claim, nor does EPA define what is meant by use of the term "significant." In Texas, the first permit for *in situ* uranium mining was issued in 1975. Since that time, the state has issued 41 Class III injection well permits for *in situ* uranium mining operations, and within those permitted areas, 64 production areas (similar to EPA's "wellfield") have been mined or are being mined. None of this mining activity has resulted in contamination of a USDW, downgradient or otherwise. There is no evidence, at least in Texas, that *in situ* uranium mining has affected groundwater any distance downgradient of an *in situ* uranium mining area. EPA has cited no examples of groundwater contamination resulting from *in situ* uranium mining operations to support it concerns. Rather than relying on conjecture and speculation, EPA should substantiate this claim with relevant evidence; such as an investigation at one or more closed *in situ* mine areas. Again, TCEQ is available to assist EPA in reviewing information about particular former licensed and permitted in situ uranium mines in Texas.

EPA's descriptions and expressed concerns about changes in hydrogeology resulting from *in situ* mining operations are contradictory and not supported by scientific data.

On page 4165, EPA states, "the fact that *significant* quantities of uranium and other constituents have been removed from the natural setting may affect flow patterns and create discontinuities that further complicate or retard the restoration process." EPA continues its discussion by suggesting that the removal of uranium alters the permeability and porosity of the host formation. EPA uses the term "significant" with no qualifying information or citation to this claim. The *in situ* uranium mining process is designed to dissolve uranium from underground sediments. In Texas, the ore grade in typical uranium deposits that are mined using *in situ* techniques ranges from a few hundredths to a few tenths of a percent U3O8.[3] Removal of all of this uranium would have minimal, if any, effect on the porosity or permeability of the sediments containing the uranium mineralization. And, as EPA recognizes, the extraction process does not remove all of the uranium.

After suggesting that removal of uranium increases porosity and permeability of the host formation, EPA later states on page 4166, "in examining the technical literature pertaining to ISR operations, we have found that some modeling studies indicate that the uranium recovery operations can result in the development of relatively slower groundwater pathways through the wellfield, as well as the persistence of injected lixiviant within the production zone." On one hand, EPA claims injection will result in an increase in porosity and permeability within the ore body; on the other, EPA claims injection will result in a decrease in porosity and permeability with the ore body. The TCEQ recommends that EPA first conduct studies of the hydrologic dynamics associated *in situ* mining and restoration before proposing rules.

EPA does not consider whether adoption of the proposed rules will result in a loss of available groundwater to future users.

EPA states in the preamble (p. 4164) that "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….Thus taking a more qualitative view of the situation leads us more broadly to consider the impacts on future groundwater issues." However, adoption of the proposed rules will result in the depletion of large quantities of water from the aquifers that EPA is intending to protect.

TCEQ recommends that EPA consider both the qualitative and quantitative assessment of the proposed rules on groundwater. EPA should conduct a water availability study of the *in situ* uranium mining process and examine each proposed rule against the availability of water in the mined aquifer for future users. Extended operations, extended restoration, and additional well sampling will all result in a loss of water from the mined aquifer and additional wastewater disposal in a Class I injection well where the water will no longer be available for future users.

[3] Uranium Provinces of North America—Their Definition, Distribution, and Model; 1996, USGS Bull. 2191, by Warren I. Finch, p. 10

As EPA noted (p. 4162), "an inward hydraulic gradient is established using the injection and extraction wells" at *in situ* uranium mining operations. For Texas *in situ* uranium operations, the operators maintain the inward gradient or "sink" during mining operations, restoration and the stability period. To maintain this sink, more water is withdrawn from the mined aquifer than is injected. The sink pulls in water from outside the mine area that was previously unaffected by the operations. The excess water is disposed in a Class I injection well in a formation with groundwater with total dissolved solids in concentration in excess of 10,000 mg/l. Extending periods of operation, restoration, and stability will increase the withdrawal of water from the mined aquifer so that it is no longer available. Restoration activities greatly increase the withdrawal of groundwater from the mined aquifer. All operators in Texas use reverse osmosis treatment in the restoration process. Reverse osmosis treatment produces a byproduct material waste stream. Approximately 20-30% of the water that is run through the reverse osmosis treatment process is reject wastewater that is disposed in a Class I injection well as byproduct material. Increasing or prolonging restoration requirements will increase the amount of groundwater removed from the mined aquifer and disposed in a deep formation so that it is unavailable for future users. And finally, sampling protocols require well purging techniques to assure that collected samples are representative for formation water. Each sampling event requires a volume of water to be collected and disposed as wastewater. The volume of water lost is small compared to the water lost in maintaining a sink or restoration activities, but increasing the number of sampling and extending the duration of sampling requirements to a 30-year period will also result in a loss of water from the mined aquifer. EPA should conduct a quantitative analysis on the groundwater that will be lost for future users as a result of the proposed rules. TCEQ recommends that EPA withdraw its proposed rules and perform quantitative studies before proposing new rules.

EPA's assumptions that oxidizing conditions exist in the downgradient formation or that restored groundwater constituents get remobilized are flawed. This inflates cost estimates to remediate a plume of contamination.

In order to illustrate the potential benefits of avoiding impacts to groundwater, EPA estimated the costs of corrective action that would be required if uranium and other constituents remobilized in groundwater over time. EPA estimated that cleaning up a plume of contamination could require 100 years of pump and treat remediation.

The assumptions used in the modeling to estimate the cost benefits of avoiding impacts to groundwater are flawed with respect to the South Texas uranium district. As stated in EPA's draft economic report:

> "For developing the geochemical model, it is important to characterize conditions downgradient from the ore body. As mentioned earlier, chemically reducing conditions in the sandstone host rock were responsible for originally sequestering the uranium and the presence of these conditions in the portion of the aquifer downgradient of the ore zone would act as a barrier to contaminant migration from the ore zone if re-mobilization occurs. In many cases, unmined downgradient materials will maintain reducing conditions with sufficient capacity to immobilize a plume. The simulations in this

> appendix assume oxidizing conditions remain as the plume migrates downgradient." [4]

EPA acknowledges that chemically reducing conditions exist downgradient of a mined aquifer and that these reducing conditions act as a barrier to the assumed contaminant migration from the mined sediments. Nevertheless, EPA ignores these facts and assumes that oxidizing conditions present in the mined sediments will somehow replace the naturally-occurring chemically reducing conditions that exist downgradient of the mined sediments. EPA offers no justification for this assumption.

Any modeling regarding migration of fluids from the mined sediments should address the presence of a chemically reducing environment in the sediment surrounding a mined ore body. TCEQ recommends that EPA re-evaluate their modeling regarding plume migration from a mined ore body by considering the effect of these chemically reducing conditions outwards from a mined ore body.

Further, the modeling described in EPA's draft economic report is based on the assumption that constituents in the mined ore body will be remobilized over time, even in a mined ore body that has been restored in accordance with EPA's proposed rules, by an influx of oxygenated water into the aquifer.

EPA's described scenario is how the uranium ore body was created in the first place. As oxygenated water was introduced into the aquifer, uranium was dissolved from volcanic glass in the sediments and transported downgradient where the uranium was precipitated when the previously-described chemically reducing conditions were encountered. Any influx of sufficient volumes of oxygenated water would mobilize uranium in an unmined ore body as well as in a mined ore body in which the groundwater has been restored. One difference between the two is 80-90% of original uranium has been removed in a mined ore body, as have other constituents of concern. Based on EPA's assumption regarding uranium mobilization from an influx of oxygenated water, an unmined ore body poses a larger threat to a downgradient well than does a mined ore body that has been restored.

EPA's modeling efforts regarding downgradient migration of contaminants in a mined ore body should be based on reasonable conservative assumptions for the model. However, EPA's conclusions are based on modeling that requires the same conditions under which a uranium ore body is created, and assumes that chemically oxidizing conditions will replace chemically reducing conditions that exist outwards from the mined ore body. These assumptions are not reasonable. If EPA's modeling efforts regarding the potential downgradient migration of contaminants from a mined ore body at which the groundwater has been restored are to have any integrity, such modeling should account for the effect of these reducing conditions and how they will affect the mobility of groundwater constituents. TCEQ recommends that any groundwater modeling done by EPA consider the effects of the presence of chemically-reducing conditions downgradient of any mined ore body. TCEQ further recommends that this modeling assume the groundwater associated with the mined ore body has been restored in accordance with the proposed rules.

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[4] EPA (2014): 402-R-14-003, pp. C-6 through C-8.

EPA does not consider the costs of the proposed rules to the state regulatory agency that must implement them.

In discussing the cost impacts of the proposed rule on pages 4180-1, EPA estimated the costs the proposed rule would have for ISR companies, and the effect the proposed rules would have on the uranium market. EPA did not estimate the costs to regulatory agencies, such as the TCEQ. Specifically, EPA's analysis is silent regarding the effects of proposed rule §192.53(a)(1)(iii), under which 30 years of long-term stability monitoring is required, on states that would be required to extend the time a license is active. These regulatory agencies will have to dedicate staff and resources, for over 30 years, to inspect these sites, review the quarterly monitoring reports, and, maintain continued regulation and oversight of a licensee. TCEQ recommends that EPA consider these costs.

EPA does not explain its authority and applicability of the proposed new subpart to the management of byproduct materials "prior to" the processing of uranium ores.

Proposed rule at 192.50 (p. 4183) states that the subpart applies to the management of uranium byproduct materials "prior to" the processing of uranium ores utilizing *in situ* recovery methods. Yet, EPA's explanation of proposed Section 192.50 only discusses the applicability "during and following" the processing of uranium ores (pp. 4169 and 4183). As explained above, UMTRCA does not provide EPA authority to promulgate rules in the uranium recovery process prior to the generation of byproduct material. Byproduct material is not generated until source material is recovered. TCEQ requests clarification on EPA's statutory authority to regulate the management of byproduct materials "prior to" the generation of such waste and recommends revision of the section so that it does not apply to the management of uranium "byproduct" materials prior to the processing of source material. It is not apparent that the proposed rules in Subpart F address byproduct materials at all.

EPA does not include the consumption of groundwater resources during further restoration as a consideration in approving a provisional alternate concentration limit in §192.52(c)(4).

Under proposed rule §192.52(c)(4), EPA lists the factors that may be considered in approval of an alternate concentration limit when a restoration goal for a constituent cannot be met. It appears that these factors do not include consideration of the consumption of groundwater resources during further restoration. As discussed previously, restoration activities result in a loss of groundwater, through deep well disposal. Unless EPA intended such consumption to be considered under proposed rule §192.52(c)(4)(i)(*C*)—The quantity of groundwater and the direction of groundwater flow—proposed rule §§192.52(c)(4)(i) and (ii) each should be amended to add (*J*)—the consumption of groundwater during further restoration—to the factors considered when establishing and alternate concentration limit. Proposed rule §192.52(c)(4)(ii) should be amended to add (*K*)— the consumption of groundwater during further restoration—to the factors considered when establishing an alternate concentration limit.

Similarly, TCEQ notes that under §192.52(c)(4), when establishing an alternate concentration limit, no consideration is allowed regarding the current and future suitability of the use of the groundwater. A person could currently be using groundwater for irrigation, even though the groundwater is not suitable for such use. The suitability of the groundwater should be a consideration in establishing an alternate concentration limit. TCEQ recommends proposed rule §192.52(c)(4)(i) be amended to add (*K*)—the current and future suitability of the use of the groundwater—to the factors considered when establishing and alternate concentration limit. Proposed rule§192.52(c)(4)(ii) should be amended to add (*L*)— the current and future suitability of the use of the groundwater—to the factors considered when establishing an alternate concentration limit.

Current and future use are factors in consideration of approving an alternate concentration limit in §192.52(c)(4)(i)(*E*) and (ii) (*E*) , yet EPA states that class-of-use restoration goals are inconsistent with the requirements of 40 CFR Part 192 and 10 CFR part 40, Appendix A.

Although under proposed rules §§192.52(c)(4)(i)(*E*) and (ii)(*E*) current and future use are considerations for establishing an alternate concentration limit, EPA states on page 4173 of the proposed rule preamble that restoration goals should not be based on class-of-use. TCEQ is unsure how the factors at §192.52(c)(4)(i)(*E*) and (ii)(*E*) can be considered if an alternate concentration limit cannot be based on class-of-use. Current and future use may be for drinking water for human consumption, drinking water for various types of livestock, irrigation of specific types of crops, aquatic life, wildlife, recreational use, or industrial use. TCEQ notes that under Criterion 5B(5), cited by EPA in the preamble, at (c) under this criteria, alternate concentration limits are allowed, and at Criterion 5B(6)(a)(v), current and future use are considerations in making a hazard finding under Criterion 5B(6). TCEQ agrees with the language in NUREG-1569[5] that class-of-use is an appropriate standard for groundwater restoration when original restoration values cannot be achieved. As discussed above, TCEQ disagrees that consideration of class-of-use goals are inconsistent with the requirements 40 CFR Part 192 and 10 CFR part 40, Appendix A. TCEQ requests EPA provide clarification regarding consideration of current and future use pursuant to §§192.52(c)(4)(i)(*E*) and (ii)(*E*) when establishing alternate concentration limits under §192.52(c)(4).

Section 192.52(a): It is not possible for all of the new requirements in Subpart F to be applied to wellfields that have already been mined.

EPA states that proposed rule in §192.52(a) and the rest of Subpart F will apply to all new wellfields, operating wellfields and expansion of wellfields, except for those currently in restoration, stability monitoring or long-term monitoring. There are wellfields in Texas that currently are being mined. When permitted, the site operators

[5] NUREG-1569, *Standard Review Plan for In Situ Leach Uranium Extraction License Applications.* U.S. Nuclear Regulatory Commission. June 2003. p. 6-9.

were required to establish baseline groundwater quality for 26 water quality parameters according to applicable TCEQ requirements. This list does not include four of the constituents in proposed Table 1 to Subpart F: barium, chromium, silver, and gross alpha particle activity. Because mining of these wellfields has begun, establishment of baseline groundwater quality for these four constituents is no longer is possible. TCEQ suggests that any standards for determination of baseline groundwater quality only apply to new licensees.

EPA's discussion of ACLs includes consideration of the practicability of establishing concentration levels based on risk that should be included in the rule language in §192.53(c).

On page 4173, EPA states "…ACLs, should, when practical, be established at concentration levels that represent a cumulative excess lifetime risk to an average individual at no greater that 10^{-4} (one in ten thousand)." The language in proposed rule §192.52(c)(1)(iii)and §192.52(c)(5), however, does not include the qualifier "when practical." TCEQ recommends that the qualifier "when practical," be included in §192.52(c)(1)(iii) and §192.52(c)(5). Establishing an ACL that has a cumulative excess lifetime risk no greater than 10^{-4}**,** which is the criterion for primary drinking water standards (as described at http://water.epa.gov/drink/standards/hascience.cfm), is impossible when the pre-mining groundwater quality exceeds this standard. As stated by the USGS,[6] pre-operational groundwater quality did not meet primary drinking water standards at any of the Texas *in situ* uranium mining sites. TCEQ recommends proposed rule §§192.52(c)(1)(ii) and 192.52(c)(5) be revised to include the qualifier "when practical" or "when appropriate" regarding establishment of ACLs.

Comparison of a failed hazardous waste management unit to an *in situ* mining operation is not appropriate for establishing 30-year stability monitoring period in Section 192.53(e).

EPA stated that since an engineered RCRA disposal facility for containment of chemically hazardous waste is similar in concept to relying upon a chemically treated ISR wellfield to contain the potential spread of contaminants, EPA believes it is reasonable to conclude that a 30-year long-term stability monitoring period for ISR activities is a consistent application of RCRA requirements. Throughout the proposed rule preamble (on pages 4164, 4171, 4174, 4175, and 4179), EPA compares sediments mined using *in situ* methods to a RCRA engineered disposal structure. Based on this comparison, EPA justified application of the RCRA-required 30-year post-closure care period to restored wellfields. A RCRA hazardous waste disposal unit is an engineered structure designed to contain hazardous waste generated by human activity. A review of the nature of hazardous wastes, especially listed hazardous wastes, indicates these wastes are overwhelmingly synthetic organic compounds. Because these compounds are not naturally-occurring, they are unaffected by natural processes, such as

[6] Hall, Susan. *Groundwater Restoration at Uranium In-Situ Recovery Mines, South Texas Coastal Plain.* USGS Open-file Report 2009-1143, p. 11.

biodegradation. Therefore, engineered containment structures, such as landfills constructed with composite liners and leachate detection systems are necessary to isolate hazardous wastes from the environment.

No synthetic pollutants, however, are generated during *in situ* mining. The mining fluid, or lixiviant, is composed of local groundwater fortified with oxygen, and at times, bicarbonate. As necessary, pH of the lixiviant is adjusted with hydrogen peroxide. Uranium and other naturally-occurring constituents are present in groundwater associated with uranium ore bodies in Texas. *In situ* mining essentially reverses the ore-forming process. Whereas uranium dissolved in naturally-oxygenated groundwater is precipitated when that groundwater encounters reducing conditions in the subsurface, that same uranium is dissolved in the oxygenated-lixiviant. Constituents whose concentrations in the groundwater are increased from *in situ* mining occur naturally in the groundwater and in the ore deposit. For example, arsenic often is associated with uranium ore bodies in South Texas, and occurs in the groundwater that is in contact with these ore bodies. Because both uranium and arsenic solubilities are influenced by oxidation-reduction conditions, the concentrations of both in groundwater are elevated by active *in situ* uranium mining. When the *in situ* mining ceases and the oxygenated lixiviant is no longer added to the groundwater, the uranium and arsenic concentrations in groundwater decrease.

The length of time for post-closure monitoring of a RCRA disposal facility includes time for engineered barriers to become compromised and time for hazardous constituents to travel to groundwater. At *in situ* mining sites there is no need to account for the time for engineered structures to fail or constituents of concern to travel to the monitored formation. The monitored constituents are present in groundwater prior to, during, and after the mining and restoration operations.

Neither the natural conditions that result in a uranium ore body nor the effects of *in situ* mining bear any resemblance to disposal and containment of human-generated synthetic organic compounds in a RCRA landfill. The groundwater monitoring list for RCRA units is comprised overwhelmingly of artificial organic chemicals.[7]

Although the groundwater conditions within the mined ore body have been altered temporarily from chemically-reducing to chemically-oxidizing, the chemical conditions within the sediments outward from the mined ore body are chemically reducing, as documented in geologic literature.[8] Additionally, in the Texas Gulf Coast Plain,

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[7] See 40 CFR 264, Appendix IX; Groundwater Monitoring List.

[8] For example, see "Description and Interpretation of Test Cores—Brooks and Adjacent Counties, South Texas" by William E. Galloway and D. A. Morton, NURE GJBX-9(82), Bureau of Economic Geology, Univ. Texas-Austin, prepared for the U.S. Department of Energy; "Catahoula Formation of the Texas Coastal Plain: Depositional Systems, Composition, Structural Development, Ground-Water Flow History, and Uranium Distribution," by William E. Galloway, 1977, Report of Investigations No. 87, Univ. Texas Bureau of Economic Geology; "Epigenetic Zonation and Fluid Flow History of Uranium-bearing Fluvial Aquifer Systems, South Texas Uranium Province," 1982, by William E. Galloway, Bureau of Economic Geology, UT Austin, Report of Investigations No. 119; "Catahoula Formation of the Texas Coastal Plain: Origin, Geochemical Evolution, and Characteristics of Uranium Deposits," 1980,by William E. Galloway and W.R. Kaiser, Bureau of Economic Geology, UT Austin, Report of Investigations No. 100; "Considerations in the Extraction of Uranium from a Fresh-water Aquifer – Miocene Oakville Sandstone, South Texas," 1982, by Christopher D. Henry, William E. Galloway, and Gary E. Smith, Bureau of Economic Geology, UT Austin, Report of Investigations No. 126; and "Depositional Framework,

uranium ore bodies have undergone re-reduction by sequential intrusion of sulfidic, reducing connate waters[9] from the presence of hydrocarbons. Because of this re-reduction, even the oxidized sediments within the interior portion of the uranium roll fronts have been superimposed with reducing conditions.[10] The sediments surrounding these ore bodies would have been subjected to the same original reducing conditions and to the additional reducing actions of these hydrocarbons.

Therefore, in the South Texas mining district, uranium ore bodies that have been mined and restored, and the oxidizing conditions created by *in situ* mining, are effectively surrounded by regionally extensive reduced sediments. Any oxidizing solutions that may migrate from the mined ore body will encounter these reduced conditions. Because of this natural, effective reduced barrier, the RCRA 30-year post-closure care period that is required for hazardous waste disposal units cannot reasonably be applied to *in situ* uranium mining sites in South Texas as the default stability period. For these reasons, TCEQ recommends this requirement be removed from the proposed rules.

Restoration of an aquifer that has been mined for uranium using *in situ* methods is more comparable to a situation involving groundwater contamination that is addressed under compliance monitoring required under the RCRA rules at 40 CFR §264.99 than to a RCRA engineered disposal unit. As noted by EPA in the proposed rule preamble, a RCRA unit subject to compliance monitoring must demonstrate that the groundwater protection standard has not been exceeded for a period of three years as provided in 40 CFR §264.96. Current TCEQ rules require a stability period of one year if groundwater within the mined portion of the aquifer has been restored to the initially-determined baseline water quality conditions. In a case where baseline groundwater quality values have been revised, the stability period is two years. TCEQ considers these state requirements to be protective, and operators can choose to extend the time of the stability period. TCEQ does not believe use of the 30-year post-closure period to be appropriate by analogy or justified by EPA in its explanation for use as the default stability period for *in situ* uranium mining.

The proposed rules are too vague and subjective. Agreement State regulatory agencies and operators do not have sufficient direction about what is required in the proposed regulations.

The State of Texas and the Nuclear Regulatory Commission have entered an agreement under Section 274(b) of the Atomic Energy Act. As an Agreement State, Texas implements the radioactive materials licensing program for *in situ* mining operations.

Hydrostratigraphy, and Uranium Mineralization of the Oakville Sandstone (Miocene), Texas Gulf Coast Plain," 1982, by William E. Galloway, Christopher D. Henry, and Gary E. Smith, Bureau of Economic Geology, UT Austin, Report of Investigations No. 113.

[9] "Depositional Framework, Hydrostratigraphy, and Uranium Mineralization of the Oakville Sandstone (Miocene), Texas Gulf Coast Plain," 1982, by William E. Galloway, Christopher D. Henry, and Gary E. Smith, Bureau of Economic Geology, UT Austin, Report of Investigations No. 113.

[10] See "Geologic Controls of Uranium Deposition, Karnes County, Texas," by Kendall A. Dickinson, 1976,USGS Open File Report 75-331; "Geochemical and Mineralogical Studies of a South Texas Roll Front Uranium Deposit," 1977, by Martin B. Goldhaber and Richard L. Reynolds, USGS Open File Report 77-821; and "Formation and Resulfidization of a South Texas Roll-type Uranium Deposit:, by Martin B. Goldhaber, Richard L. Reynolds, and Robert O. Rye.

The TCEQ's state licensing program must be compatible with the NRC's requirements and, the NRC retains authority to make the final determination that all applicable standards and requirements have been met prior to the termination of a TCEQ license.

EPA's proposed rules present too much uncertainty and subjectivity in the application of the requirements so that TCEQ may not know whether it is maintaining a compatible program. Further, TCEQ's interpretation of these very subjective rules may lead to second-guessing by the NRC (or EPA) when it comes to time to terminate a license. The licensee and the Agreement State regulatory agency may undertake significant effort to demonstrate groundwater restoration and stability only to learn later that the NRC (or EPA) desires different information to make the same determination. The applicable requirements should be certain, specific, and predictable so that an operator, an Agreement State regulatory agency, and the NRC all know the applicable requirements and can implement them consistently.

For example, in the proposed rule §192.53(a)(1) (p. 4186) for preoperational phase monitoring, EPA proposes, "A *sufficient* number of wells, at *appropriate* locations and depths, shall be installed *in such a manner* as to yield representative samples in order to define the ground flow regime and measure preoperational conditions and water quality for use in statistical tests during operations, restoration, stability, and long-term stability." The lack of specificity in this requirement presents too much uncertainty for a license applicant or the regulatory agency. How many wells are sufficient? What locations are appropriate? Should the wells be spaced randomly or on a grid pattern? Should the wells be located throughout the wellfield or located in areas with uranium ore? Should the wells be screened through the entire thickness of the mined aquifer or screened at intervals that correspond to the location of the ore bodies? If the Agreement State interprets this provision differently than the NRC, is the Agreement State maintaining a compatible program?

There are many other examples where uncertainty and subjectivity are present in the proposed rules. Proposed §192.53(a)(4) (p. 4186) states, "During the monitoring effort, *relevant* data documenting geology, hydrology and geochemistry for radiological and non-radiological constituents shall be collected…." Proposed §192.53(a)(4)(i) (p. 4186) states, "the monitoring effort shall be of *sufficient* duration of no less than one year and of *sufficient* scope to *adequately* characterize temporal and spatial variations in groundwater…." Proposed §192.53(a)(4)(iii) (p. 4186) states, "the licensee shall employ *appropriate* statistical techniques…." Proposed §192.53(d)(2) (p. 4187) states, "…applying *appropriate* statistical techniques, the licensee shall demonstrate that aquifer conditions with the production zone are stable." Proposed §192.53(e)(1) (p. 4187) states, "Through field measurements utilizing the monitoring network established to meet the requirements of §192.53(a) of this section, observations and calculations, and applying *appropriate* statistical techniques, the licensee shall demonstrate that post-restoration aquifer conditions within the production zone remain stable…." Who determines what relevant data is required or what statistical techniques are appropriate? What if the NRC and the Agreement State differ about what data is required or what statistical techniques are appropriate? The proposed rules present too much uncertainty for an Agreement State program to implement and maintain a compatible program. TCEQ recommends that EPA re-propose the rules and provide more specific requirements.

EPA's suggested statistical techniques may not be able to maintain desired Type I error rates for excursion detection as implemented in proposed rule Section 192.53(b).

EPA discusses how upper control parameters are established and compared to periodic sampling results to detect excursions. On page 4167, EPA states, "that upper control limits for excursion detection can be calculated using various statistical techniques." Many inferential statistical methods involve comparison of population parameters (such as the true mean) from two or more populations, as is the case of the Student-t Test. To maintain a desired type I error rate, each population must be sampled each time the test is performed. In RCRA groundwater monitoring, the two populations are the up-gradient and downgradient groundwater relative to the regulated unit. Twice a year, up-gradient and downgradient groundwater is sampled, and the sample results are compared using an appropriate statistical method. By doing this, a desired type I error rate is achieved for the procedure[11].

For excursion monitoring at *in situ* uranium mining sites, the two populations that are compared are the pre-mining groundwater quality in monitor wells, and subsequent determinations of the quality of that water in those wells. The pre-mining groundwater quality is only determined once and cannot be determined each time groundwater is sampled after that initial determination. To identify excursions, subsequent sample values are compared to the pre-mining values. Unless the statistical test accounts for this situation (such as a prediction interval on the next *n* comparisons), the type I error rate cannot be maintained. This is true for confidence intervals, tolerance intervals, and two-sample tests.

TCEQ cautions that determining a value for a statistic, such an upper tolerance limit, maintains the desired type I error rate only for the first comparison. If the upper tolerance limit is calculated only once (as is the case with pre-mining groundwater quality), and subsequent sample results are compared to that upper tolerance limit, the desired type I error rate will not be maintained.

EPA does not fully explain the statistical methods required to demonstrate stability as required in proposed Section 192.53(d).

EPA states that stability would be demonstrated using statistical tests with sufficient power to detect trends with a false negative rate no higher than 5 percent. A false negative rate (Type II error rate, or β) of 0.05 corresponds to a test with a power (1 – β) of 0.95. According to existing EPA guidance, determining the exact power function of many statistical tests is difficult to calculate due to the fact that many test statistics have a complicated distributional behavior under the alternative hypothesis.[12]

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[11] For example, see "Statistical Intervals, A Guide for Practitioners," 1991, by Gerald J. Hahn and William Q. Meeker, John Wiley and Sons, New York, pgs 26 and 31; and "Probability and Statistics for Engineers and the Sciences, 2nd Ed., 1987, by Jay L. Devore, Brooks/Cole Pub. Co. pgs 253-254.

[12] "Analysis of Groundwater Monitoring Data at RCRA Facilities—Unified Guidance," USEPA, March, 2009, Appendix C.2., p. C-10.

EPA does not specify the alternative hypothesis to which a power of 0.95 would apply. EPA does provide a discussion of statistical power and the concept of a minimum detectable difference in their Draft Technical Report;[13] however, no clarification is given with regards to the alternative hypothesis at which a power of 0.95 should be achieved.

If EPA believes that statistical tests used to demonstrate stability should be performed with a type II error rate of 0.05, EPA should provide power functions for the various statistical methods that are acceptable to EPA for demonstration of stability. Additionally, EPA should specify the alternative hypothesis that must have a power of 0.95.

Proposed rule 40 CFR §192.53(d)(2)(i), under which the use of a 95% confidence interval is required to demonstrate stability for three consecutive years, is vague.

On page 4166 of the preamble, EPA states "While we do not recommend any specific statistical method should be applied universally to all ISR situations (because the hydrogeology and geochemistry of ISR site are not uniform by nature and because there is more than one statistical method that can be used), we do believe that the method(s) chosen must be justified by the quality and quantity of the field data collected." However, a specific statistical method, a confidence interval, is mandated in proposed rule §192.53(d)(2)(i). The proposed rule is vague because it does not specify the distributional parameter (such as the true mean) on which the confidence interval is to be constructed, or whether a one-sided or two-sided interval should be constructed.

Further, in the proposed rule preamble, a confidence limit, not a confidence interval as required in the proposed rule, is specified.[14] Use of a confidence interval as required by the proposed rule is problematic in that demonstration of stability will require several comparisons. Based on the quarterly sampling requirement in this rule, over three years, the results of no less than 12 sampling events would be compared to the upper confidence limit, as specified in the preamble, that was constructed using pre-mining groundwater data. If multiple comparisons are made to a single determination of a confidence interval, the desired type I error rate of the statistic will not be maintained, and will change with each comparison. As described in Devore,[15] the confidence level associated with a confidence interval is based on recalculating the interval for each comparison. It appears that to maintain a type I error rate of 0.05 as required under the proposed rules, the ISR facility operator would have to use a prediction interval constructed to contain the next 12 measurements.[16] TCEQ recommends this proposed rule be revised to allow for other statistical tests.

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[13] "Considerations related to Post Closure Monitoring of Uranium In-Situ Leach/In-situ Recovery (ISL/ISR) Sites" Background Information Document for the Revision of 40 CFR Part 40, Draft Technical Report, Revision 8, September, 2014, p. 163.
[14] P. 4178, Section IV.E.3.a.
[15] "Probability and Statistics for Engineers and the Sciences," 2nd Ed., 1987, by Jay L. Devore, Brooks/Cole Pub. Co. pp. 253-254.
[16] See Statistical Methods for Groundwater Monitoring, 1994, by Robert D. Gibbons, John Wiley and Sons, Inc., New York, pp. 11-15.

The timing of applicability of the proposed rules is not consistent with UMTRCA.

The proposed rule at 40 CFR 192.55 (p. 4187) provides that Subpart F shall be effective 60 days after publication of the final rule in the Federal Register. Section 275(b)(2) of the Atomic Energy Act provides that "within three years after such revision [by the Administrator], the Commission and any State permitted to exercise authority under section 2021(b)(2) of this title shall apply such revised standard in the case of any license for byproduct material as defined in section 2014(e)(2) of this title or any revision thereof." EPA does not explain how the effective date of the proposed rules complies with the three-year implementation allowed under UMTRCA.

As noted above, as applied to the State of Texas, the proposed rules shift requirements from one regulatory program (the UIC program) to another (the radioactive materials licensing program). To implement the proposed rules, TCEQ would require an extensive rulemaking project to revise the rules for both programs. In addition, because of the many instances where the proposed rules are subjective, the Agreement State regulatory program may need to wait for NRC interpretation or guidance on the implementation of these rules in order to maintain a compatible program. If EPA decides to adopt the rules, TCEQ requests that the rules not be effective for a period of three years to allow time for state rulemaking to implement the requirements.

II. If EPA must move forward on the rules in Subpart F of Part 192, essential changes are necessary to the rules for an Agreement State to be able to implement them.

As discussed above, the TCEQ, on behalf of the State of Texas, recommends that EPA withdraw the proposed rules and carefully study active and historic uranium mining sites *before* proposing any changes to regulation of *in situ* uranium mining. If EPA decides to move forward on the adoption of new rules in Subpart F of Part 192 despite the numerous problems presented, the TCEQ requests the following changes to the rules. EPA has the luxury of proposing rules under its UMTRCA authority that it never has to implement or enforce. In Texas, implementation and enforcement of the rules would be accomplished by the Agreement State program run by TCEQ. The following changes would be essential for TCEQ to be able to implement the new rules of Subpart F.

The new requirements of Subpart F should only apply to new *in situ* uranium mines that have not been previously licensed by the NRC or an Agreement State program. The applicability section in §192.50 should be revised to state: "This subpart applies to the in-situ recovery of uranium at a new site that is authorized under a license issued by the regulatory agency on or after January 1, 2019. In-situ recovery of uranium at sites authorized under a license issued by a regulatory agency prior to January 1, 2019 is not subject to this subpart."

Existing *in situ* uranium mines should be allowed to continue to operate and decommission under the requirements that applied when the applicable permits and licenses were issued. Changing the rules after-the-fact risks abandonment of the existing sites. Existing operators may be unable to secure lease extensions or financing that would be required to extend the projected life of a planned project to include the proposed additional 30-year long-term stability monitoring period or to achieve changed restoration requirements. Despite best efforts, existing operators may be unable to comply with new requirements and abandon licensed projects. Abandoned sites leave a problem for others, such as the state or landowners, to take responsibility for the decommissioning and closure requirements. Abandoned sites would lead to delays in decommissioning and would reduce protections of public health, safety and the environment. If the new rules applied only to new sites licensed on or after January 1, 2019, risk of abandonment at existing operations would be reduced.

It would be impossible for the TCEQ to implement Subpart F as proposed and apply the new requirements to existing mines. For example, TCEQ requires the determination of pre-mining baseline water quality and restoration requirements for a different suite of parameters than is included under new §192.52(c). TCEQ's required parameters are established in 30 Texas Administrative Code §331.104(b) and do not include barium, chromium, silver, or gross alpha particle activity. A licensee who has already started mining would not be able to establish pre-mining water quality for these parameters.

Planned *in situ* uranium mining projects should have sufficient time to prepare for compliance with the new requirements of Subpart F. The development of an *in situ* uranium mine takes many years of planning: exploration, delineation of minerals, acquisition of property rights and leases, financing, facility design, construction, personnel training, permitting, licensing, and marketing of the product. Establishing an effective date of January 1, 2019 would provide extra time to allow operators to plan for any new requirements imposed in Subpart F.

Thirty years of long-term stability monitoring in proposed §192.53(e)(1)(iii) is not supported by the geochemical conditions of uranium ore zones and needlessly extends the duration of licensed activity beyond reason. The alternative in the proposed rule for shortening the period is vague and would be difficult for an Agreement State program to maintain a compatible program. Section 192.53(e) should be removed from the adopted rule.

Imposing a new 30-year period of long-term stability monitoring unduly strains the regulatory agency by extending the licensed term beyond the originally-expected life of a project and exposes the regulatory agency to risk of site abandonment. The allowance for an alternative term in proposed §192.53(e)(1)(iii) does not provide the regulatory agency certainty that its acceptance of the alternative will maintain compatibility with NRC requirements or will be accepted by the NRC for determining final decommissioning of a particular site.

Use of the RCRA 30-year post-closure care time period that applies to hazardous waste disposal units is not appropriate for a mined aquifer. As noted previously, restoration of

an aquifer that has been mined for uranium using *in situ* methods is more comparable to a situation involving groundwater contamination that is addressed under compliance monitoring required under the RCRA rules at 40 CFR §264.99. As noted by EPA in the proposed rule preamble, a RCRA unit subject to compliance monitoring must demonstrate that the groundwater protection standard has not been exceeded for a period of three years as provided in 40 CFR §264.96. Three years of stability monitoring in §192.53(d)(2)(i) would maintain EPA's desire to adopt rules under its UMTRCA authority that are consistent with RCRA regulations. TCEQ recommends that the rules be amended to remove §192.53(e).

The effective date of the rules should be changed to allow sufficient time for the NRC and Agreement States to adopt implementing rules. Section 192.55 should be revised to state "Subpart F shall be effective on January 1, 2019."

Section 275(b)(2) of the Atomic Energy Act provides that "within three years after such revision [by the Administrator], the Commission and any State permitted to exercise authority under section 2021(b)(2) of this title shall apply such revised standard in the case of any license for byproduct material as defined in section 2014(e)(2) of this title or any revision thereof." Establishing an effective date of January 1, 2019 would be consistent with UMTRCA's three year allowance for NRC or Agreement State implemenation. Because of the significant revision to the regulation of *in situ* uranium mining operation in the proposed rules, the TCEQ and the state of Texas would need sufficient time to: reorganize the existing Underground Injection Control and Radioactive Materials licensing programs, review any NRC implementation or guidance issued on new subpart F, and then undertake corresponding rulemaking. If statutory changes are required in Texas to implement new requirements, a regular session of the Texas legislature would also be available during the period that extends the effective date of the rules.