

## **HOTLINKS FOR POST-CLOSURE MONITORING OF URANIUM IN-SITU LEACH/IN-SITU RECOVERY (ISL/ISR) SITES**

**Hotlink for Review Document:** Draft technical report entitled "*Considerations Related to Post-Closure Monitoring of Uranium In-Situ Leach/In-Situ Recovery (ISL/ISR) Sites*," June 2011. The document may be found electronically at: <http://www.epa.gov/radiation/docs/tenorm/post-closure-monitoring.pdf>

### **Hotlinks for Select Background Documents:**

Information pertaining to EPA's regulatory standards in 40 CFR part 192—Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings can be found at:

<http://yosemite.epa.gov/oepi/rulegate.nsf/byRIN/2060-AP43?opendocument>

***Technical Report on Technologically Enhanced Naturally Occurring Radioactive Materials from Uranium Mining (Updated June 2007)***: Volume one of this document provides useful background information describing the activities and methods of uranium mining and milling, including the process of in-situ leaching. While the hard copy of the document now includes volume 2 as well, it is volume 1 that we are referencing as background information. This document may be found electronically at: <http://www.epa.gov/japan2011/tenorm/pubs.html>.

***Monitored Natural Attenuation of Inorganic Contaminants in Ground Water, Volume 3 Assessment for Radionuclides Including Tritium, Radon, Strontium, Technetium, Uranium, Iodine, Radium, Thorium, Cesium, and Plutonium-Americium*** (147 pages) is found at: <http://www.epa.gov/nrmrl/pubs/600r10093/600r10093.pdf>

***Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance (March 2009)***: This guidance document provides "a suggested framework and recommendations for the statistical analysis of groundwater monitoring data at RCRA facility units...". We are including Chapters 1, 2 and 4 as background material because the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) requires EPA to develop health and environmental standards for both Title I inactive mill sites administered by DOE and Title II and future NRC licensed sites.

EPA's standards are required to address non-radiological, as well as radiological, constituents. Therefore, for Title I sites, UMTRCA states that the standards shall, "... to the maximum extent practicable, be consistent with the requirements of the Solid Waste Disposal Act, as amended," now known as RCRA. For Title II and future NRC licensed sites, the standards shall be "... consistent with the standards required under subtitle C of the Solid Waste Disposal Act [now RCRA], as amended, which are applicable to such hazards."

EPA's current standards in 40 CFR part 192 incorporate the RCRA ground-water monitoring requirements for hazardous waste units specified in 40 CFR part 264, including statistical techniques applicable to determining when monitoring requirements have been achieved. A key question in this advisory is whether it is appropriate to apply these techniques, which were developed to address releases to ground water from engineered units such as landfills, impoundments, and tanks, to in situ leach uranium recovery facilities, where the regulated "unit" is the geologic formation within a defined portion of the aquifer.

This entire document (almost 900 pages) may be found electronically at:

<http://www.epa.gov/osw/hazard/correctiveaction/resources/guidance/sitechar/gwstats/unified-guid.pdf>

Hall, Susan, 2009, **Groundwater Restoration at Uranium In-Situ Recovery Mines, South Texas Coastal Plain**: U.S. Geological Survey Open-File Report 2009-1143, 32 pages. It's available at: <http://pubs.usgs.gov/of/2009/1143/pdf/OF09-1143.pdf>

**Lessons Learned from the US Nuclear Regulatory Commission at the Public NMA/NRC Uranium Recovery Workshop in Denver, CO in January 2011:**

As a follow-up in response to a specific request from a RAC member during the July 12 public conference call, the U.S. EPA Office of Radiation and Indoor Air (ORIA) Staff obtained a publically available power point presentation on "lessons learned" from the US Nuclear Regulatory Commission. The presentation by Elise A. Striz, Ph.D., Hydrogeologist in the Uranium Recovery and Licensing Branch of the U.S. NRC is entitled "**ISR Application and Licensing Actions: Hydrogeology Lessons Learned.**" The "lessons learned" cover site characterization, ISR operation, restoration standards and hydrogeology and regulation of groundwater.

Specifically, the NRC staff stated:

Yes, you may use this presentation. It was given at the public NMA/NRC Uranium Recovery Workshop in Denver in January 2011. It was intended as a "lessons learned" presentation targeted to the ISR industry to improve their license applications. It is available from the NRC public website at:

[www.nrc.gov/materials/uranium-recovery/public-meetings/ur-workshops/estriz-nrc.pdf](http://www.nrc.gov/materials/uranium-recovery/public-meetings/ur-workshops/estriz-nrc.pdf) - 2011-03-31

(end of NRC comments)

For additional references and background material, please visit the following website:  
<http://epa.gov/radiation/docs/tenorm/references/ISLPostClosureReferences.pdf>