UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF FEDERAL AND STATE MATERIALS
AND ENVIRONMENTAL MANAGEMENT PROGRAMS
WASHINGTON, D.C. 20555

November 5, 2009

NRC REGULATORY ISSUE SUMMARY 2009-14
LICENSING APPROACH FOR
URANIUM IN SITU RECOVERY FACILITY APPLICATIONS

ADDRESSEES

All holders of operating licenses for uranium in situ recovery (ISR) facilities and all companies that have submitted applications to construct new ISR facilities or letters of intent to submit such applications. In addition, the U.S. Nuclear Regulatory Commission (NRC) is providing this Regulatory Issue Summary (RIS) to appropriate Agreement States for their information.

INTENT

The NRC is issuing this RIS to inform addressees of the NRC's position regarding an issue that has arisen in conjunction with the anticipated increase in and variety of license applications for new facilities, restarts, and expansions of ISR operations. No specific action or written response is required of the addressees.

BACKGROUND

Certain basic ISR facility terminology herein has been defined and is included for reference as Enclosure 1. All uranium recovery facilities, whether they are conventional mills or ISRs, must have a license to operate. Such licenses are issued either by NRC or an Agreement State. Typically, a new facility requires a new license. For example, a company that has a license for a conventional mill and proposes to build another mill at a different location would need a separate license for the second mill. This is in conformance with the NRC's long-standing position of requiring separate licenses for individual fuel cycle facilities. Once licensed, changes to the facility are approved through the process of amending the license. Changes that are addressed through the amendment process include, among other things, additions to the facility. Thus, a new tailings cell at a conventional mill or a new evaporation pond at an ISR facility would be approved by amending the existing license.

However, some proposed or potential ISR licensing actions exist that raise the question of whether the action should be approved via an amendment to an existing license, or the issuance of a new license. For example, one scenario is the licensing of ISR/resin operations as satellites that feed loaded resin to an existing ISR/yellowcake operation owned by the same company. In the past, the staff has approved these satellites by amending the license for the existing ISR/yellowcake operation. Those decisions were justified, because, in most cases, the proposed satellite facility was adjacent, or in close proximity to, the licensee's existing ISR/ yellowcake facility and would be operationally connected to that facility. Thus, the satellite was

ML090290197

considered an extension of the licensed ISR operation. However, in some cases, the proposed ISR satellite is not close to the licensed ISR/yellowcake operation.

Additionally, the NRC staff has received inquiries from companies proposing construction of uranium recovery facilities deviating from a simple ISR/yellowcake operation. Industry has expressed interest in licensing stand-alone ISR/resin operations, licensing stand-alone Central Processing Plants (CPPs) without well fields, and adding CPPs at satellite ISRs. To address these and other application scenarios that may emerge in the future, the staff is proposing a general position on whether the various ISR facility licensing scenarios will be approved by issuing an amendment to an existing license, or by issuing a new license.

SUMMARY OF ISSUES

The key issue to address is identifying proposed ISR scenarios that require a new license and those that can be approved by amending an existing license. The NRC's position on ISR facility licensing is as follows:

1. Generally, additions or enhancements to a license for an ISR facility can be approved by amending the license. Although nuclear power plant units co-located at a site require separate licenses, NRC historically has approved enhancements and additions to fuel cycle facilities through the amendment process. With the increased interest in uranium processing, an ISR licensee may request one or more additional CPPs at a site that is already licensed. This position allows approval of a request for an additional CPP, at a facility that already has a CPP, to be in the form of an amendment to the existing license. Unlike reactor licenses, which focus primarily on the reactor and its various components, uranium recovery licenses focus primarily on the site where the licensed activity occurs. This focus on the site is the basis for this position. Further, it would not be an efficient use of resources to create multiple uranium recovery licenses at a single uranium recovery site.

2. For NRC staff to consider approving additions or enhancements to facilities not located at the existing licensed site through amendment of the existing ISR license, the licensee must show a strong connection (discussed below) between the proposed additions or enhancements and the existing licensed operations. This position would prevent one entity from using a single license to cover disparate facilities at separate locations. The fact that the facilities are similar and are owned by the same entity does not necessarily demonstrate a strong connection. If the facilities are located on separate non-contiguous sites and not operationally connected, NRC would treat them as separate facilities and license them individually.

The strong connection discussed above can be met by either of two ways:

> Operational Connection – Demonstrating that the new facility would not be functional without the existing facility. For example, an existing ISR licensee is proposing the addition of a new ISR/resin operation that will involve shipping the resin to the licensee's operating CPP or ISR/yellowcake operation for further processing (satellite facility). Without the existing CPP, the new ISR/satellite would not be able to process the resins, and, thus, would not be able to produce the uranium.

Hydrogeologic Connection – An existing ISR licensee is proposing the addition of a new ISR/resin operation involving well fields containing the ore zone, and hydrogeologic conditions that are the same as the existing licensed ISR/resin operations. The procedure for determining whether a sufficiently strong hydrogeologic connection exists is described in the enclosed Procedure for Determining Strong Hydrogeologic Connection (Enclosure 2).

If an operational connection or a sufficiently strong hydrogeologic connection is shown, multiple ISR operations at separate locations could be authorized under a single license.

The amendment of a license based on showing a strong connection only applies to facilities located completely within states where the NRC has not delegated its authority under Section 274 of the Atomic Energy Act. A new ISR facility in an Agreement State cannot be licensed as a satellite under an existing NRC license, nor can a proposed ISR facility in a state where NRC has regulatory authority be licensed as a satellite under an Agreement State license.

Unless a showing is made as discussed above, approval of the proposed action would require issuance of a separate license. For example, some prospective licensees have discussed constructing detached ISR/resin operations from which the loaded resin would be taken to another company's CPP for processing. Such an ISR/resin operation would need a separate license. In addition, a stand-alone CPP without well fields, that receives and processes resin from other companies' ISR facilities, would not be approved by amending an existing ISR facility's license but would need a separate license.

Adding a CPP to a previously licensed satellite ISR/resin operation would only be authorized by issuing a separate license for the newly created independent ISR/yellowcake operation. The basis for this position is that, unlike an ISR satellite operation, a CPP produces yellowcake, and thus, is a stand-alone facility whose only connection to an existing licensed ISR facility may be that it is owned by the same entity. Additionally, because of processes necessary to produce yellowcake, each CPP requires an onsite radiation safety officer (RSO) or technician and an onsite facility or site manager. Note that there currently is one ISR license under which the licensee is authorized to operate more than one CPP. This situation occurred through a past licensing action that combined 3 separate licensed sites under one license (one owner). Currently, that operation has several satellites sending resin to a main CPP, although one of those satellites has a licensed CPP in standby. If the licensee were to notify the NRC of plans to restart that CPP, that action would normally require issuing a separate license, consistent with this position. However, this RIS will not be applied retroactively, so the CPP in question would be grandfathered, and its restart would only require an amendment of the existing license.

The enclosed Table (Enclosure 3) presents an overview of ISR licensing options and the associated licensing process based on this position.

FEDERAL REGISTER NOTIFICATION

A notice of opportunity for public comment on this RIS was not published in the *Federal Register* because this RIS is informational and does not represent a departure from current regulatory requirements.

CONGRESSIONAL REVIEW ACT

This RIS is a rule under the Congressional Review Act (5 U.S.C. §§ 801-886). The Office of Management and Budget has determined that this is not a major rule.

PAPERWORK REDUCTION ACT STATEMENT

This RIS does not contain any information collections and, therefore, is not subject to the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.).

CONTACT

This RIS requires no specific action or written response. If you have any questions about this summary, please contact the technical contact listed below.

/RA/

Larry W. Camper, Director
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Technical Contact: Bill von Till
(301) 415-0598
E-mail: bill.vontill@nrc.gov

Enclosures:
1. Definitions
2. Procedure for determining hydrogeologic strong connection
3. Table of ISR licensing action scenarios and corresponding process requirements
4. List of Recently Issued FSME Generic Communications

FEDERAL REGISTER NOTIFICATION

A notice of opportunity for public comment on this RIS was not published in the *Federal Register* because this RIS is informational and does not represent a departure from current regulatory requirements.

CONGRESSIONAL REVIEW ACT

This RIS is a rule under the Congressional Review Act (5 U.S.C. §§ 801-886). The Office of Management and Budget has determined that this is not a major rule.

PAPERWORK REDUCTION ACT STATEMENT

This RIS does not contain any information collections and, therefore, is not subject to the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.).

CONTACT

This RIS requires no specific action or written response. If you have any questions about this summary, please contact the technical contact listed below.

/RA/

Larry W. Camper, Director
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Technical Contact: Bill von Till
(301) 415-0598
E-mail: bill.vontill@nrc.gov

Enclosures:
1. Definitions
2. Procedure for determining hydrogeologic strong connection
3. Table of ISR licensing action scenarios and corresponding process requirements
4. List of Recently Issued FSME Generic Communications

ML090290197

OFC	DWMEP	FSME	DWMEP	DWMEP	OGC
NAME	DGillen	AMcIntosh	BGarret	BVontill	TRothschild nlo-email
DATE	02/05/09	05 / 26 /09	02/05/09	02/09/09	02/18/09

OFC	OGC	DWMEP	OIS	OE	DWMEP
NAME	JHull/nlo-via email	KMcConell	TDonnell	NHilton	LCamper
DATE	02/ 18 /09	05 / 20 /09	03 / 23 /09	03 / 30 /09	11/05/09

OFFICIAL RECORD COPY

Definitions

***In situ* Recovery (ISR) Operations** - In situ recovery, also known as solution mining, or in situ leaching, means the process for extracting uranium from an underground ore body by injecting a leaching solution (lixiviant) into an ore body and pumping the solution to a surface facility for further processing.

Wellfield – A well field means an area within a facility from which source material is extracted by ISR operations, and that contains injection, production, and monitoring wells as proposed by the applicant or licensee and approved by the Commission.

Ion Exchange (IX) Plant – An IX Plant is a process building at an ISR Facility in which the pregnant lixiviant (solution containing uranium) from the production wells flows through ion exchange columns where resin beads selectively remove the uranium from the solution. IX Plants do not process the resins further. The saturated resins are transported to a Central Processing Plant to convert the uranium into yellowcake.

Central Processing Plant (CPP) – A CPP is a process building at an ISR Facility in which yellowcake is produced. The yellowcake can be a slurry or a dried powder. Activities at a CPP can include the entire uranium processing circuit (i.e., lixiviant preparation in support of an active well field, uranium stripping in ion exchange resin columns, resin elution, uranium precipitation, yellowcake slurry thickening and drying, and yellowcake packing), or a portion of the circuit that results in yellowcake production (e.g., ion exchange (IX), elution, precipitation, and thickening).

ISR Facility – An ISR Facility is an operation that includes one or more well fields, and either an IX Plant or a CPP. For the purposes of this document, an operation with one or more well fields and an IX Plant is referred to as an **ISR/resin operation**, and an operation with one or more well fields and a CPP is referred to as an **ISR/yellowcake operation**.

ISR Satellite – An ISR Satellite is an ISR/resin operation that transports its loaded resin to a CPP operated by the same company/licensee. As such, the ISR/resin operation is a “satellite” of the CPP.

PROCEDURE FOR DETERMINING STRONG HYDROGEOLOGIC CONNECTION

Purpose:

The following procedure provides guidance for determining if there is a strong hydrogeologic connection between a licensed ISR facility and proposed new ISR facility.

Procedure:

1. Characterize sites. For each site being compared, determine its characteristics pertinent to each of the factors listed below. These factors are natural system factors that are fundamental to well field performance, and to designing a well field pattern and monitoring plan. All of the factors are qualitative to provide flexibility in characterizing and comparing sites with a great variability of geologic and hydrogeologic characteristics. These factors are:

    1. Regional structural setting
    2. Regional stratigraphy and hydrogeology
    3. Ore zone stratigraphy and lithology
    4. Confining unit stratigraphy, continuity, permeability

2. Compare sites. Compare the degree of similarity or difference between the proposed new facility's hydrogeologic characteristics and those of the existing licensed facility using the factors above. For each factor, identify if the factor is the same (S), different (D), or very different (VD) (see example below). Differences must be significant to the hydraulic behavior of the well field. If the comparison of a factor is not obvious or is uncertain, that factor's impact on hydraulic behavior should be evaluated further. If, on further evaluation, a minor difference is identified that is not significant to hydraulic behavior, then the comparison for that factor should be identified as the same and the basis documented.

3. Determine strong hydrogeologic connection. For a new well field to have a strong hydrogeologic connection to an existing well field, none of the factors should be identified in Step 2 as different or very different.

EXAMPLE: COMPARISON OF 3 POWER RESOURCES, INC. SATELLITE FACILITIES TO ITS SMITH RANCH HIGHLAND CENTRAL PROCESSING PLANT

Purpose: To illustrate how the factors can be used, the staff compared the PRI Smith Ranch licensed ISR to its other satellite facilities at Reynolds Ranch, North Butte, and Gas Hills. The comparison table included identifies similarities and differences and provides a basis for the conclusions below.

Background:

- The Smith Ranch facility and the satellite facilities used in this comparison were consolidated under a single license from 2002 to 2005.
- All of these 4 PRI sites are located in central Wyoming near Casper.
- Distance from Smith Ranch to satellites:
    - Reynolds Ranch: 6 miles to the North and southern boundary contiguous to Smith Ranch
    - North Butte: approximately 30 road miles to the North
    - Gas Hills: approximately 140 road miles to the South and West

Results:

- The four facilities were compared using the four evaluation factors and summarized the information in a comparison table.
- Reynolds Ranch: **Same as** Smith Ranch; a strong hydrogeologic connection
    - Similarities
        - Same regional structural and stratigraphic setting
        - Same ore zone and confining units ("P" shale)
        - Lack of faults
        - Lack of impacts from uranium mining or other resource extraction
    - Differences: no differences significant to well field performance
- North Butte: **Different** than Smith Ranch; not a strong hydrogeologic connection
    - Similarities
        - Same regional structural and stratigraphic setting
        - Lack of faults
    - Differences
        - Different ore zone and confining units (laterally discontinuous shales)
        - Impacts from nearby coal bed methane extraction need extensive monitoring and assessment
- Gas Hills: **Very different** than Smith Ranch; not a strong hydrogeologic connection
    - Similarities
        - Regional stratigraphy is the same; Tertiary alluvial fan deposits with ore zones in channel sands
    - Differences
        - Regional structural setting; Wind River Basin separate from Powder River Basin and contains faults
        - Ore zones are in different formations
        - Confining units are different formations, especially the lower units are different formations that are not well characterized
        - Traceable and subsidiary faults need extensive characterization and assessment
        - Impacts on hydrogeology from nearby abandoned underground mines and open pits need testing and assessment as well as consideration in well field design and monitoring

Conclusions about site comparisons:

- Reynolds Ranch is “the same” as Smith Ranch under all the factors, and, therefore, has a strong hydrogeologic connection to the Smith Ranch site.
- Both North Butte and Gas Hills have significant differences with Smith Ranch, and therefore do not have a strong hydrogeologic connection with the Smith Ranch site.

NOTE: As previously stated, this discussion illustrated the method of determining a strong hydrogeologic connection using the PRI Smith Ranch licensed ISR and its satellite sites. Although, this example shows that some satellites do not exhibit a strong hydrogeologic connection to the PRI Smith Ranch licensed ISR, all the satellites exhibit an operational connection. Based on this operational connection, all of these satellites were licensed by amendments to the PRI Smith Ranch license instead of by separate licenses.

EXAMPLE: COMPARISON OF PRI SATELLITE FACILITIES TO SMITH RANCH HIGHLAND CPP

	SMITH RANCH, HIGHLAND CPP	REYNOLDS RANCH	NORTH BUTTE	GAS HILLS
SUMMARY COMPARISON		SAME	DIFFERENT	VERY DIFFERENT
1. Regional structural setting.	Southern part of Powder River Basin.	Southern part of Powder River Basin. **(S)**	Southern part of Powder River Basin. **(S)**	Wind River Basin and separated from the Powder River Basin. **(VD)**
2. Regional stratigraphy and hydrogeology.	Tertiary Eocene Wasatch and underlying Fort Union alluvial fan deposits of interbedded sandstones and claystones. Numerous facies changes over short lateral distances; coarser units to the south and closer to the source of sediment. Wells often completed in multiple sandstone aquifers.	Same **(S)**	Similar lithologies but different formations and age. **(D)**	Similar lithologies but different formations and age. **(D)**
3. Ore zone stratigraphy and lithology.	Ore zones found in course channel sands of Eocene Fort Union Fm. Ore zones in O-and Q sand units.	Same ore zones as Smith Ranch. Ore zones U/S and O sands of Fort Union. **(S)**	Different ore zones: Although the ore zones are in channel sands within the same Tertiary alluvial fan deposits as Smith ranch, the sandstone ore zones are different. Ore zones are in lower part of Wasatch Fm that overlies the Fort Union Fm and in three sand units A, B, and C, that are connected in some places forming one unit.	Different ore zones: Wind River Fm contains ore in arkosic sandstones to pebble and boulder conglomerates. 5 separate mining units in different fan deposits. Complicated stratigraphic interpretation. **(D)**

	SMITH RANCH, HIGHLAND CPP	REYNOLDS RANCH	NORTH BUTTE	GAS HILLS
SUMMARY COMPARISON		SAME	DIFFERENT	VERY DIFFERENT
			Similar lithology, highly lenticular with numerous facies changes over short distances. In some cases, cannot trace stratigraphic units more than a few thousands of feet. **(D)**	
4. Confining unit stratigraphy, continuity, permeability.	Confining units are Tertiary shales. Upper confining unit is a laterally continuous lacustrine claystone 60 ft thick ("P" shale) of the Fort Union Fm. Lower confining unit is a claystone.	Same - "P" shale is also present as the laterally continuous overlying confining unit **(S)**	Different specific units, but similar lithologies. Impermeable shale layers bound above and below the 3 ore bearing sand members, but these are laterally discontinuous overback deposits different than the continuous lacustrine clays of the "P" shale at Smith Ranch. **(D)**	Different confining units - Upper confining units are Tertiary shales; Shales are complex and pinch in/out. Lower confining units are pre-Tertiary and multiple, different formations that are not well characterized and different than the Fort Union or Wasatch shale units at the other sites. Individual mining units have different lower confining formations that add additional characterization and testing complexity. **(D)**

TABLE OF ISR LICENSING ACTION SCENARIOS AND CORRESPONDING PROCESS

ISR-RELATED APPLICATION	LICENSING PROCESS
New applicant or existing licensee proposes a new ISR/yellowcake.	License
New applicant or existing licensee proposes a new ISR/resin, with the resin shipped to a separate business entity's CPP.	License
ISR/resin licensee proposes an additional ISR/resin w/ no strong connection.	License
ISR/resin licensee proposes an additional ISR/resin close by with strong hydro-geologic connection.	Amendment
Licensee proposes a satellite, i.e., remote ISR/resin w/ resin shipped to its licensed existing CPP or ISR/yellowcake (strong operational connection).	Amendment
New applicant or existing licensee proposes a stand-alone CPP at new site.	License
ISR/resin licensee proposes to add a CPP at its site.	Amendment
Existing CPP or ISR/yellowcake licensee with a satellite proposes to add a CPP at the satellite.	License
Licensee proposes an additional CPP at its existing CPP or ISR/yellowcake site (increased capacity).	Amendment
Licensee proposes restart of an ISR facility in standby or decommissioning.	Amendment
ISR licensee proposes additions, modifications, or enhancements to its licensed facility.	Amendment

List of Recently Issued Office of Federal and State Material and Environmental Management Programs Generic Communications			
Date	GC No.	Subject	Addressees
12/01/08	RIS-2008-31	Licensing Requirements for Sentinel Lymph Node Biopsy.	All U.S. Nuclear Regulatory Commission medical use licensees and NRC master material licensees. All Agreement State Radiation Control Program Directors and State Liaison Officers.
12/22/08	RIS-2008-10, Suppl. 1	Notice Regarding Forthcoming Federal Firearms Background Checks.	All U.S. Nuclear Regulatory Commission licensees, certificate holders, and applicants for a license or certificate of compliance who use armed security personnel as part of their physical protection system and security organization. All Radiation Control Program Directors and State Liaison Officers.
01/12/09	IN-2008-22	Molybdenum-99 Breakthrough in Molybdenum-99/Technetium-99m Generators.	All U.S. Nuclear Regulatory Commission medical, radiopharmacy, molybdenum-99/ technetium-99m generator manufacturers, and master material licensees authorized to manufacture or use generators. All Agreement State radiation control program directors and State liaison officers.
01/22/09	IN-2009-01	National Response Framework.	All holders of operating licenses or certificates for nuclear power plants, research and test reactors, independent spent fuel storage installations, fuel cycle facilities, and radioactive materials. All holders of operating licenses for uranium recovery facilities and all holders of licenses or certificates for the following types of facilities undergoing decommissioning: nuclear power plants, research and test reactors, fuel cycle facilities, and uranium recovery facilities.
02/03/09	IN-2009-05	Contamination Events Resulting from Damage to Sealed Radioactive Sources During Gauge Dismantlement And Nonroutine Maintenance Operations.	All U.S. Nuclear Regulatory Commission materials licensees; all Agreement State Radiation Control Program Directors and State Liaison Officers.
03/30/09	IN-2009-07	Withholding of Proprietary Information from Public Disclosure.	All current holders of and potential applicants for licenses, certificates of compliance, permits, or standard design certifications, as well as any other persons submitting a request that information be withheld from public disclosure under the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 2.390, "Public inspections, exemptions, requests for withholding.
Note: This list contains the six most recently issued generic communications, issued by the Office of Federal and State Materials and Environmental Management Programs (FSME). A full listing of all generic communications may be viewed at the NRC public website at the following address: http://www.nrc.gov/reading-rm/doc-collections/gen-comm/index.html			