September 17, 2009

Mr. Mike Griffin
Director of Environmental
and Regulatory Affairs
Uranium One
907 N. Poplar Street
Suite 260
Casper, WY 82601

SUBJECT: AUGUST 18, 2009, CONFERENCE CALL REGARDING ENERGY METALS CORPORATION'S MOORE RANCH IN SITU RECOVERY URANIUM PROJECT

Dear Mr. Griffin:

On August 18, 2009, a public conference call was held to discuss Energy Metals Corporation's (EMC's) application for a license to construct and operate a uranium *in situ* recovery facility at its Moore Ranch site. The U.S. Nuclear Regulatory Commission (NRC) has completed its review of the radiological and miscellaneous aspects of EMC's application and has prepared an internal draft of the Safety Evaluation Report (SER). The conference call was held to discuss open issues that NRC staff identified in preparing the radiological and miscellaneous sections of the draft SER. A summary of the meeting is enclosed.

Within 30 days, please either provide the information identified in the meeting summary or inform us of the date you expect to provide the information. At this point in the review process, NRC staff has presented all open issues to EMC regarding the Moore Ranch facility SER. The staff previously provided written discussions of open issues on September 8, 2009, and May 26, 2009. The staff is therefore curtailing any further work until resolution of the open issues.

If you have any questions concerning this letter, please contact me, either by telephone at (301) 415-0724, or by e-mail at douglas.mandeville@nrc.gov.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for

public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

Sincerely,

/RA/ by S.Cohen for

Douglas T. Mandeville, Project Manager
Uranium Recovery Licensing Branch
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No. 40-9073

Enclosure: Meeting Summary
Attendance List

cc: Meeting Attendees
G. Mooney, WDEQ

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MEETING SUMMARY
Energy Metals Corporation Moore Ranch ISR

DATE: August 18, 2009, 2009

TIME: 10:00 a.m. – 12:00 Noon

PLACE: U.S. Nuclear Regulatory Commission
Two White Flint North, Rockville, Maryland
Room T8 C5

PURPOSE: To discuss radiological and miscellaneous issues relating to Moore Ranch ISR License Application

ATTENDEES: See Attached Attendee List

BACKGROUND:

The teleconference was held to discuss Energy Metal Corporation's (EMC's) application to construct and operate a uranium *in situ* recovery (ISR) facility at its Moore Ranch site in Wyoming. The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of the radiological and miscellaneous aspects of EMC's application and prepared an internal draft of the Safety Evaluation Report (SER). The teleconference was held to discuss open issues that NRC staff identified in preparing the miscellaneous and radiological sections of the draft SER.

DISCUSSION:

The teleconference began at 10:00 a.m. EST. The NRC team leader for new uranium recovery facilities, Stephen Cohen, stated that the meeting was open to the public and that members of the public would be allowed to ask questions or make comments at the end of the meeting. Several members of the public listened in on the conference call.

The NRC staff discussed the status of its review, indicating that this meeting addresses several miscellaneous and radiological sections of the draft SER. The staff is in the process of finalizing the draft SER.

The open issues were then discussed.

Enclosure

MISCELLANEOUS ISSUES

A summary of the issues identified and EMC's responses is presented below.

1. Adequacy of monitoring well ring.

This issue was discussed during the July 27, 2009 public meeting and was mistakenly included on this agenda. This open issue was not discussed during this public meeting.

2. Qualifications of non-RSO personnel to conduct inspections.

This issue was discussed during the July 27, 2009 public meeting and was mistakenly included on this agenda. This open issue was not discussed during this public meeting.

3. Qualification of QA personnel.

This issue was discussed during the July 27, 2009 public meeting and was mistakenly included on this agenda. This open issue was not discussed during this public meeting.

4. Procedure for updating monitoring plan.

The applicant stated that monitoring procedures have been established for the sampling and process design at WY ISR sites. It stated that the site specific environmental monitoring plan defined in the application describes the sample location and sampling frequency and types of analysis. The applicant stated that the environmental monitoring plan would be reviewed every five years and updated as necessary. NRC staff concurs that non-radiological environmental monitoring to be conducted at Moore Ranch has been sufficiently described in the application. However, the applicant did not state that updates to the monitoring plan will be made by license amendment or through the SERP Process.

EMC understands this issue and will address it.

5. Discussion of standard procedures for sampling.

The applicant stated that sampling methods will follow procedures based on nationally recognized consensus standards such as EPA methods, American Society for Testing and Materials Standards, or instrument manufacturer recommended procedures. The Senior Environmental Specialist (SES) will be responsible for ensuring that field measurements and samples are properly documented, occur at the prescribed frequency and location, and are obtained in compliance with procedures and requirements specified. The applicant reported that any deviation from these procedures would have to be approved by the SES before the start of work. The applicant did not state how standard procedures would be selected, maintained on site, provided to the employees, or revised.

EMC understands this issue and will address it.

6. Lack of discussion of decontamination of sample containers and equipment.

The applicant described the preparation and decontamination requirements for the sampling equipment. This included a brief discussion of requirements for sample containers, preservation, and holding times. No description of in-house cleaning of sampling equipment, sample containers, or other instruments was provided. Please discuss the above procedures to prevent cross-contamination of samples

EMC understands this issue and will address it.

7. Site specific records management plan.

The applicant stated that documentation and records will be specified, prepared, reviewed, approved, and maintained under a site-specific records management plan. Procedures for document control and changes, corrections to documents, document updates and revisions, field documentation, laboratory documentation and reports received from subcontractors were presented. The SES will be responsible for ensuring that all documentation and records are appropriately identified and maintained. Modifications to the site-specific records plan must be submitted and approved by the SES. The applicant did not provide the site-specific records management plan to enable NRC to evaluate where or how long records will be maintained.

EMC indicated that this information may be provided in Section 5 of the application. EMC will address this issue.

8. Discussion of functions of onsite and subcontract labs and their QA programs.

The applicant provided procedures for receipt of samples at the subcontract analytical laboratory. It stated that upon receipt, the lab will be responsible for the care, custody, archiving, and disposal of samples. It stated that any laboratory that analyzes samples will have a written QA/QC program that ensures reliability and validity of all analyses. It stated that subcontracted laboratories will be required to pass appropriate audits or be certified. In the plan, the applicant did not distinguish between the on-site laboratory or subcontractor laboratory. NRC staff, therefore, could not assess if these terms were synonymous. Please describe the function of the on-site laboratory and subcontract laboratory and state if the QA/QC and accreditation at the onsite laboratory would be the same as the subcontract laboratory.

EMC will address this issue.

9. Discussion of corrective action program integrating QA components.

The applicant has not discussed or demonstrated a corrective action program at the site that integrates components of the Quality Assurance program. The staff cannot determine if the applicant will adequately identify deficiencies and take corrective action.

EMC will address this issue.

RADIOLOGICAL ISSUES

1. Proposed in-plant locations of airborne particulate and radon daughter monitoring.

The applicant stated that the proposed locations of airborne particulate and radon daughter samples are depicted in Figure 5.7-1 of the Technical Report. The applicant provided a page with a title but no map or figures showing the proposed locations of airborne particulate and radon daughter sampling. The staff, therefore, cannot determine if the applicant has properly located the airborne particulate and radon daughter sampling stations in the facility in accordance with Regulatory Guide 8.25.

EMC indicated that it will provide the figure.

2. Frequency of air sampling in airborne radioactivity areas.

The applicant stated that air samples will be obtained using area samplers on a monthly frequency. Regulatory Guide 8.30 discusses weekly air sampling in airborne radioactivity areas. The applicant stated that the yellowcake packaging area will be closed and posted as an airborne radioactivity area during packaging. The applicant's proposed air sampling frequency is not consistent with Regulatory Guide 8.30, for this airborne radioactivity area.

EMC understands this issue and will provide additional detail.

3. Action level for uranium or other radionuclides based on gross alpha counting of air filters.

The applicant indicated that the measurement of airborne uranium will be performed by gross alpha counting of the air filters for uranium air particulates. The applicant has not provided justification that the air filters will contain only uranium or explained how it will evaluate a mixture of radionuclides including uranium. The staff notes that Ra-226 and Th-230 may also be present in the air, and thus, a mixture of radionuclides may be present on the air filters. Gross alpha counting of the air filters will not be able to differentiate specific radionuclides. Consequently, the applicant may not be able to accurately determine if the action level for uranium or other radionuclides, such as Ra-226 and Th-230, has been reached by relying on gross alpha counting of the air filters.

EMC acknowledged this issue.

4. Instrument detection levels within 10 percent of DAC value for uranium and radon in air.

The applicant stated that the sample volume will be adequate to achieve the lower limits of detection (LLD) for uranium in air. However, the applicant did not define the lower limit of detection for uranium.

The applicant has stated that the predominant radionuclide in the air will be Rn-222, and that radon samples will be analyzed on an alpha scaler using the modified Kusnetz method. The applicant did not discuss the lower limit of detection (LLD) for the alpha scaler used to measure radon samples. Regulatory Guide 8.30 recommends that the quantity of the air sampled and

the method of analysis should be 10 percent of 10 CFR 20 Appendix B limit. The staff cannot determine if the instrument can detect within 10 percent of the DAC value for uranium and radon.

EMC acknowledged the issue.

5. Selection of action level for soluble natural uranium.

This is similar to the issue that was discussed during the July 27 conference call. The applicant set an action level of 25 percent of the DAC for soluble natural uranium. The applicant stated that the DAC for soluble (inhalation class "D") natural uranium is 5 E-10 uCi/ml. The applicant further stated that gross alpha counting will be conducted for air particulate sampling. The applicant has not demonstrated that the activity on air samples is attributed solely to uranium and that the inhalation class of the uranium is inhalation class "D." The applicant has not demonstrated the most conservative DAC that will be used for establishing action levels.

EMC acknowledged the issue.

6. Identification of employees by work classification who will receive more than 10 percent of the allowable occupational dose limit.

The applicant stated that routine employee external exposures will be determined and recorded for those employees likely to receive more than 10 percent of the allowable occupational dose limit. 10 CFR 20.1502(a)(1) states that each licensee shall monitor occupational exposure to radiation sources under the control of the licensee and shall supply and require the use of individual monitoring devices by adults likely to receive in one year from sources external to the body, a dose in excess of 10 percent of the limits in 10 CFR 20.1201(a). The applicant has not defined those employees by work classification that will receive more than 10 percent of the allowable occupational dose limit.

EMC acknowledged the issue. EMC indicated that they will probably badge most individuals when operations start and will likely evaluate occupational doses at that time.

7. Review of external radiation monitoring program to ensure that unmonitored workers do not exceed 10 percent of the dose limits.

The applicant stated that occupational exposure to external gamma and beta radiation will be measured using personnel dosimeters such as Thermoluminescent Dosimeters (TLDs) or Optically Stimulated Luminescence (OSL) dosimeters. The occupational exposure to external radiation will be used to determine the Total Effective Dose Equivalent (TEDE) for employees whose work locations or functions may exceed 10 percent of the occupational exposure limits. The applicant stated that the Radiation Safety Officer (RSO) will use historical and current monitoring and survey data to ensure that external radiation exposures are less than 10 percent of the occupational dose limit for all unmonitored workers. The results of the external radiation monitoring program will be recorded and reviewed annually by the RSO to ensure that unmonitored employees have not exceeded 10 percent of the dose limits. The staff notes that unmonitored employees may receive in excess of 10 percent of the dose limits prior to the annual review.

EMC acknowledged the issue and will address the frequency of the review.

8. Monitoring and recordkeeping related to soluble uranium intake by an individual, which is limited to 10 milligrams in a week.

The staff notes that 10 CFR 20.1201(e) states that in addition to the annual dose limits, the licensee shall limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity. The applicant has not described how it will monitor and keep records of this requirement.

EMC acknowledged this issue and identified a potential resolution based on DAC-hours per employee being converted to a mass intake. EMC will address this issue.

9. Occupational exposure record and determination of actual scheduled time.

The applicant stated that intakes will be totaled and entered onto each employee's Occupational Exposure Record. Reporting and recordkeeping will be consistent with Regulatory Guide 8.7. The applicant stated that each classification of workers will be assumed to have spent their entire work shift in the survey area(s). The applicant stated that occupancy time determinations will be based on the actual scheduled time in the restricted area for each occupational group. The staff cannot determine what is meant by the term "actual scheduled time," and the staff cannot determine how the applicant will address the occupancy time if the actual time is greater than the scheduled time.

EMC acknowledged the issue and will address it.

10. Identification of all radionuclides and concentrations that may exist in air and determination of the dose from this mixture.

The applicant did not appear to address the possibility of other radionuclides that may be present in air concentrations. According to 10 CFR 20.1204(f), if the identity of each radionuclide in a mixture is known, but the concentration of one or more of the radionuclides in the mixture is not know, the DAC for the mixture must be the most restrictive DAC of any radionuclide in the mixture. The applicant must identify all radionuclides and concentrations that may exist in air and determine the dose from this mixture. The staff notes that this is similar to the DAC issue discussed during the July 27, 2009 phone call; however, the applicant should note that selection and justification of the appropriate DAC needs to be consistent throughout the application.

EMC acknowledged the issue and will address it.

11. Providing information related to prenatal/fetal dose to pregnant women.

The applicant did not discuss how they will provide information to pregnant women, and other personnel, to help make decisions regarding radiation exposure during pregnancy.

EMC acknowledged the issue and will address it.

11A. Reporting requirements under 10 CFR Part 20.

According to 10 CFR 20.2205, "When a licensee is required by §§20.2203 or 20.2204 to report to the Commission any exposure of an identified occupationally exposed individual, or unidentified member of the public, to radiation or radioactive material, the licensee shall also provide the individual a report on his or her exposure data included in the report to Commission. This report must be transmitted no later than the transmittal to the Commission." The applicant has not demonstrated that such a report will be transmitted to the individual or the Commission, or explain why such a report will not be transmitted to the individual and/or the Commission.

EMC acknowledged the issue and will address it.

12. Effluent monitoring program for airborne particulates and gaseous effluents.

The applicant stated that the yellowcake drying facilities will be comprised of vacuum dryers, and by design, the vacuum dryers will not discharge any uranium when operating. The applicant, however, did not provide any data or information to substantiate the statement that the vacuum dryers will not discharge any uranium when operating. The applicant has not identified the release point of the discharge of air from the vacuum dryer and packaging system, so the NRC staff can not evaluate the effluent monitoring program for airborne particulates and gaseous effluents.

EMC acknowledged this issue.

13. Location of boundary air particulate samplers and impacts on proposed operational air particulate and direct radiation sampling locations.

The applicant shows the air particulate and radon sampling locations in Figure 5.7-2, however, the applicant does not identify these air particulate and radon sampling locations by sector or distance. The applicant has not provided sufficient information demonstrating that the three site boundary air particulate and radon sampling stations have been placed in locations and sectors that have the highest predicted concentrations of airborne particulate that is consistent with Regulatory Guide 4.14. The staff notes that the location of the air particulate and radon sampling locations may have an impact on the proposed soil sampling locations.

EMC acknowledged the issue and indicated this may have been discussed in Section 2.9 of the application. EMC indicated that a previous version of Figure 5.7-2 was included in the RAI response.

14. Location of radon monitoring stations in relation to air particulate stations.

The applicant identified MR-1 as the control location in the RAI responses. The staff notes that MR-1 is not co-located with MRA-4. The applicant has not provided sufficient justification for separating the location of the radon and air particulate stations.

EMC acknowledged this issue.

15. Sediment sampling during operations.

Regulatory Guide 4.14, Table 2, suggests that sediment sampling be conducted as an annual grab sample in one or two of the surface water sampling locations from each water body. The sediment samples should be analyzed for natural uranium, Th-230, Ra-226, and Pb-210. The applicant has not discussed sediment sampling during operations.

EMC recognized this omission from the application.

16. Operational sampling for food, fish, and vegetation sampling.

The applicant has not provided sufficient justification for not conducting food or fish sampling in the application. The staff notes that the applicant has not provided any calculations to support the position that the vegetation pathway is not a potentially significant exposure pathway and an individual would not exceed 5 percent of the applicable radiation protection standards. The MILDOS analysis does not include a food/vegetation dose pathway analysis for the east sector at a distance of 1.5 km. The staff cannot verify that the assumptions used in the MILDOS analysis are representative of the anticipated conditions at the facility.

EMC acknowledged this issue.

17. Gamma levels and cleanup criteria.

The applicant plans to use hand-held and GPS-based gamma surveys to guide soil remediation efforts. The applicant will monitor excavations with hand-held detection systems to guide the removal of contaminated material to the point where the applicant can determine that there is a high probability that an area meets the cleanup criteria. The applicant has not defined what gamma level will correspond to the cleanup criteria. Although the applicant identified a correlation between gamma readings and Ra-226 concentrations in soil in Section 2.9.2.2.3 of the Technical Report, the applicant has not demonstrated how the gamma level will correlate to the uranium or other radionuclides that may be present.

EMC acknowledged this issue.

18. Definition of potentially contaminated areas.

The applicant states that cleanup of surface soils will be restricted to a few areas where there are known spills and, potentially, small spills near wellheads. The applicant will conduct final GPS-based gamma surveys in potentially contaminated areas; however, the applicant does not define potentially contaminated areas.

EMC acknowledged this issue and will respond.

19. Gamma action limits and relation to preoperational gamma survey and preoperational environmental monitoring.

The applicant states that pre-reclamation surveys will be conducted, as described in Section 6.2.1 of the Technical Report, in areas where known contamination has occurred or the

potential for unknown soil contamination exists. The applicant plans to divide areas into 100 m^2 grid blocks. Soil samples will be obtained from these grid blocks with gamma count rates exceeding the gamma action limit. The applicant does not define the gamma action limits or explain the relationship between the gamma count rates obtained during the surface soil cleanup verification and the preoperational gamma survey and preoperational environmental monitoring conducted prior to construction. The applicant has not provided assurance that the survey method for verification of soil cleanup is designed to provide 95 percent assurance that the soil units meet the cleanup guidelines.

EMC acknowledged this issue.

20. Application of radium benchmark dose on remaining structures.

According to 10 CFR 40 Appendix A, Criterion 6(6), it states, "Byproduct material containing concentrations of radionuclides other than radium in soil, and surface activity on remaining structures, must not result in a total effective dose equivalent (TEDE) exceeding the dose from cleanup of radium contaminated soil to the above standard (benchmark dose), and must be at levels which are as low as is reasonably achievable." In Section 6.3 of the Technical Report, the applicant states that based on the results of the preliminary radiological surveys, gross decontamination techniques will be employed to remove loose contamination before decommissioning activities proceed. The applicant also discusses in Section 6.3 of the Technical Report the release limits for alpha contamination. However, the applicant does not discuss how byproduct material containing concentrations of radionuclides other than radium in soil, and surface activity on remaining structures will not result in a total effective dose equivalent (TEDE) exceeding the dose from cleanup of the radium contaminated soil to the above standard (benchmark dose) and will be at levels which are as low as is reasonably achievable (ALARA).

EMC acknowledged this issue.

One item was mistakenly omitted from the meeting agenda. This item is included below as issue 21.

21. Alternate disposal of byproduct material.

In addition to requiring a permit from Wyoming, to dispose of liquid wastes in deep wells, EMC must also show compliance with NRC regulations for the alternate disposal of byproduct material. The appropriate requirements are found in 10 CFR 20.2002. EMC has not provided sufficient information demonstrating that it will meet those requirements. Specifically, EMC has not discussed compliance with 20.2002(d) which requires analysis and procedures to ensure that doses are maintained ALARA and within the dose limits of 10 CFR part 20.

After covering the items on the agenda, the NRC staff opened the meeting to questions from the public. There was one question from the public which related to the role of Occupational Safety and Health Administration (OSHA) for protection of workers at ISR facilities. ISR facilities are subject to OSHA regulations and the NRC has a memorandum of understanding (MOU) with OSHA regarding occupational safety at licensed facilities. According to the MOU, NRC personnel may identify safety concerns within OSHA's responsibilities and can bring these concerns to licensee management or NRC management when appropriate.

MEETING AGENDA
Uranium One/Moore Ranch ISR
August 18, 2009

MEETING PURPOSE: Teleconference to Discuss Radiological and Miscellaneous Issues Relating to Moore Ranch ISR License Application.

MEETING PROCESS:

Time	Topic	Lead
10:00 a.m.	Introductions	All
	Discussion of Miscellaneous issues (list of issues attached)	All
	Discussion of Radiological Issues (list of issues attached)	All
	Summary of Action Items	Moderator
	Public Comment/Questions	Moderator
12:00 p.m.	Adjourn	

Miscellaneous Issues
Uranium One/Moore Ranch ISR
August 18, 2009

1. Adequacy of monitoring well ring.
2. Qualifications of non-RSO personnel to conduct inspections.
3. Qualification of QA personnel.
4. Procedure for updating monitoring plan.
5. Discussion of standard procedures for sampling.
6. Lack of discussion of decontamination of sample containers and equipment.
7. Site specific records management plan.
8. Discussion of functions of onsite and subcontract labs and their QA programs.
9. Discussion of corrective action program integrating QA components.

Radiological Issues
Uranium One/Moore Ranch ISR
August 18, 2009

1. Proposed in-plant locations of airborne particulate and radon daughter monitoring.

2. Frequency of air sampling in airborne radioactivity areas.

3. Action level for uranium or other radionuclides based on gross alpha counting of air filters.

4. Instrument detection levels within 10 percent of DAC value for uranium and radon in air.

5. Selection of action level for soluble natural uranium.

6. Identification of employees by work classification who will receive more than 10 percent of the allowable occupational dose limit.

7. Review of external radiation monitoring program to ensure that unmonitored workers do not exceed 10 percent of the dose limits.

8. Monitoring and recordkeeping related to soluble uranium intake by an individual, which is limited to 10 milligrams in a week.

9. Occupational exposure record and determination of actual scheduled time.

10. Identification of all radionuclides and concentrations that may exist in air and determination of the dose from this mixture.

11. Providing information related to prenatal/fetal dose to pregnant women.

12. Effluent monitoring program for airborne particulates and gaseous effluents.

13. Location of boundary air particulate samplers and impacts on proposed operational air particulate and direct radiation sampling locations.

14. Location of radon monitoring stations in relation to air particulate stations.

15. Sediment sampling during operations.

16. Operational sampling for food, fish, and vegetation sampling.

17. Gamma levels and cleanup criteria.

18. Definition of potentially contaminated areas.

19. Gamma action limits and relation to preoperational gamma survey and preoperational environmental monitoring.

20. Application of radium benchmark dose on remaining structures.