



April 20, 2015

Mr. Ken Kalman
Project Manager
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2738

Re: Docket No. 70-925; License No. SNM-928
March 11, 2015 Meeting Notes - U-235 Possession Limit

Dear Mr. Kalman:

Attached please find meeting notes documenting a meeting between NRC and the Oklahoma Department of Environmental Quality (DEQ) the afternoon of March 11, 2015. The purpose of the meeting was to discuss NRC's review of a December 16, 2014 submittal by Environmental Properties Management LLC (EPM), prepared by Enercon Services Inc. (Enercon).

The paper discussed regulatory and technical issues related to a potential license amendment request, which would involve converting the existing mass possession limit for uranium-235 to a concentration limit.

These notes were drafted by EPM and revised in accordance with your comments.

Sincerely,

A handwritten signature in black ink that reads "Jeff Lux".

Jeff Lux, P.E.
Project Manager

Attachment

cc: David Cates, DEQ
Gerald Schlapper, NRC Region IV

Cimarron Environmental Response Trust
U-235 Concentration Limit Paper
Meeting Notes
March 11, 2015

Environmental Properties Management LLC, Trustee for the Cimarron Environmental Response Trust, with Enercon Services, Inc., met with NRC and the Oklahoma Department of Environmental Quality (DEQ) the afternoon of March 11, 2015, at NRC headquarters. The purpose of the meeting was to discuss NRC comments on *Discussion and Justification of Need for an Application for License Amendment*, submitted to NRC on December 16, 2014. A brief description of the topics covered follows, and a copy of the presentation slides are attached to this meeting summary.

Attendees included:

US NRC

Ken Kalman
Varughese Kurian
Gerald Schlapper
Chris Tripp
Tom Nicholson
Chris McKenney

ODEQ

David Cates
Paul Davis
Kate Deaton

EPM

Jeff Lux

Enercon Services

Gerald Williams
Joe Nardi
Curt Lindner

Members of the Public

Ruth Thomas
Marvin Lewis

Background

Mr. Lux stated that the possession limit for U-235 stipulated in license SNM-928 represents a significant constraint on the ability to conduct the groundwater remediation that will be required to complete the decommissioning of the Cimarron site. An enrichment of 2% has been observed in groundwater for which remediation is required, but the area within which groundwater remediation is required exceeds 200 acres. Either large flow rates (hundreds of gallons per minute) or an extremely long duration (decades) will be required to remediate site groundwater.

Removal of uranium from groundwater by ion exchange is the most practical method for remediating groundwater at the Cimarron site. Large flow rates necessitate large resin beds to extract uranium from groundwater, and the existing possession limit of 1,200 grams of U-235 would be exceeded long before the resin adsorbed its capacity of uranium. This would result in the disposal of large quantities of resin as low level radioactive waste, even though it would contain only a small fraction of its capacity of uranium.

Consequently, Enercon Services was retained to conduct an evaluation of the regulatory and technical issues that may require consideration to if a request to amend the license is submitted to NRC to provide a concentration limit rather than a mass possession limit for U-235. EPM also

March 11, 2015 Meeting on U-235 Possession Limit
Meeting Notes

requested Enercon to identify precedents in other special nuclear materials licenses that should be considered in submitting such a license amendment request.

License Amendment Overview

Enercon identified 1 gram of U-235 per 2 kilograms of non-fissile material as the fissile exempt criteria for special nuclear material. This is the criterion established in 10 CFR 71.15, which allows a licensee to transport to a disposal facility material containing U-235 below this criterion in a Type A container (e.g., 55-gallon drum or B-25 container).

Enercon presented calculations based on 80,000 mg uranium per kilogram resin (1/2 of the concentration identified in recent site-specific treatability tests). A 168 ft³ resin bed would be used for a 150 - 200 gpm flow rate; it would contain 8,400 grams of U-235 (at 2% enrichment). A 68 ft³ resin bed would be used for a 50 - 75 gpm flow rate; it would contain 3,400 grams of U-235 (at 2% enrichment). Saturating the resin would yield twice those masses.

Enercon presented two potential license conditions with concentration limits. One condition would impose the fissile exempt concentration for material to be shipped for disposal. The second condition would impose a concentration limit for uranium adsorbed onto resin.

Applicable regulatory requirements that were identified in the paper were:

- Nuclear criticality monitoring.
- Physical security.
- Material control and accountability.
- Emergency planning.
- Enhanced security for nuclear facilities.

Enercon also presented similar amendments for other licensees:

- Windsor, CT soil remediation project.
- Clive, UT disposal site.
- Andrews, TX disposal site.

Controls to be Incorporated in the Design

The intent was to discuss controls to be incorporated into the remediation design, including:

- Describing the loading capacity of the resin based on tests conducted to maximize uranium adsorption.
- The use of mass balance calculations to ensure that the uranium concentration for each resin bed would be monitored.
- The use of radiation detection instrumentation to monitor the distribution of uranium within resin beds.
- Sampling and analysis of spent resin to monitor uranium concentrations.

NRC staff reviewed the nuclear criticality safety analysis which followed the discussion on controls.

Nuclear Criticality Safety Analysis

NRC staff stated that the nuclear criticality safety analysis (NCSA) did not contain sufficient information to constitute a sufficiently complete analysis that could be critically reviewed. Until this deficiency is addressed, the NRC staff is holding off on its review. NRC's comments on the submittal were summarized as:

- An acceptable basis needs to be provided for the exclusion from 10 CFR 70.24, Criticality Accident Requirements. It is not enough to say that criticality is not feasible based on having an NCSA. The standard is to have both criticality controls based on an NCSA and a criticality alarm system.
- The NCSA that has been submitted is stated as being preliminary. The stated reason is that the final design is not sufficiently complete to do a final detailed analysis. However, this is needed to support any amendment.
- The preliminary NCSA does not contain many of the elements expected in a criticality analysis. This document appears to be a study based on a calculation, but not a full-blown NCSA. The missing elements include:
 - A description of the processes involved in operation of the ion exchange system.
 - A discussion of upset conditions or demonstration of double contingency.
 - Parametric studies to show that the most reactive credible conditions have been modeled, and that assumptions are bounding.
 - A list of controls on concentration and any other controlled parameters.
 - Information on the validation of the calculation methods used, including demonstrating the calculations are within the validated area of applicability.

Your submittal acknowledges that its ion exchange system would increase the uranium concentration, and the NCSA indicates a concentration factor of 1.5 would be sufficient to exceed the Upper Subcritical Limit (USL). Previous analyses mentioned in support of the amendment request (e.g., NUREG/CR-6505) conclude that much higher concentration factors are credible. Therefore, this point needs to be addressed up front.

It was concluded that an NCSA and corresponding license amendment request will not be submitted until a license amendment request containing both the groundwater remediation design is submitted. That design will contain sufficient information regarding the water treatment process and adsorption capacity of the resin, that the issues identified by NRC can be addressed in more detail.

Questions and Answers

Questions were received from members of the public attending the meeting. Questions focused on:

- The enrichment of the uranium
- The source of funding for the remaining decommissioning activities
- The source of information to the public

Conclusion

In response to NRC's comments, EPM will develop the aforementioned license amendment request. EPM anticipates submitting this request by December 31, 2015.