

January 26, 2005

Mr. Lawrence J. Corte  
Western Nuclear, Inc.  
2801 Youngfield Street, Suite 340  
Golden, CO 80401

SUBJECT: SUPPLEMENTAL REQUEST FOR ADDITIONAL INFORMATION (RAI), SPLIT  
ROCK SITE, JEFFREY CITY, WYOMING: MODIFICATIONS TO  
GROUNDWATER AND SURFACE MONITORING PROGRAM (TAC LU0044)

Dear Mr. Corte:

By letter dated May 24, 2004, Western Nuclear, Inc. (WNI), submitted a request to amend License Conditions 24 and 74 of its Source Materials license SUA-56. Requested amendments included modifying the compliance monitoring network by reducing the number of monitoring wells, reducing the number of parameters to be analyzed, reducing sampling frequencies, and increasing the number of surface water samples.

By letter dated November 10, 2004, the NRC forwarded a Request for Additional Information (RAI) containing questions and comments regarding the number of wells in the proposed network, sampling frequencies, and mapping information. During the week of December 6, 2004, WNI raised specific issues with NRC's comments and requested clarification of the RAI. WNI and the NRC discussed the issues, in general, via a teleconference on December 16, 2004, and in greater detail via a teleconference on December 20, 2004. The NRC is issuing this supplemental RAI that discusses the data obtained during these teleconferences and presents the requested clarifications.

As you know, the May 24, 2004, license amendment request was submitted to the NRC during an ongoing review of WNI's application for Alternate Concentration Limits (ACLs). Consequently, questions and comments presented in the November 10, 2004, RAI reflect an understanding that the proposed monitoring network would ultimately become the compliance monitoring network under the ACL monitoring program, if that request is approved. Considering the current ACL application status, requesting license amendments to the surface water and ground water monitoring programs at this point in time is somewhat premature. The NRC, however, reviewed the requested amendments accordingly and raised issues that otherwise would have been raised during the ACL review. Comments and questions in the November RAI were based on the general premise that ACL programs rely upon natural systems to contain and attenuate contamination *in-lieu* of active remediation. Therefore, more comprehensive ground water monitoring is desired to ensure public health, safety, and environmental protection.

If you have any questions regarding this letter or the NRC staff review, please contact the Project Manager, William von Till, at (301) 415-6251 or by e-mail at [rwv@nrc.gov](mailto:rwv@nrc.gov). By this letter, we are

closing our current tracking number (TAC LU0044) and will open a new TAC number when we receive your response. WNI should only respond to this supplemental RAI. The November 10, 2004, RAI may be referred to for our original comments and associated regulatory justifications.

In accordance with 10 CFR 2.390 of the NRC's Rules of Practice, a copy of this letter will be available electronically from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Please note that on October 25, 2004, the NRC suspended public access to ADAMS, and initiated an additional security review of publicly available documents to ensure that potentially sensitive information is removed from the ADAMS database accessible through the NRC's web site. Interested members of the public may obtain copies of the referenced documents for review and/or copying by contacting the Public Document Room pending resumption of public access to ADAMS. The NRC Public Document Room is located at NRC Headquarters in Rockville, MD, and can be contacted at 800-397-4209 or 301-415-4737 or [pdr@nrc.gov](mailto:pdr@nrc.gov).

Sincerely,

/RA/

Gary S. Janosko, Chief  
Fuel Cycle Facilities Branch  
Division of Fuel Cycle Safety  
and Safeguards  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 40-1162  
License No.: SUA-56

Enclosure: Supplemental Request for Additional Information

cc: Mark Thiesse, Wyoming DEQ  
J. Wagner, WDEQ  
Art Klienrath, DOE  
Nicol M. Thompson, Esq.  
Heather Jacobson, Esq.  
Earl and Wallace Jamerman

L. Corte

2

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Sincerely,

**/RA/**

Gary S. Janosko, Chief  
Fuel Cycle Facilities Branch  
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**Close TAC LU0044**

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ENCLOSURE

**WESTERN NUCLEAR, INC.**  
**SPLIT ROCK SITE, JEFFREY CITY, WYOMING**  
**SOURCE MATERIALS LICENSE SUA-56**  
**SUPPLEMENTAL REQUEST FOR ADDITIONAL INFORMATION**

This supplemental Request for Additional Information (RAI) presents comment clarifications and additional information provided by WNI during teleconferences of December 16 and 20, 2004. Clarifications and additional information are organized according to the same comment number sequence presented in the November 10, 2004, RAI.

**1. PROPOSED MONITORING NETWORK**

**Comment No. 1A.** In the November RAI, the NRC requested two additional wells in the area of SWAB-31 because we believed that the uranium contaminant plume was in the vicinity of SWAB-29. The NRC based this understanding on ground water data and an isoconcentration map presented in the document, "Site Ground Water Characterization and Evaluation, Volume 1 of 1" (SGWC) dated 1999, and data from the "Supplemental Data Collection Program Trip Report," dated May 2002. Table 1 presents uranium contamination data obtained from SWAB-29 from 1996, 1997, and 2002.

**Table 1**  
**SWAB-29 Uranium Concentrations**

<b>Date</b>	<b>U Concentration (mg/l)</b>
8/15/96	0.124
8/29/96	0.132
10/21/96	0.1336
9/11/97	0.10
11/3/97	0.124
2/7/02	0.018

A review of Table 1 indicates that uranium concentrations in 1996 and 1997 were consistently equal to or greater than 0.10 mg/l. However, one data point 5 years later exhibited an order of magnitude drop in uranium concentrations. Because we have no data for the period between 1997 and 2002, the NRC cannot determine if concentrations actually decreased or if the 2002 result is an anomaly caused by natural heterogeneity of ground water contaminant plumes.

During the December 20, 2004, teleconference, WNI stated that the NRC-concurred ground water model from 2002 indicates that uranium ground water contamination would not impact the Red Mule subdivision for approximately 500 years; therefore, no imminent threat exists to this community. Model results notwithstanding, the NRC's request for additional wells in the area of SWAB-31 is reasonable protection under an alternate concentration limit (ACL) program in the event that the model proves incorrect or hydrogeologic conditions change. WNI has also supported the use of such wells because a sentinel was included as part of the alternate water supply alternative described in the SGWC.

**Comment No. 1B.** In the November RAI, the NRC requested additional monitoring wells north of the hydraulic divide. During the December 20, 2004, teleconference, WNI explained that no wells were proposed in this area because uranium contamination remains within close proximity to the exposed granite formations, as supported by the lack of ground water contamination found in WN-16 and Well 27. In addition, the data from wells in this area would not provide any new information. The NRC's intent of this comment was to request an additional well within the plume (near WN-24 or Well 3), as well as outside the plume boundary (near WN-16 or Well 27). A well inside the plume would serve to track ground water pollution emanating from the southwest valley, and one outside the plume would serve to bound the plume and protect potential receptors should hydrogeologic conditions change. While no contamination has been detected in WN-16 and Well 27, under an ACL scenario where active remediation ceases, monitoring beyond the current limits of a contaminant plume is important to allow the NRC to ensure that public health is being protected. Therefore, the NRC requests the addition of both of these wells under a new ACL monitoring program.

**Comment No. 1C.** In the November RAI, the NRC questioned why Well 4R was being removed from the monitoring network. During the December 20, 2004, teleconference, WNI stated that its recommendation for eliminating Well 4R and utilizing Well 5 is based on a zone of contamination between Wells 4R and 5. WNI directed the NRC to information in the SGWC that stated hazardous constituents from tailings seepage have become associated with aquifer solids that will slowly remobilize over time. WNI reasons that this seepage area is a source term, and Well 5 is downgradient of this source while Well 4R is not. The NRC reviewed this information and agrees with WNI that Well 4R does not monitor contamination from all sources. However, this well provides valuable information regarding the water quality immediately downstream of the former tailings impoundments. Well 4R should, therefore, remain in the current monitoring network until the ACL application is approved.

**Comment No. 1D.** In the November RAI, the NRC questioned why Well 1 was not being considered for the proposed monitoring network. On December 21, 2004, WNI provided the NRC additional information from a tailings reclamation plan, dated February 1994, that indicates Well 1 is within an area to be covered by the future corrective action evaporation ponds cap. As such, the NRC agrees that Well 1 may be excluded from the future ACL monitoring network. However, Well 1 currently provides valuable information regarding contamination emanating from the former tailings impoundments. Therefore, WNI should continue sampling from Well 1 until WNI's ACL application is approved.

**Comment No. 1E.** In the November RAI, NRC requested that WNI move Surface Water A to within an adjacent meander that appeared to be a significant ground water contaminant discharge point. The NRC based this comment on a uranium plume map from the SGWC that indicated that uranium contamination appeared to preferentially discharge in the meander near Surface Water A. WNI stated that it did not believe that contaminant discharge was concentrated to the degree represented on the aforementioned uranium plume map. However, it agreed to move Surface Water A, as requested by NRC.

**Comment No. 1F.** In the November RAI, the NRC stated that uranium contamination appeared to be migrating northwest for the following reasons. The 0.1 mg/l contour on the June 2004 uranium plume map indicated that the plume was approximately 1,500 feet west of the 0.1 mg/l

contour depicted on the 1996/97 plume map contained in the SGWC. Hydrogeologic cross-sections A-B (Figure 15) and A-C (Figure 16) in the SGWC also showed ground water gradients trending in a northerly direction indicating that contamination could migrate in a more northerly direction than that represented in the SGWC uranium plume map. Lastly, well WN43A exhibited uranium ground water contamination during drilling. Therefore, at some point in time, conditions existed to allow contamination to migrate in a northerly direction.

WNI explained that the discrepancy between the location of the 0.1 mg/l contour on the SGWC and the June 2004 uranium plume maps was due to an error on the latter uranium plume map. WNI acknowledged that this error gave the appearance that contamination was migrating in a more northerly direction. WNI also acknowledged that a northerly ground water component likely exists. However, WNI stated that no chemical data exists supporting the conclusion that ground water contamination is migrating to the north *in-lieu* of or in addition to east-northeast. After a further review, the NRC agrees with WNI that the current set of monitoring well data appears to support the premise that groundwater contamination is migrating east-northeast. Therefore, a new well is not necessary.

**Comment No. 1G.** In the November RAI, the NRC originally posed the question of whether contamination could migrate across the Sweetwater River. Because hydraulic cross-sections in the SGWC only contained information from south of the river, the NRC found it difficult to determine if such migration could occur. WNI provided additional information that indicated contamination would not likely cross to the north side. Geologic information indicated that the exposed granite formations near Grieve Ranch would likely induce a southerly ground water hydraulic gradient. This appears to be supported by ground and surface water data that shows hydraulic gradients are typically to the south. Furthermore, the NRC agrees that site characterization data indicates that contamination has not migrated under the Sweetwater River to date. However, since a water supply well exists at Grieve Ranch, the NRC requests that a well be added to the monitoring network to provide early warning in the event contamination migrates under the Sweetwater River.

**Comment No. 1H - 1J.** Comments 1H through 1J involve the issue of reducing sampling frequency and number of analytical parameters for either surface water or ground water sampling. In the November RAI, the NRC stated that reducing the frequency and analytical parameters lists for surface and ground water samples was premature. The NRC's position is that sampling as part of an ACL or natural attenuation program should occur more frequently during the beginning phases and gradually reduce according to the data. WNI stated, during the December 20, 2004, teleconference, that the ground water model and analytical data indicate ground water movement and water quality variations occur slowly; therefore, a lower sampling frequency is sufficient. However, the NRC believes that its position is appropriate because more frequent sampling will be more protective of human health and the environment in the event the model is incorrect or hydrogeologic conditions change. Lower sampling frequencies and modified analytical lists could be more appropriate after sufficient data supporting such modifications has been collected. At this time, the NRC would accept semi-annual instead of quarterly sampling. It should be emphasized that this comment is not intended to imply that any residents of Jeffrey City or the Red Mule Subdivision are currently at risk.

## 2. MAPPING

**Comment No. 2A.** WNI agreed to provide the information requested in this comment.

**Comment No. 2B.** In the November RAI, the NRC indicated that the ground water elevation contours in the SGWC and June 2004 supplement did not appear correct near the Sweetwater River. The NRC expressed this concern because ground water contours are typically drawn so the resulting ground water flow direction is perpendicular to the alignment of the stream bed. Furthermore, hydrogeologic cross-sections A-B and A-C indicate that ground water flows toward the river in a perpendicular fashion which contradicts the ground water contour maps.

During the December 20, 2004, teleconference, WNI indicated that a northerly component (toward the river) likely does exist and that the contours may not be drawn accurately near the river. However, WNI maintains that the primary ground water flow direction is preferentially toward the northeast. Furthermore, WNI stated that the strong northeast flow component is the primary contaminant transport mode. WNI stated that they would attempt to draw the ground water contours more accurately near the river in the future.

**Comment No. 2C.** In the November RAI, the NRC requested information regarding the operational status of a downstream diversion dam identified on mapping from the June 2004 supplement. During the December 20, 2004 teleconference, WNI stated that the water diverted by the dam enters a ditch and is ultimately used for Pasture irrigation. WNI further stated that a State of Wyoming study indicates that the tailings impoundment has not impacted water quality in the Sweetwater River. However, WNI stated that it would move surface water C downstream closer to, but upstream of, the diversion dam.

**Comment No. 2D.** WNI agreed to provide the information requested in this comment.