TECHNICAL EVALUATION REPORT FOR
WESTERN NUCLEAR, INC., SPLIT ROCK MILL SITE,
JEFFREY CITY, WY

DOCKET NO.: 40-1162

LICENSE NO.: SUA-56

DATE: February 24, 2010

FACILITY: Western Nuclear, Inc., Split Rock Title II Uranium Recovery Site, WY

TECHNICAL REVIEWERS: Richard Chang, Stephen Cohen

PROJECT MANAGER: Richard Chang

1.0 SUMMARY

On December 1, 2008, Western Nuclear, Inc. (WNI) submitted a request to amend License Condition (LC) 74 (WNI 2008a). Specifically, WNI requested revisions to LC 74B, LC 74D, LC 74F, and LC 74G. This was then supplemented by a February 7, 2009, submittal from WNI (WNI 2009a). WNI also submitted a separate amendment request dated March 9, 2009 (WNI 2009b) to establish standards for constituents that must be monitored but for which there are no associated standards. The U.S. Nuclear Regulatory Commission (NRC) staff sent a request for additional information (RAI) to WNI on April 1, 2009 (NRC 2009a). WNI responded to the RAI on June 16, 2009 (MGC 2009a). This Technical Evaluation Report addresses the license amendment requests from December 1, 2008, and March 9, 2009, because of their similarities.

WNI requested multiple changes to LC 74B. Specifically, it requested that chromium be deleted from the list of constituents having a specific standard and that the groundwater protection standard for selenium be raised from the current value of 0.013 milligrams per liter (mg/L) to the current U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) of 0.05 mg/L for drinking water. NRC staff finds the request to have chromium deleted from the license acceptable because NRC previously approved an acceptable compliance monitoring program that excluded chromium (NRC 2005). The NRC also finds the request for an alternate concentration limit (ACL) for selenium acceptable, in accordance with Criterion 5B(6) of Appendix A, to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 40, because the licensee demonstrated that its requested standard is protective of human health and the environment and is as low as is reasonably achievable (ALARA). In a letter dated March 9, 2009 (WNI 2009b), and an RAI response dated June 16, 2009 (MGC 2009a), WNI requested that standards be added to the license for aluminum (37 mg/L), antimony (0.006 mg/L), arsenic (0.05 mg/L), beryllium (0.01 mg/L), fluoride (4 mg/L), and thallium (0.002 mg/L). For this request, the NRC staff noted that it had previously reviewed and approved standards for these constituents in 2006 (NRC 2006a), but the approved standards were not included in the license. The staff finds this acceptable because the March 9, 2009, requested standards are equal to, or lower than, the standards approved in 2006, and are equal to the criteria in 10 CFR Part 40, Appendix A, Criterion 5B(5), or the EPA MCLs or EPA Risk Based Concentrations (RBCs) (when MCLs are not applicable).

For LC 74D, WNI requested that its groundwater trigger levels for natural uranium be revised from the EPA MCL value of 0.03 mg/L (with the exception of Well SWAB-32) to reflect the site background upper limit values of 0.087 mg/L for the Split Rock aquifer and 0.044 mg/L for the flood-plain aquifer. The background values are based on appropriate methods for determining background as discussed in NUREG-1620. NRC staff finds it acceptable to set the groundwater natural uranium trigger levels to background.

WNI has requested that LC 74F, which pertains to the licensee's corrective action program (CAP), be deleted because its CAP was discontinued in 2006 by License Amendment No. 99 (NRC 2006a). The CAP was discontinued when ACLs for ammonia, manganese, molybdenum, nitrate, radium-226, radium-228 and natural uranium were approved.

The licensee requested that LC 74G be deleted from the license. WNI completed the repair of all erosion protection thin spots on the cover for the corrective action ponds, which was documented in an inspection report (NRC 2008a). Therefore, the staff finds this amendment request acceptable.

2.0 BACKGROUND

2.1 Site History

The Split Rock uranium mill site is located approximately 3.2 kilometers (km) (2 miles (mi)) northeast of the town of Jeffrey City, Wyoming, at the head of two alluvium-filled valleys. The mill was an acid-leach, ion-exchange, and solvent-extraction uranium ore processing mill. Approximately 7 million metric tons (tonnes) (7.7 million short tons (tons)) of uranium ore were processed at the mill between 1957 and 1981. On June 19, 1981, WNI announced that the mill would be placed on standby because of a diminishing demand for the ore and because of depressed uranium prices. The mill remained on standby until 1986, when the license was amended to terminate the use of tailings impoundments for disposal.

2.2 Mill Reclamation Activities

Reclamation of the uranium mill site focused on the following three activities:

(1) reclamation of the tailings disposal area
(2) reclamation of the groundwater CAP ponds
(3) completion of the groundwater remediation

WNI started reclaiming the mill site and tailings impoundment in 1988, and completed these activities in 1998. On May 21, 1999, the NRC staff determined that surface areas outside of the impoundments of the Split Rock site were suitable for unrestricted release (NRC 1999). Reclamation construction activities included decontamination of the mill and placement of the radon barrier and erosion protection layers over the tailings impoundment. WNI submitted a Construction Completion Report (CCR) documenting these activities to the NRC in 1999 (WNI 1999a). The NRC approved these activities on September 20, 2000 (NRC 2000). The groundwater CAP ponds were in operation until 2006 when ACLs were granted for the site (NRC 2006a). A CCR for the reclamation of the CAP ponds was submitted to the NRC on July 10, 2007. The NRC approved that CCR on November 30, 2007 (NRC 2007).

The groundwater CAP involved pumping contaminated groundwater from the northwest (NW) valley and southwest (SW) valley to the CAP ponds for evaporation. The system operated from 1990 until September 2006 when the NRC approved the ACLs for ammonia, manganese, molybdenum, nitrate, radium-226, radium-228, and natural uranium (NRC 2006a).

WNI has established institutional controls (ICs) restricting domestic groundwater use within the long-term surveillance boundary. WNI's use of ICs constituted an alternative to the provisions of Appendix A to 10 CFR Part 40. On December 19, 2002, NRC approved the use of ICs to prevent human exposures to site-derived contaminants for the duration of the 1,000-year performance period. WNI finalized all IC arrangements in January 2006. In addition to the ICs, a groundwater and surface water monitoring network was established to track groundwater contamination and to assess model predictions. The NRC staff also developed trigger values for surface water and groundwater contaminants at the point of exposure (POE). These trigger values would require a licensee response if the values are exceeded.

2.3 Recent Activities

In its review of the WNI surface water and groundwater monitoring report, dated February 5, 2008, the NRC staff noted that the licensee's values for selenium exceeded the groundwater protection standards specified in LC 74B (NRC 2008b). Additionally, in its review of the WNI surface water and groundwater monitoring report, dated July 18, 2008 (WNI 2008b), the NRC staff noted that one of the wells approximately 4,000 feet (ft) upgradient from the POE was reading above the WNI trigger values for uranium (NRC 2008b).

Consequently, on December 1, 2008, the licensee requested that it be granted an ACL for selenium at the point of compliance (POC) wells and that the natural uranium trigger values at the POE be set to aquifer-wide background concentrations rather than the current value, which is equal to the EPA MCL for drinking water. The WNI December 1, 2008, submittal also requests modifications to the license to reflect work that has previously been completed. The staff based its review on the December 1, 2008, submittal (WNI 2008a); the February 7, 2009, supplemental submittal (MGC 2009b); the March 9, 2009, amendment request (WNI 2009b); the WNI response to RAIs dated June 16, 2009 (MGC 2009a); and the WNI site closure plan and the site groundwater characterization and evaluation report (WNI 1999b), which was referenced in the December 1, 2008, submittal.

3.0 TECHNICAL EVALUATION

3.1 Groundwater Hydrology

3.1.1 Hydrogeology

Groundwater flow and transport of site-derived constituents primarily involves the Sweetwater River alluvium aquifer, which is called the flood-plain aquifer, and the Split Rock aquifer. The flood-plain aquifer is a shallow aquifer (4.6 to 9.1 meters (m) (15 to 30 ft) thick) of river sediments that overlies and is hydraulically connected to the Split Rock aquifer. This shallow and highly permeable flood-plain aquifer was formed where the river cut and meandered across the Split Rock Formation, which fills the alluvial basins between the Green Mountain and Crooks Mountain to the south and the Granite Hills.

The Split Rock Formation outcrops in a wedge-shaped pattern that begins west of Sweetwater Station (approximately 32.2 km (20 mi) west of the site) and extends east to the North Platte River (approximately 64.4 km (40 mi) east of the site), covering an area of approximately 3,883 square km (1,500 square mi) (WNI 1999b). Its saturated thickness ranges from 152 to 915 m (500 to 3,000 ft) south of the Sweetwater River and from 61 to 183 m (200 to 600 ft) north of the river. Areas of greatest saturated thicknesses are along the axis of the Split Rock Syncline, directly south of the site. Table 1 summarizes the hydrogeologic characteristics of the aquifers at or near the site.

Table 1 Aquifer Hydrogeologic Characteristics

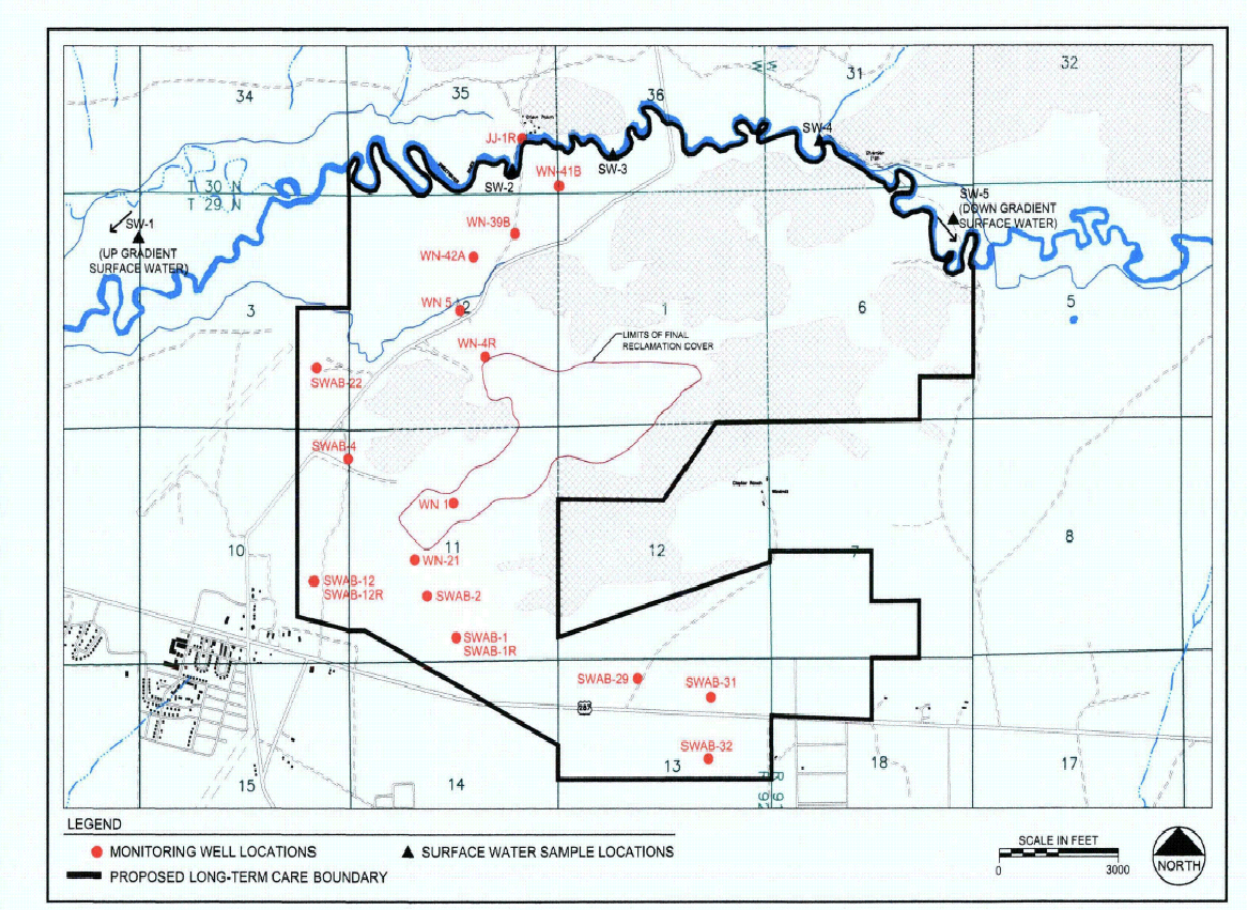
Unit	Transmissivity (m^2/day (ft^2/day))	Storativity	Hydraulic Conductivity (m/day (ft/day))
Upper Split Rock	217 (2,337)	0.021	5.8 (19.0)
Lower Split Rock	107 (1,153)	0.003	2.0 (6.6)
Flood plain	389 (4,185)	0.21	76 (248)
Alluvial deposits	66 (710)	0.005	3.0 (9.8)

Aquifers near the site are recharged from direct precipitation on the valley floor and from precipitation runoff from the surrounding granite hillsides. Approximately 1.5 centimeters (0.6 inches) per year of precipitation infiltrates the valley floor to deep recharge, whereas approximately 15 centimeters (6 inches) per year of runoff from the surrounding granite hillsides recharge the flood-plain aquifer. Drainage of the tailings has also historically added approximately 5,300 L/min (1,400 gal/min) to the site groundwater system. Since the cessation of tailings and water disposal in the tailings impoundments in 1986, tailings drainage and consolidation have greatly diminished, and the elevated groundwater levels beneath the tailings caused by tailings drainage have largely dissipated.

Groundwater at the site flows from high elevations surrounding the main tailings impoundment down the NW and SW valleys and then merges with regional flow. Groundwater exiting the NW valley merges with the northeastward regional flow. Groundwater exiting the SW valley meets the regional flow and diverges into two flowpaths around the granite outcrops—one to the north and one to the southeast. Approximately 80 percent of the SW valley groundwater flows to the south and east around the granite outcrops, whereas the remaining 20 percent flows to the north where it joins the regional flow in the Sweetwater River flood plain.

In the vicinity of the Split Rock site, the regional flow gradient is approximately 0.003 to the east. Areas of structurally high granite beneath the Sweetwater River flood plain cause groundwater to discharge from the Split Rock aquifer into the flood-plain aquifer. A significant lateral constriction in the Split Rock and flood-plain aquifers occurs at the point where the river passes through the granite outcrop at the Three Crossings Diversion Dam. This constriction enhances groundwater discharge from the flood-plain aquifer into the Sweetwater River.

The Sweetwater River is the primary discharge point for the regional groundwater flow, although it acts as a recharge mechanism to the flood-plain aquifer during periods of seasonal high flow, typically from May to August. Near the site, the river is classified as Class 2AB surface waters. Class 2AB waters are those known to support game fish populations or spawning and nursery areas, at least seasonally. Unless shown otherwise, these waters presumably have sufficient quality and quantity to support drinking water supplies and are protected for that use.
Class 2AB waters are also protected for nongame fisheries, fish consumption, aquatic life other than fish, primary contact recreation, wildlife, industry, agriculture, and scenic value uses (Wyoming Department of Environmental Quality 2009).



3.2 Hazards and Exposure Assessments Review

Request to Exclude Chromium from the List of Hazardous Constituents

The NRC staff finds the request to have chromium removed from the list of constituents monitored acceptable because NRC previously approved an acceptable compliance monitoring program that excluded chromium (NRC 2005). However, staff performed a reevaluation of chromium.

Chromium, with one exception, has regularly been well below its background upper limit of 0.05 mg/L (which is the current LC) at onsite monitoring wells (based on a review of groundwater monitoring data from 2000–2005). As noted below, in accordance with Criterion 5B(3) of Appendix A to 10 CFR Part 40, chromium can be excluded from consideration because it appears to be immobilized at the site (WNI 1999c), and is not capable of posing a substantial present or potential hazard to human health or the environment.

The site currently has approved ACLs for ammonia, manganese, molybdenum, nitrate, radium-226, radium-228, and natural uranium and ICs limiting groundwater use at the site (NRC 2006a). The potential that future health risks will occur at the site because of failure to monitor for chromium is minimal, given the existing ICs and given that chromium has not been detected above background values in any wells near the POE or, with the exception of one sample, above background values at wells away from the impoundment. The potential for chromium to result in health risks at the site is low, as the last chromium sample was below the EPA MCL of 0.1 mg/L, and the monitoring wells (from 2000 through 2005) have typically been at less than 10 percent of that value.

The potential damage to wildlife, crops, vegetation, and physical structures is minimal because chromium on site is essentially at or below background levels. The permanence of these effects will also be limited because the site chromium values are essentially at background values.

The potential adverse effect on hydraulically connected surface water quality is minimal because chromium in the groundwater has been measured below the background limit defined in LC 74B for many years. Monitoring wells along the long-term surveillance boundary have trigger limits for ACL constituents that require the licensee to institute actions if the limits are exceeded (NRC 2006a). Because uranium is more mobile than chromium at this site (WNI 1999b), chromium will not likely affect the quality of the surface water and groundwater outside of the long-term surveillance boundary before uranium and the other ACL constituents trigger licensee actions at the site.

Based on the information stated above, in accordance with 10 CFR 40, Appendix A, Criterion 5B(3) and NUREG-1620, Chapter 4, “Protecting Water Resources,” chromium can be excluded from the list of hazardous constituents.

Request for an ACL for Selenium at the POC Wells

The licensee’s request for an ACL for selenium equal to EPA’s MCL in Title 40 of the *Code of Federal Regulations* (40 CFR) 141 at the POC wells meets the standards in Criterion 5B(6) of Appendix A to 10 CFR Part 40. Criterion 5B(6) requires in relevant part that the proposed ACL is ALARA and that the proposed ACL value will not pose a substantial present or future hazard

to human health or the environment as long as the ACL is not exceeded. Specifically, under Criterion 5B(6)(a), staff considered the potential adverse effects on groundwater quality for the requested selenium level of 0.05 mg/L. In addition, under Criterion 5B(6)(b), NRC staff considered the potential adverse effects on hydraulically connected surface water quality.

Criterion 5B(6)(a) requires NRC staff to consider a number of possible impacts on groundwater quality as part of an ACL review. Specifically, the possible impacts to groundwater are discussed in Criterion 5B(6)(a)(i) through Criterion 5B(6)(a)(xi).

Under Criterion 5B(6)(a)(i), the volume and physical and chemical characteristics of the waste at the site, including its potential to migrate were considered. In examining the previously approved ACLs, staff noted that ICs have previously been instituted within the proposed long term surveillance boundary (LTSB) that prevent the domestic use of groundwater to the extent that uranium (the most mobile constituent) is expected to travel within the compliance period (WNI 1999b). WNI's request is equivalent to EPA's MCL for selenium in 40 CFR 141 (0.05 mg/L), which has been determined by EPA to be a protective level for selenium in drinking water. Since this ACL request is for selenium, which is expected to migrate less than uranium (NRC 2006b), the potential impact of granting this request is not expected to be significant.

Criteria 5B(6)(a)(ii), (iii) and (iv) requires that staff examine the hydrogeological characteristics of the facility and surrounding land, the quantity and quality of groundwater and direction of groundwater flow, and the proximity and withdrawal rates of the groundwater users. At the site, groundwater flows from higher elevations surrounding the new tailings impoundment down the NW and SW valleys and then merges with regional flow. Groundwater flows NW out of the NW valley and merges with the northeastward regional flow. Groundwater flows SW out of the SW valley, meets regional flow, and diverges into two flowpaths around the granite outcrops, one to the northeast and one to the east. Areas of higher granite basement elevations beneath the Sweetwater River flood plain cause groundwater to discharge from the Split Rock aquifer into the flood-plain aquifer. Local groundwater at the Split Rock site and within the LTSB is recharged from direct precipitation on the valley floor and from precipitation runoff from the surrounding granite hillsides. Approximately 1.52 centimeters (0.6 inches) per year of precipitation infiltrates the valley floor to deep recharge, whereas approximately 15.2 centimeters (6 inches) per year of runoff from the surrounding granite hillsides recharge the flood-plain aquifer (WNI 1999b). Most residents of Jeffrey City (which is adjacent to the site) derive their water supply from the town wells drilled into the Split Rock aquifer. The Jeffrey City municipal wells supply approximately 379 L/min (100 gal/min), although pumping occurs only periodically to fill the storage tanks (WNI 1999b). These wells are located cross gradient or upgradient of the groundwater plumes, and are unlikely to be affected by the site.

Criterion 5B(6)(a)(v) requires that NRC staff consider the current and future uses of groundwater in the area. ICs for agricultural and livestock watering have only been granted west of the site near well SWAB-22. A previous evaluation performed by the NRC determined that "well SWAB-22 is either beyond or slightly upgradient of the plume (NRC 2006a). Since every sampling event for selenium at well SWAB-22 has had undetectable levels of selenium, this previous evaluation appears to be still valid. Given that access to groundwater is limited due to ICs at the site, and the only area where groundwater is allowed for agricultural and livestock watering has previously been determined to likely remain unimpacted, the current and future uses of groundwater are not expected to change.

Criterion 5B(6)(a)(vi) requires that staff examine the existing quality of groundwater and the potential cumulative impacts on groundwater quality. Given the previously approved ACLs at the site, and given that WNI's request is equivalent to EPA's 40 CFR 141 MCL for selenium in the drinking water (0.05 mg/L), no significant impact on groundwater quality at the site is expected.

Criterion 5B(6)(a)(vii) discusses the human health risks caused by human exposure to waste constituents. In examining the previously approved ACLs, staff noted that institutional controls have previously been instituted within the LTSB that prevent domestic use of groundwater to the extent that uranium (the most mobile constituent) is expected to travel within the compliance period. Additionally, because the proposed selenium ACL value selected by WNI (0.05 mg/L) is equal to the EPA's 40 CFR 141 MCL for drinking water (0.05 mg/L), this constituent is not expected to pose a substantial present or future hazard to human health or the environment.

Criterion 5B(6)(a)(viii) discusses the need to consider potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents. ICs for agricultural and livestock watering have only been granted west of the site near well SWAB-22. A previous evaluation performed by the NRC determined that "well SWAB-22 is either beyond or slightly upgradient of the plume. Because seepage from the impoundments is decreasing, contamination in excess of the standards is not likely to spread west and impact the McIntosh property" (NRC 2006a). Since every sampling event for selenium at well SWAB-22 has had undetectable levels of selenium, this previous evaluation appears to be still valid. Given that access to groundwater is limited due to ICs at the site, and the only area where groundwater is allowed for agricultural and livestock watering has previously been determined to likely remain unimpacted, the potential damage to wildlife, crops, vegetation and physical structures is not expected to be significant.

Criterion 5B(6)(a)(ix) discusses the need to consider the persistence and permanence of the potential adverse effects to the groundwater. Since ICs have previously been instituted within the LTSB that prevent the domestic use of groundwater, and the requested ACL value for selenium is equal to EPA's 40 CFR 141 MCL (0.05 mg/L), it is expected that the potential adverse effects to the groundwater will be insignificant.

In accordance with Criterion 5B(6)(b), staff evaluated the effects of this ACL request on hydraulically connected surface water quality. Specifically, the possible impacts to surface water are discussed in Criterion 5B(6)(b)(i) through Criterion 5B(6)(b)(x).

Under Criterion 5B(6)(b)(i), the volume and physical and chemical characteristics of the waste in the site were considered as part of this ACL request. NRC staff evaluated a WNI submittal dated October 2, 2009, which demonstrates that the proposed selenium value of 0.05 mg/L will not likely exceed Wyoming Department of Environmental Quality (WDEQ) standards protective of aquatic life in the Sweetwater River (Miller 2009). Specifically, this submittal shows that selenium entering the Sweetwater River would dilute to a value of 0.003 mg/L, which is below the WDEQ selenium standard of 0.005 mg/L for the protection of aquatic life. Given that the Sweetwater River is expected to dilute selenium from the site to levels below what WDEQ has deemed protective for aquatic life, and this request is equal to what EPA has determined to be protective for selenium in drinking water in 40 CFR 141, significant impacts to the Sweetwater River are not expected from this request.

Criteria 5B(6)(b)(ii), (iii) and (v) require that the hydrogeological characteristics of the facility and surrounding land, the quantity and quality of groundwater and direction of groundwater flow, and the proximity of the site to surface waters be considered in the approval of an ACL. The Sweetwater River (the only perennial stream in the site vicinity) and several flood-plain lakes adjacent to the river are located approximately 1.6 km (1 mi) north of the site. These lakes are north of the river and are essentially unconnected to the hydrologic systems south of the river (WNI 1999b). The hydrogeological characteristics of the facility and groundwater qualities have previously been discussed under the review of Criteria 5B(6)(a)(ii) through (iv).

Criterion 5B(6)(b)(vi) discusses the need to consider the current and future uses of surface waters in the area and any water quality standards for those surface waters. The Sweetwater River is protected as a drinking water supply and for recreational use. Staff determined that WNI's requested value of 0.05 mg/L is equal to WDEQ standards for the human health value of fish and drinking water and will not likely exceed the WDEQ standards protective of aquatic life. Thus, this action will not change the current uses of the Sweetwater River.

Criterion 5B(6)(b)(vii) requires that staff consider, as part of an ACL review, the existing quality of surface water, including other sources of contamination, and the potential cumulative impacts on surface water quality. Given that groundwater contamination from the site currently seeps into the Sweetwater River, resulting in small contributions of sulfate, total dissolved solids, and uranium, potential receptors are ecological and human by contact during recreational activities and by potential consumption of fish. However, surface water dilutes groundwater influent to the point where contamination contributed by the site minimally affects surface water concentrations (WNI 1999b). For example, the maximum surface water uranium concentration obtained in a recent monitoring report, dated July 18, 2008, is 0.004 mg/L (WNI 2008b), which is well below the MCL of 0.03 mg/L. Therefore, staff does not consider the cumulative impacts of granting an ACL for selenium equal to 0.05 mg/L to substantially affect the surface water quality, given that this standard is equal to WDEQ standards for the human health value of fish and drinking water.

Criterion 5B(6)(b)(viii) requires the consideration of the potential health risks caused by human exposure to waste constituents in surface water. WNI's request is equivalent to EPA's MCL for selenium in 40 CFR 141, which has been determined by EPA to be an acceptable level of selenium in the drinking water.

Criterion 5B(6)(b)(ix) and (x) require NRC staff to examine the potential damage to wildlife, crops, vegetation, and structures caused by exposure to waste constituents, as well as the permanence of the potential adverse effects. WNI's request is equivalent to EPA's MCL for selenium in 40 CFR 141, which has been determined by EPA to be an acceptable level of selenium in the drinking water. In addition, since selenium has been demonstrated to dilute to levels below what WDEQ has determined to be protective of aquatic life in the Sweetwater River, it is expected that the potential damage and permanence of the potential adverse effects will not be significant (Miller 2009).

NRC staff considered the potential adverse effects of this ACL request on hydraulically connected surface water quality as outlined in Criterion 5B(6)(b). Given the staff's consideration of the above criteria, it is unlikely that granting this ACL request will cause a substantial present or potential hazard to human health or the environment in hydraulically connected surface waters.

WNI's submittal dated June 16, 2009 (MGC 2009a), demonstrates that groundwater remediation for selenium is ALARA because domestic access to groundwater is already prohibited, and that any action to reduce selenium concentrations would be unlikely to reduce selenium concentrations and be prohibitively expensive. NUREG-1620 states that "once nonradiological constituent are below regulatory maximum concentration levels, the licensee has no further obligation to reduce the constituent concentrations." Therefore, NRC staff considers WNI's license amendment request for an ACL for selenium to be ALARA.

WNI also argues that the selenium derived from the tailings impoundment will not exceed the MCL value beyond the edge of the tailings impoundment in the future (WNI 1999d). In an RAI dated April 1, 2009 (NRC 2009a), NRC staff requested that WNI confirm that selenium is not expected to travel outside of the impoundment above the requested value (0.05 mg/L) given that values at Well WN-42A have, in the recent past, approached this value. WNI responded that the elevated selenium levels at Well WN-42A are likely to result in a pulse of water with elevated selenium moving from the tailings area that will continue to be diluted as it travels (MGC 2009a). Considering that monitoring data for wells at the POC (which is upgradient of Well WN-42A) have lower values of selenium, NRC staff agrees that it is reasonable to expect selenium values to start declining at Well WN-42A. Recent groundwater monitoring data indicates that selenium at Well WN-42A has gone down from a high of 0.042 mg/L to 0.03 mg/L.

NRC staff determined that the licensee's request is reasonable and meets 10 CFR 40, Appendix A, Criteria 5B(6)(a) and 5B(6)(b). Staff based its conclusions primarily on: 1) this ACL request is equal to the EPA MCL for drinking water; 2) the POC wells have not exceeded the MCL value for approximately 30 years; 3) existing ICs within the proposed LTSB limit domestic groundwater use; and 4) the adverse effects on surface water quality appear to be minimal.

Standards at the POC Wells for Hazardous Constituents

WNI has proposed standards for aluminum (37 mg/L), antimony (0.006 mg/L), arsenic (0.05 mg/L), beryllium (0.01 mg/L), fluoride (4 mg/L), and thallium (0.002 mg/L) at the POC wells. In reviewing licensing documents, the NRC staff noted that it had previously found that standards for these constituents would be protective of human health (NRC 2006a). The current standards requested by WNI are acceptable because they are equal to, or more conservative than, the previously reviewed and approved standards. Additionally, these proposed standards meet Criterion 5B(5) of Appendix A to 10 CFR Part 40, or the current EPA MCLs or RBCs (where MCLs are not applicable) if a Criterion 5B(5) standard is not applicable.

Uranium Limit at the Point of Exposure

Based on the analysis described below, the NRC staff finds the WNI request to raise the uranium trigger level values from 0.03 mg/L to a background upper limit of 0.044 mg/L at the flood-plain aquifer and to raise the uranium trigger level values from 0.03 mg/L to a background upper limit of 0.087 mg/L at the POE for the Split Rock aquifer acceptable. The current trigger levels are set at the drinking water MCLs, which is lower than the site's background conditions.

The NRC staff had previously reviewed and accepted the values of 0.044 mg/L for the flood-plain aquifer and 0.13 mg/L for the Split Rock aquifer as being equivalent to background. NRC questioned this value as a different number had been presented in the past (NRC 2009a). WNI subsequently revised its background value from 0.13 mg/L to 0.087 mg/L for natural uranium in the Split Rock Aquifer (MGC 2009a). The licensee used ASTM PS 64-96, and the EPA document "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities," in concert with guidance referenced in ASTM D 6312 in order to calculate background. NRC staff determined that the methodology used to determine background was appropriate. Additionally, a trigger limit of 0.087 mg/L will allow licensee actions to begin if there is a noticeable difference with site derived groundwater and the aquifer background at the POE. Approving this action is in agreement with NUREG-1620, Section 4, "Protecting Water Resources," which discusses that the applicable background concentration should be used as the compliance monitoring limit at wells at the point of exposure.

LCs 74F and 74G

LC 74F, which refers to the WNI CAP, can be deleted because the licensee's CAP was discontinued in 2006 by License Amendment No. 99 (NRC 2006a). Additionally, LC 74G can be deleted because the licensee has completed the repair of all erosion protection thin spots on the cover for the corrective action ponds. The NRC documented the completion of this work in an inspection of the site and in a letter to the licensee (NRC 2008a).

3.3 Conclusions

The NRC staff concludes that chromium can be excluded and deleted from the license in accordance with Criterion 5B(3) of Appendix A to 10 CFR Part 40. Additionally, in accordance with Criterion 5B(6), the NRC staff concludes that the standard of 0.05 mg/L for selenium at the POC wells is acceptable because it is ALARA and that selenium will not pose a substantial present or potential hazard to human health and the environment. Given that the requested standards for aluminum (37 mg/L), antimony (0.006 mg/L), arsenic (0.05 mg/L), beryllium (0.01 mg/L), fluoride (4 mg/L), and thallium (0.002 mg/L) are equal to, or less than, those previously approved in 2006, the staff concludes that the values requested by WNI are acceptable. Finally, the staff agrees that 0.087 mg/L for the Split Rock aquifer and 0.044 mg/L for the flood-plain aquifer are reasonable natural uranium trigger levels for licensee actions at the POE.

The staff also concludes that LC 74G and LC 74F can be deleted because of the completion of the work and based on previous NRC approvals.

4.0 RECOMMENDED LICENSE AMENDMENT

The NRC staff recommends that the following license amendments be approved:

74. B. Comply with the following ground-water protection standards at point of compliance Wells 5 and 21 ~~with background being recognized in Well 15~~: aluminum = 37 mg/L, antimony = 0.006 mg/L, arsenic = 0.05 mg/L, beryllium = 0.0~~5~~1 mg/L, cadmium = 0.01 mg/L, ~~chromium = 0.05 mg/L~~, fluoride =4 mg/L, lead = 0.05 mg/L, nickel = 0.05 mg/L, selenium = ~~0.013 mg/L~~ 0.05 mg/L, thallium = 0.002 mg/L, and thorium-230 = 0.95 pCi/L.

D. Comply with the following ground water trigger levels at the point of exposure:

Trigger Levels for the Split Rock aquifer: ammonia = 0.5 mg/L, manganese = 0.73 mg/L, molybdenum = 0.18 mg/L, nitrate = 10 mg/L, radium-226 and -228 = 5.0 pCi/L, and natural uranium = ~~.03~~ 0.087 mg/L or 0.3 mg/L for SWAB-32.

Trigger Levels for flood-plain aquifer: ammonia = 0.5 mg/L, manganese = 2.39 mg/L, molybdenum= 0.18 mg/L, nitrate = 10 mg/L, radium-226 and -228 = 5.0 pCi/L, and natural uranium = ~~.03~~ 0.044 mg/L.

~~F. The licensee shall submit by December 15 of each year, a review of the corrective action program and its effect on the aquifer.~~

[Applicable Amendments: 25, 27, 36, 39, 40, 44, 48, 51, 56, 58, 61, 62, 67, 69A, 79, 99, 105]

~~G. The licensee shall repair all erosion protection thin spots on the groundwater corrective action ponds cover and the area between the corrective action ponds and the reclaimed tailings impoundment.~~

[Applicable Amendments: 92, 99, 100, 102, 105]

5.0 REFERENCES

Miller, Lou. "Split Rock Information." Message to Richard Chang. 2 Oct. 2009. E-mail. (ADAMS Accession No. ML092800103)

Miller Geotechnical Consultants, Inc., 2009a “Request for Additional Information-Amendments to L.C. 74, Materials License SUA056, Western Nuclear Inc., Split Rock Site,” June 16, 2009. (Agencywide Documents Access and Management System (ADAMS) Accession No. ML0916805630)

Miller Geotechnical Consultants, Inc., 2009b, “RE: License Amendment Request for Western Nuclear, Inc., Split Rock Mill Site, Source Material License SUA-56,” February 7, 2009. (ADAMS Accession No. ML090430285)

MFG, Inc., 2003, “Supplemental Groundwater Modeling Report for the Split Rock, Wyoming Site,” March 31, 2003. (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML0307603380, and ML030760346)

U.S. Nuclear Regulatory Commission, 1999, “Radiological Verification Completion Report Review, Amendment No. 88,” May 21, 1999. (ADAMS Accession No. 9906020031)

U.S. Nuclear Regulatory Commission, 2000, “Completion Report Review for the Western Nuclear Split Rock Site, Jeffrey City, Wyoming, Amendment 92 Source Material License SUA-56,” May 21, 1999. (ADAMS Accession No. 9906020031)

U.S. Nuclear Regulatory Commission, 2005, "Amendment of Source Materials License SUA-56 To Modify the Ground-Water and Surface Water Monitoring Programs at Western Nuclear, Inc.'s, Split Rock Site, Amendment 98," June 15, 2005. (ADAMS Accession No. ML051670656)

U.S. Nuclear Regulatory Commission, 2006a, "License Amendment No. 99 Approving Alternate Concentration Limits, Western Nuclear, Inc., Split Rock Site, Jeffrey City, Fremont County, Wyoming, SUA-56," September 28, 2006. (ADAMS Accession No. ML0629102165)

U.S. Nuclear Regulatory Commission, 2006b, "Environmental Assessment For Amendment to Source Materials License SUA-56 Ground Water Alternate Concentration Limits," August 29, 2006. (ADAMS Accession No. ML0621303873)

U.S. Nuclear Regulatory Commission, 2007, "License Amendment No. 102, Construction Completion Report, Corrective Action Ponds, and Surety Reduction, Western Nuclear, Inc., Split Rock Site, Jeffrey City, Fremont County, Wyoming, SUA-56 (TACs J00532 And J00545)," November 30, 2007. (ADAMS Accession No. ML0728405427)

U.S. Nuclear Regulatory Commission, 2008a, "NRC Inspection Report 040-01162/08-001," August 18, 2008. (ADAMS Accession No. ML0823215683)

U.S. Nuclear Regulatory Commission, 2008b, "Review of Surface Water and Groundwater Monitoring Report for Western Nuclear, Inc., Split Rock Mill," August 6, 2008. (ADAMS Accession No. ML0821005881)

U.S. Nuclear Regulatory Commission, 2009a, "Request For Additional Information – Amendments to License Condition 74, Materials License SUA-56, Western Nuclear Inc., Split Rock Site, Jeffrey City, Wyoming," April 1, 2009. (ADAMS Accession No. ML0908203304)

U.S. Nuclear Regulatory Commission, 2010, "Final Environmental Assessment, Materials License SUA-56, Western Nuclear Inc., Split Rock Site, Jeffrey City, Wyoming," January 28, 2010. (ADAMS Accession No. ML092780275)

Western Nuclear, Inc., 1999a, "Split Rock Tailing Reclamation Construction Completion Report," April 21, 1999. (ADAMS Accession No. 9905170227)

Western Nuclear, Inc., 1999b, "Site Closure Plan" and "Site Ground Water Characterization and Evaluation," October 29, 1999. (ADAMS Accession Nos. ML003672392, ML003672396, ML003672400, and ML003672402)

Western Nuclear, Inc., 1999c, "Site Ground Water Characterization and Evaluation," December 31, 1999. (ADAMS Accession Nos. ML0036725731, ML0036725701, and ML0036725791)

Western Nuclear, Inc., 1999d, "Site Ground Water Characterization and Evaluation, Appendix I," December 31, 1999. (ADAMS Accession No. ML0036726191)

Western Nuclear, Inc., 2008a, "Western Nuclear, Inc., Split Rock Uranium Mill Tailings Facility, Source Materials License SUA-56, Proposed Amendments to License Condition 74," December 1, 2008. (ADAMS Accession No. ML0833804533)

Western Nuclear, Inc., 2008b, “Source Material License SUA-56; Western Nuclear, Inc., Split Rock Uranium Mill Tailings Facility; Surface Water and Groundwater Monitoring Report,” July 18, 2008. (ADAMS Accession No. ML0821408696)

Western Nuclear, Inc., 2009a, “License Amendment Request for Western Nuclear Source Materials License SUA-56,” February 7, 2009. (ADAMS Accession No. ML090430285)

Western Nuclear, Inc., 2009b, “Source Material License SUA-56; Western Nuclear, Inc., Split Rock Uranium Mill Tailings Facility; License Condition 74,” March 9, 2009. (ADAMS Accession No. ML0907509228)

Wyoming Department of Environmental Quality, 2009, “Wyoming Surface Water Quality Standards,” http://soswy.state.wy.us/Rules/RULES/6547.pdf.