



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

April 29, 1997

Mr. Joseph E. Virgona, Project Manager  
U.S. Department of Energy  
Grand Junction Project Office  
P.O. Box 2567  
Grand Junction, Colorado 81502-2567

SUBJECT: LONG-TERM SURVEILLANCE PLAN FOR THE BLUEWATER MILL SITE

Dear Mr. Virgona:

The U.S. Nuclear Regulatory Commission staff has reviewed the U.S. Department of Energy's (DOE) Long-Term surveillance Plan (LTSP), transmitted by DOE letter dated February 5, 1997, for the Atlantic Richfield Company's Bluewater Uranium Mill and Tailings site near Grants, New Mexico. Except for the missing documents identified in Carl Jacobson's January 31, 1997, letter which was enclosed with your letter, the NRC has identified only groundwater monitoring as an area in the LTSP which requires modification and page changes.

The NRC staff has determined that the three year sampling frequency proposed in the LTSP is not sufficiently conservative (see enclosure). The rate of uranium transport in the Alluvial aquifer is estimated to be 580 feet per year, and the transport rates for molybdenum and selenium are expected to be in the same range. During post-reclamation, the tailings are not anticipated to be a source of future groundwater contamination. However, if a uranium plume exceeding compliance standards were to occur, then in three years, it would move, at most, 44% of the distance to the point of exposure, assuming continuous release of ground-water contaminants from the tailings pile. If sampling is conducted annually in the Alluvial aquifer, then in one year, a uranium plume exceeding compliance standards would move, at most, 580 feet past the point of compliance, or 15% of the distance to the point of exposure. Thus, annual sampling will allow contamination to be detected long before it reaches the point of exposure.

Using the 580 ft/yr uranium velocity for the Alluvial aquifer, it is estimated that after six years, water from the opposite side of the carbonate tailings would have moved past the point-of-compliance (POC) well in the Alluvial aquifer. The tailings should act as a reduced source of ground-water pollution in the future. As a result, the potential for exceeding the groundwater protection standards at the point of compliance should be much lower after six years. Therefore, after six years of annual sampling of the Alluvial aquifer, the NRC staff would consider it appropriate to change to sampling the Alluvial aquifer every three years for molybdenum, selenium, and uranium.

The LTSP indicates that the POC wells in the Alluvial aquifer will be sampled annually for other water quality parameters for more than six years. Therefore, the increase in costs should be limited to the laboratory costs of analyzing for the three additional constituents, resulting in minimal if any necessary increase in the funds for long-term care.

J. Virgona

2

Additionally, the staff notes that well X(M) on Plate 1, Filename S0002100, prepared January 28, 1997, is incorrectly identified as San Andres-Clorieta well and should be corrected.

If you have any questions, please contact the NRC Project Manager, Ken Hooks at (301) 415-7777.

Sincerely,

(Original signed by)

Charles L. Cain, Acting Chief  
Uranium Recovery Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Docket No. 40-8902  
License No. SUA-1470

Enclosure: As stated

cc: R. Ziegler, ARCO Grants  
R. Ohrbom, New Mexico Environment Dept.

DISTRIBUTION: File Center URB r/f PUBLIC  
WFord MFederline W/o TLJohnson DRom  
DOCUMENT NAME: S:\DWM\URB\KRH\ARCOFLTS  
\* See previous concurrence

*CCain*  
~~LHowell~~ RIV  
EBrummett

OFC	URB*		URB*		URB*		URB	E	
NAME	KHooks/dh		WFord		DGillen		CCain <i>OK</i>		
DATE	4/20/97		4/24/97		4/28/97		4/29/97		

OFFICIAL RECORD COPY

J. Virgona

2

Additionally, the staff notes that well X(M) on Plate 1. Filename S0002100, prepared January 28, 1997, is incorrectly identified as San Andres-Clorieta well and should be corrected.

If you have any questions, please contact the NRC Project Manager, Ken Hooks at (301) 415-7777.

Sincerely,

Charles L. Cain, Acting Chief  
Uranium Recovery Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Docket No. 40-8902  
License No. SUA-1470

Enclosure: As stated

cc: R. Ziegler, ARCO Grants  
R. Ohrbom, New Mexico Environment Dept.

DISTRIBUTION: File Center URB r/f PUBLIC LHowell RIV  
WFord

MFederline TLJohnson DRom EBrummett

DOCUMENT NAME: S:\DWM\URB\KRH\ARCOFLTS

OFC	URB	E	URB		URB	h	URB		
NAME	KHooks/dh	W	WFord	W	DGillen		CCain		
DATE	4/20/97	17	4/24/97		4/24/97	C	4/ /97		

OFFICIAL RECORD COPY

## ENCLOSURE

### DETAILED GROUND-WATER REVIEW OF THE LONG-TERM SURVEILLANCE PLAN (LTSP) FOR THE DOE BLUEWATER (UMTRA TITLE II) DISPOSAL SITE NEAR GRANTS, NEW MEXICO, JANUARY, 1997.

The review of the Long-Term Surveillance Plan (LTSP) for the DOE Bluewater (UMTRA Title II) Disposal Site Near Grants, New Mexico, dated January, 1997, considered the following issues:

1. Resolution of previous comments.
2. Were the wells correctly identified as to surface location and aquifers monitored?
3. Will the right ground-water contaminants be monitored and have the correct groundwater protection standards been established?
4. Is the sampling frequency appropriate to protect the public and environment at the point of exposure (POE)?

This review recommends that point-of-compliance (POC) monitoring be conducted annually in the Alluvial aquifer for the first 6 years and then every three years thereafter. Furthermore POE well "X(M)" should be correctly identified on Plate I, Filename S0002100, as to the aquifer it is monitoring.

#### Previous Comments

On May 9, 1996, the NRC transmitted comments to Joseph Virgona (DOE) on the Draft Long-Term Surveillance Plan for the Bluewater Mill Site. The current version of the Long-Term Surveillance Plan addresses those comments. The DOE was asked to provide information on (1) environmental monitoring, (2) a ground-water monitoring schedule, and (3) the need for future well maintenance. The DOE was also asked to provide for long-term maintenance of background, POC, and POE wells and to describe the actions that DOE would take should groundwater protection standards be exceeded. This information is supplied in Section 3.6.4, "Reporting Maintenance and Emergency Measures," and Section 3.7.1, "Ground-Water Monitoring".

#### Location and Completion of Monitor Wells

With the exception of well "X(M)", all monitor wells have been correctly located and identified as to aquifers monitored. Well X(M) on Plate I, Filename S0002100, prepared January 28, 1997, is incorrectly identified as a San Andres-Clorieta well.

#### Compliance Parameters and Standards

POC standards based on an alternate concentration analysis have been established in the ARCO license (SUA-1470 Amend. No. 34) for selenium, uranium, and molybdenum. The groundwater protection standards for the POC in

the Long Term Surveillance Plan (DOE, 1997) are identical to the ARCO License. In the Long Term Surveillance Plan, selenium, uranium and molybdenum will continue to be sampled for. The staff concludes that the Long Term Surveillance Plan has correctly established the parameters to be sampled and the groundwater protection standards for those parameters at the point of compliance.

### Sampling Frequency

On page 2-14 of Applied Hydrology, Inc., 1995, it is estimated that the ground-water velocity in the San Andres aquifer at the POE is about 285 ft/yr, while ground-water velocities in the Alluvial aquifer are estimated to range from 1,760 ft/yr to 3,520 ft/yr (Applied Hydrology, Inc., 1995, pages 2-16 and 2-41). In the San Andres aquifer, uranium is not predicted to be significantly retarded by adsorption processes. However, in the Alluvial aquifer, adsorption processes may produce a mean velocity for uranium in the Alluvial aquifer of 580 ft/yr (Applied Hydrology, Inc., 1995, page 2-41). Under oxidizing conditions, it is not unreasonable to expect that retardation coefficients for molybdenum and selenium are greater or in the same range as uranium (Sheppard and Thibault, 1990, page 472). Oxidizing environments should exist in the Alluvial and San Andres aquifers at the Bluewater site. Consequently, selenium and molybdenum should be transported no faster than uranium and will probably move much slower. Therefore, a sampling frequency based on the predicted rate of uranium movement should also be adequate for the sampling of selenium and molybdenum.

In the LTSP, DOE states that uranium, selenium, and molybdenum will be monitored every 3 years. For the Alluvial aquifer, this sampling frequency does not appear to be sufficiently conservative. The POE for the Alluvial aquifer is approximately 4000 feet from the nearest POC, and the projected rate of uranium transport in the Alluvial aquifer is 580 ft/yr. During post-reclamation, the tailings are not anticipated to be a source of future groundwater contamination. However, if a uranium plume exceeding compliance standards were to occur, then in 3 years, it would move, at most, 1,740 feet past the POC, or 44% of the distance to the POE, assuming continuous release of ground-water contaminants from the tailings pile. If sampling is conducted annually in the Alluvial aquifer, then in one year, a uranium plume would move, at most, 580 feet past the POC, or 15% of the distance to the POE.

Using the 580 ft/yr uranium velocity for the Alluvial aquifer, it is estimated that after 6 years, water from the opposite side of the carbonate tailings would move past the POC well in the Alluvial aquifer. The tailings should act as a reduced source of ground-water pollution in the future. As a result, the potential to exceed the groundwater protection standards at the POC should be much lower after 6 years. Therefore, after six years of annual sampling of the Alluvial aquifer, the staff would consider it appropriate to change to sampling the Alluvial aquifer every three years for molybdenum, selenium, and uranium.

Sampling the Alluvial aquifer annually for six years for molybdenum, selenium, and uranium at the three Alluvial aquifer POC wells, should not result in a large increase in the cost of monitoring. This is because the Long Term



Surveillance Plan indicates that these wells will be sampled annually for other water quality parameters. Therefore, the increase in sampling costs should be limited to the cost of analyzing for the three additional constituents in the laboratory.

The POE for the San Andres aquifer is approximately 9,375 feet from the nearest POC. For the San Andres aquifer, in 3 years, a uranium plume exceeding compliance standards would move, at most, 855 feet past the POC, which is about 9% of the distance to the POE. Therefore, for the San Andres aquifer, a three year sampling frequency appears to be adequate, because contamination will be detected long before it reaches the POE.

#### Recommendation:

The NRC staff recommends that the Alluvial aquifer be sampled for molybdenum, selenium, and uranium at the POC wells annually for 6 years and then every three years thereafter. Well X(M) on Plate 1, Filename S0002100, prepared January 28, 1997, is incorrectly identified as San Andres-Clorieta well and should be corrected.

#### References

- Applied Hydrology Associates, Inc., 1995, Corrective Action Program and Alternate Concentration Limits Petition for Uranium, Molybdenum and Selenium, Bluewater Uranium Mill, Near Grants, New Mexico, dated April 1995.
- DOE, 1997, Long-Term Surveillance Plan for the DOE Bluewater (UMTRCA Title II) Disposal Site Near Grants, New Mexico, January 1997.
- Sheppard, M.I. and Thibault, D.H., 1990, Default Soil Solid/Liquid Partition Coefficients,  $K_d$ s, For Four Major Soil Types: A Compendium, Health Physics, Vol. 59, No. 4, page 472.