



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV
URANIUM RECOVERY FIELD OFFICE
BOX 25325
DENVER, COLORADO 80225

MAY 31 1994

Docket No. 40-8902
SUA-1470, Amendment No. 23

Atlantic Richfield Company
ATTN: Ron S. Ziegler
P.O. Box 638
Grants, New Mexico 87020

Dear Mr. Ziegler:

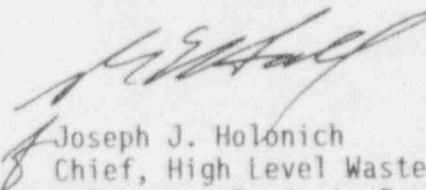
The NRC has completed the review of your January 19, 1994, request for approval of an alternative to the soil cleanup standard specified in Criterion 6 of Appendix A to 10 CFR 40 for 42 acres at the Bluewater site. The alternative was requested because of the presence of near surface bedrock in the 42 acres. The staff has concluded that approval of the alternative will not result in a significant impact to the public health and safety or the environment, and has therefore revised License Condition No. 31 to authorize the requested alternative.

The revised version of License Condition No. 31 and a summary of the staff review of your request for approval of an alternative to the soil cleanup standard are included in the enclosed Technical Evaluation Report. The license is also being reissued to incorporate the revision.

An environmental assessment for this action is not required since this action is categorically excluded under 10 CFR 51.22(c)(11), and an environmental report from the licensee is not required by 10 CFR 51.60(b)(2).

The issuance of this amendment was discussed via telecon between Mr. Natver Patel of ARCO and Mr. Pete Garcia of my staff on May 4, 1994.

Sincerely,



Joseph J. Holonich
Chief, High Level Waste & Uranium
Recovery Projects Branch, DWM

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Enclosures:
Technical Evaluation Report
Source Material License SUA-1470

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Atlantic Richfield Company

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MAY 31 1994

cc:

P. Bergstrom, ARCO

B. Garcia, NMED

B. Floyd, RCPD, NM

TECHNICAL EVALUATION REPORT

DOCKET NO. 40-8902

LICENSE NO. SUA-1471

LICENSEE: Atlantic Richfield Company

FACILITY: Bluewater Mill

PROJECT MANAGER: Pete J. Garcia, Jr.

TECHNICAL REVIEWER: Pete J. Garcia, Jr.

SUMMARY AND CONCLUSIONS:

By letter dated January 19, 1994, Atlantic Richfield Company (ARCO) requested amendment of Source Material License SUA-1471 for the Bluewater Mill to authorize an alternative to the contamination cleanup criteria of 5 pCi/g Ra-226 above background specified in Criterion 6 of Appendix A to 10 CFR 40. This alternative was requested for 42 acres where the presence of near surface bedrock precludes cost effective remediation. The staff review of the licensee's January 19 submittal indicates that the alternative is warranted, and the staff therefore concludes that the license should be amended to authorize the alternative.

DESCRIPTION OF LICENSEE'S AMENDMENT REQUEST:

Surveys for windblown contamination at the ARCO site had identified approximately 600 acres which exhibited concentrations of Ra-226 in soil in excess of 6.9 pCi/g, or 5 pCi/g above background as specified in Criterion 6 of Appendix A to 10 CFR 40. The initial surveys also identified about 210 acres in excess of the standard which consisted of volcanic bedrock, making it economically impractical and unsafe to clean the area to the standard. Due to the low average concentration of Ra-226 measured in the soil (9.9 pCi/g), the long-term governmental ownership of the site under 10 CFR 40.28, and the results of dose risk assessment performed by the licensee which indicated very low dose risks to members of the public, an alternative to the cleanup standard was authorized by the issuance of Amendment No. 8 to Source Material License SUA-1471 on September 13, 1989.

The licensee has since performed or attempted cleanup of the remaining 390 acres showing contamination levels in excess of 6.9 pCi/g Ra-226. As a result of these activities, the licensee has identified an additional 42 acres requiring cleanup under the standard where bedrock near the surface precludes the cost effectiveness of cleanup. The scrapers and other equipment used to remove contaminated soils were not effective in removing residual loose soil once the bedrock was encountered. The 42 acres are not one continuous area, but instead consist of small areas of near surface bedrock spread out within the entire 390 acres requiring cleanup under the standard.

In support of the request for the alternative, ARCO performed an extensive soil sampling program. The results of the soil sampling program are provided in Appendix A and shown on a site map in Figure 3-2 of the January 19 submittal. The results of the soil sampling program were then used to

calculate the maximum doses to members of the public which could result from the existing concentrations of radioactive materials within the entire windblown area, including the previously exempted 210-acre area referred to as the Malpais area. The licensee also calculated doses which would result from cleanup of the entire windblown area to the 6.9 pCi/g standard for comparison.

The dose assessment performed by the licensee indicates that the maximum dose to a member of the public from existing concentrations of radioactive material in the soil, based on the actual cleanup of the entire windblown area to an average Ra-226 concentration of 6.3 pCi/g, would be about 3.0 mRem/yr. The assessment also indicates that the maximum doses resulting from cleanup of the entire windblown area to the standard of 6.9 pCi/g Ra-226 would be about 3.4 mRem/yr. In addition, a cost analysis performed by the licensee indicates that the cost to decontaminate all areas to the unrestricted release criteria would be about \$630,000, or \$23,000 per person-Rem. Based on the very low projected exposures, the cost-benefit analysis, and the fact that the area will all be under long-term governmental control, the licensee requests approval of an alternative cleanup standard for the 42 acres of near surface bedrock.

TECHNICAL EVALUATION:

The NRC staff performed an evaluation of the information contained in the licensee's January 19, 1994, submittal. For the purposes of the soil sampling program and the dose assessment, the entire windblown area was divided into grid blocks of 1000 feet by 1000 feet. The grid blocks were each then divided into 25 smaller blocks of 200 feet by 200 feet. Four composite soil samples were collected within each of the smaller blocks, with each composite sample consisting of aliquots from five sample collection locations. The grid system is shown on Figure 3-2 of the January 19 submittal.

Soil samples were collected to a depth of 15 cm. when possible. Where 15 cm. of soil was not available, the available soil and small rock (with a diameter up to about 1.5 inches) above the bedrock was collected. A bulk average Ra-226 concentration was determined for the soil-rock mixture by calculating a mass-weighted average concentration for the mixture in accordance with a procedure developed by the Department of Energy for use at Title I sites. The resulting area-weighted average Ra-226 concentration for the entire windblown area, including the Malpais area previously exempted, was 4.4 pCi/g above background.

Maximum doses to members of the public were then calculated by determining emission rates for radioactive particulates and radon for each grid block and using the emission rates to determine the site boundary Effective Dose Equivalents (EDE's) for each grid block. The maximum EDE's for each grid block were then summed to obtain the total maximum EDE, which is conservative because the site boundary location showing the highest EDE for an individual grid block varied depending on the location of the grid block. Doses to the regional population within 50 miles of the site were determined by summing the population EDE's for each grid block.

The particulate emission source term was calculated using the methodology contained in Regulatory Guide 3.59 and relative concentrations of U-nat, Ra-226, and Th-230 as determined during previous sampling conducted for the NRC-approved tailings reclamation plan. Meteorological data obtained onsite between 1982 and 1985 was used in the evaluation. This methodology resulted in the calculation of activity source terms per unit area per pCi/g Ra-226 in the soil or soil-rock matrix.

The radon source term was determined by assuming that all the radon generated and released to the soil pore space is released to the atmosphere. Based on an average Ra-226 concentration of 4.4 pCi/g, the licensee calculated that the average radon flux from the entire windblown contamination area would be 0.7 pCi/m²-sec., which is 3.5 percent of the radon flux limit of 20 pCi/m²-sec. specified in Criterion 6 of Appendix A to 10 CFR 40 for reclaimed tailings disposal site.

Offsite dose calculations were performed using the CAP88-PC computer code developed by the Environmental Protection Agency. Meteorological and population data developed by the EPA in 1993 for use in calculating doses from the Bluewater Mill for the purposes of determining compliance with the EPA-promulgated National Environmental Standards for Hazardous Air Pollutants were used in the dose evaluation performed by ARCO. The analyses performed by ARCO included the total dose from the entire windblown area, including the previously exempted Malpais area.

Doses to the maximally exposed individual and the population within 50 miles of the site were calculated for two cases. The first case involved the Ra-226 concentrations which actually exist at the site following cleanup activities based on the soil sampling data. The second case assumed cleanup of the entire windblown area to the unrestricted release standard of 5 pCi/g Ra-226 above background. The parameters and methodology used in each analysis were identical, with the exception of the Ra-226 concentrations.

The results of the individual dose assessments performed by the licensee are shown on Tables 4-2 and 4-3 of the January 19 submittal, while the results of the population assessments are provided in Tables 4-4 and 4-5. For both types of assessment, the projected doses from the actual case were lower than corresponding doses for the release standard case. The calculated doses for the maximally exposed individual were 3.0 mRem/year for the actual case and 3.4 mRem/year for the release standard case. The calculated doses for the regional population were 405 mRem/year for the actual case and 444 mRem/year for the release standard case.

The conservatively estimated dose to the maximally exposed individual is only 3 percent of the dose limit of 100 mRem per year for members of the public specified in 10 CFR 20.1301. The projected dose of 3.0 mRem per year may also be compared to the background gamma exposure rate of 110 mRem per year measured at the site. The 0.4 person-Rem per year dose to the regional population of 65,129 people may be compared to the dose from naturally occurring background gamma radiation of 7,164 person-Rem per year.

The licensee has completed cleanup of the area requiring remediation to the extent practical using standard construction equipment. The contractor who performed the routine cleanup of contaminated soils provided an estimate of the cost to clean the 42 acres of near surface bedrock area. The contractor proposed to use a large dozer to rip the surface of the exposed rock and remove as much of the fractured rock as possible. The contractor estimated the cost to remove a 1-foot layer, which is the minimum thickness possible, to be about \$15,000 per acre. This would result in a total additional cost of approximately \$630,000.

The collective EDE to the population within 50 miles of the site was determined to be about 0.4 person-Rem per year. Assuming an average life span of 70 years, the total lifetime collective dose would be about 28 person-Rem. The cost to reduce the total exposure by one Rem would therefore be about \$28,000 dollars. This amount may be compared to the ALARA criterion of \$1,000 per person-Rem specified in Appendix I to 10 CFR 50.

The staff concludes that the alternative requested by ARCO is acceptable based on the following:

1. The conservatively estimated doses to the maximally exposed individual and the regional population are very low when compared to regulatory criteria or naturally occurring forms of exposure. In addition, the exposures associated with the cleanup actually achieved onsite are less than those associated with cleanup of the entire area to the criterion specified in Appendix A to 10 CFR 40.
2. The radon flux from the windblown area would be less than 4 percent of the limit for reclaimed areas specified in Criterion 6 of Appendix A to 10 CFR 40.
3. The entire windblown area, including all areas which exceed the cleanup criteria of 5 pCi/g Ra-226, will be transferred to the State or Federal government for long-term institutional control upon termination of the ARCO license.
4. The cost of cleanup to the standard is high relative to the benefit to be derived. Assuming an average lifespan of 70 years, the cost would be about \$23,000 per person-Rem.

RECOMMENDED LICENSE CHANGE:

Based on the above, the staff concludes that Source Material License SUA-1470 should be amended to authorize the alternative requested by the licensee by revising Condition No. 31, which specifies the licensee's mill decommissioning and soil cleanup programs, to reference the licensee's January 19, 1994, submittal. In addition, the staff review of License Condition No. 31 revealed that the requirements of subparts A, B, and C have been fulfilled, and they may therefore be deleted. The staff therefore recommends that Source Material License SUA-1470 be amended to authorize the alternative requested by the licensee by revising Condition No. 31 to read as follows:

31. The licensee shall decommission the Bluewater Uranium Mill in accordance with the decommissioning plan submitted by letter dated December 29, 1987, as revised by submittals dated August 9, September 26, and November 17, 1988; February 27 and June 16, 1989; March 6, 1990; and January 19, 1994. [Applicable Amendments: 8, 10, 15, 23]

ENVIRONMENTAL IMPACT EVALUATION:

In accordance with the categorical exclusion contained in paragraph (c)(11) of 10 CFR 51.22, an environmental assessment is not required for this licensing action. That paragraph states that the categorical exclusion applies to the issuance of amendments to licenses for uranium mills provided that (1) there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite, (2) there is no significant increase in individual or cumulative occupational radiation exposure, (3) there is no significant construction impact, and (4) there is no significant increase in the potential for or consequences from radiological accidents.

The licensing action discussed in this memorandum meets these criteria as the proposed amendment authorizes an alternative to the soil cleanup standard for a small area of the windblown contamination area at the Bluewater Mill. The average Ra-226 concentration for the entire windblown area, including the exempted area, is less than the cleanup standard specified in Criterion 6 of Appendix A to 10 CFR 40. An environmental report is not required from the licensee since the amendment does not meet the criteria of 10 CFR 51.60 (b)(2).