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LBP-99-19
May 13, 1999

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

Before Administrative Judges:
Peter B. Bloch, Presiding Officer
Thomas D. Murphy, Special Assistant

In the matter of

HYDRO RESOURCES, INC.
(2929 Coors Boulevard
Suite 101
Albuquerque, New Mexico 87120)

Docket No. 40-8968-ML

Re: Leach Mining
and Milling License

ASLBP No. 95-706-01-ML

SERVED MAY 13 1999

PARTIAL INITIAL DECISION
(Radioactive Air Emissions)

This partial initial decision (PID) covers Radioactive Air Emission issues raised by the Eastern Navajo Dine Against Uranium Mining (ENDAUM), and the Southwest Research and Information Center (SRIC).¹ ENDAUM and SRIC (collectively Intervenors) request me (see Intervenors' Brief at 1, 2) to reject the license application of HRI on the grounds of these two principal alleged air emission deficiencies:

¹ENDAUM and SRIC filed their Brief (Intervenors' Brief), accompanied by Testimony of Bernd Franke (Franke Testimony), on January 11, 1999. Hydro Resources, Inc. response on February 11, 1999 (HRI Response) included an Affidavit of Alan C. Eggleston, Ph.D. dated February 10, 1999 (Eggleston Affidavit). The Staff of the Nuclear Regulatory Commission responded on February 18, 1999 (Staff Response) and attached an Affidavit of Christopher A. McKenney (Staff Exhibit 1).

First, HRI and the NRC Staff fail to provide reasonable assurance that radioactive emissions from the Crownpoint Project will be maintained within regulatory limits in 10 C.F.R. Part 20. In fact, existing non-background levels of radiation at Church Rock already exceed regulatory limits, thus precluding the addition of a new source that would further jeopardize public health and safety. Second, the Final Environmental Impact Statement purported to support the issuance of the license misrepresents, distorts, or fails to disclose key information about the significant impacts of airborne emissions from the Crownpoint site.

This PID deals with the assertion that Part 20 will be violated. Other Partial Initial Decisions will address NEPA concerns, in general, and a concern about the adequacy of the Final Environmental Impact Statement with respect to the cumulative impacts of previously existing radiation sources attributable to the HRI Crownpoint Uranium Project.

DISCUSSION

In support of its first allegation, Intervenors argue that radon-222 and radium-226 are a part of uranium ore; therefore, radiation doses from those radioactive materials can not be considered to constitute background radiation dose and can not be excluded when evaluating compliance with 10 C.F.R. Part 20. Intervenors Brief at 3-6. Intervenors claim that the Staff and HRI ignore the statement of purpose of Part 20 which clearly provides that the regulations are designed to protect members of the public from all sources of radiation other than background, including unlicensed sources. Intervenors Brief at 7; see also 10 C.F.R. § 20.1001(b). Intervenors assert that HRI and the Staff in their Environmental Report and FEIS, exclude from their dose calculations contributions from existing anthropogenic sources of radon and gamma radiation at the Church Rock site by mischaracterizing them as "natural background radiation." Intervenors Brief at 8. Intervenors cite Section 3.7 of the DEIS as evidence for elevated radiation levels near the Church Rock site. Intervenors theorize that based on combined elevated

radon emissions and elevated gamma radiation readings at off site locations resulting from prior mining activities, the dose to the nearest resident is in already in excess of the limits set in part 20. Intervenors Brief at 9-14.

Finally, Intervenors challenge HRI's dose projections by citing their expert's contention that a time-weighted groundwater source term should have been used as the basis for the calculations instead of the arithmetically averaged groundwater source term used by the Staff and HRI in its use of the MILDOS code to calculate off site doses. Intervenors expert, Franke, postulates that a large part of the annual dose from radon-222 in a given year occurs from exposures over very few hours at situations where wind speed and atmospheric dispersion is low. Franke calculates in a "worst case" situation that there is a 50% chance that the regulatory limits will be exceeded. Intervenors Brief at 14-19. Franke Testimony Exhibit 2 at 10-12.

HRI responds that Intervenors misinterpret Part 20. HRI argues that:

demonstrating both common sense and a grasp of the obvious, the agency charged with promulgating regulations to control airborne radiological emissions from Atomic Energy Act regulated facilities has developed a regulation requiring licensee's operations to meet prescribed emissions limits calculated based solely on radiation sources within the licensee's control.

HRI Response at 7. HRI continues with its response arguing that concentrations of radon in lixiviant² show a high frequency of low values and that past experience with use of the NRC MILDOS code show that after field verification, the MILDOS has proven to predict doses in a conservative fashion. HRI Response at 10. HRI argues that since the production water

²Groundwater which enriched with dissolved oxygen and bicarbonate ions and is injected into the ground for the purpose of recovering uranium is called "lixiviant." When the lixiviant is passed through the uranium it becomes "pregnant" and contains uranium oxide, radon and radium. The pregnant lixiviant is then processed.

containing radon is continuously circulating in the well fields, it is not valid, as the Intervenor claim, to assume a concentration distribution of radon that varies greatly over time. HRI Response at 10-11. Finally, HRI argues that NRC requires [See License Conditions 9.8 and 10.30] and HRI proposes a complete field verification of air emission doses as part of its licensed operations. HRI Response at 11.

The NRC Staff agrees with HRI that the Intervenor have misread Part 20 and disagrees with the findings in Franke's testimony. The Staff argues that 10 C.F.R. § 20.1302(b)(1) actually refers to the total effective dose equivalent to the individual likely to receive the highest dose from the licensed operation. Staff then states that the dose can and should be calculated or measured to a real individual, not a hypothetical individual. The Staff's expert, McKenney, demonstrates that with the most conservative assumptions, HRI could not release sufficient radon to exceed the regulatory requirements during plant operations. McKenney also postulates an alternate worst case scenario for a hypothetical individual and calculates a dose less than regulatory criteria. Staff Response at 4-5 citing Franke Testimony Exhibit 2 at 10-11 and Staff Exhibit at ¶9 and ¶10.

In order to resolve this issue properly, on March 18, 1999, the Presiding Officer issued LBP-99-15, asking the parties a series of questions. The answers and responses³ to

³ ENDAUM and SRIC filed a Response to LBP-99-15, Questions Concerning Radioactive Air Emissions, dated April 7, 1999 (Intervenor LBP Response) accompanied by a Declaration of Bernd Franke dated April 6, 1999 (Franke Declaration). ENDAUM and SRIC filed a response to HRI's and NRC Staff's Answers to LBP-99-15, dated April 21, 1999 (Intervenor's Response), accompanied by a Response Declaration of Bernd Franke dated April 21, 1999 (Franke Response Declaration) and a Response Affidavit of Dr. Richard J. Abitz, dated April 16, 1999 (Abitz response Affidavit). Hydro Resources, Inc. filed a Response to LBP-99-15 dated April 7, 1999 (HRI LBP Response) accompanied by an Affidavit of Douglas B. Chamber, Ph.D. Pertaining to Radiation, dated April 7, 1999 (Chamber's Affidavit), and an Affidavit of

those questions clarify the record and confirm for the purposes of this case that NRC regulations exempt from the definition of "background radiation" radiation coming from source material or byproduct material. There is no byproduct or special nuclear material (see Pelizza Affidavit at E; McKenney April 7, 1999 Affidavit at 2) on the Church Rock site. A small quantity of source material exists on Section 8. McKenney April 7, 1999 Affidavit at 3.

ANALYSIS

Intervenors' allegations and supporting opinions raise the issue of whether HRI and NRC Staff correctly addressed potential radiation exposure resulting from operations at Church Rock Section 8. Intervenors, relying on the testimony of Bernd Franke, complain that dose calculations in the Environmental Report ("ER") and FEIS, excluded contributions from sources of radon and gamma radiation at Church Rock Section 8 by characterizing them as natural background. Intervenors' Brief at 8. Similarly, in their response to questions, Intervenors rely on their definition of background for the conclusions presented. Intervenor LBP Response at 6-12. The validity of Franke's testimony turns on the definition of "background" as his calculations and conclusions are based on the fact that "[he] believe[s] that doses from other source and byproduct materials not regulated by the Commission . . . must also

Mark S. Pelizza Pertaining to Radiation dated April 5, 1999 (Pelizza Affidavit), Hydro Resources, Inc.'s Reply to Intervenors' Response to LBP 99-15, dated April 21, 1999 (HRI Reply). The Staff replied to my questions by letter dated April 7, 1999 (Staff letter) accompanied by an Affidavit of Christopher A. McKenney dated April 7, 1999 (McKenney April 7, 1999 Affidavit). The NRC Staff's response to Intervenors' Air Emissions Answers dated April 21, 1999 (Staff Reply) was accompanied by an Affidavit of Christopher A. McKenney dated April 21, 1999 (McKenney April 21, 1999 Affidavit).

be accounted for in the compliance assessment." Franke Declaration at 6. Franke States (Franke Testimony at 6, 7) that radioactivity released from source and byproduct materials from prior uranium mining and milling activities in the Church Rock area contribute in excess of 0.2 pCi/l to the calculation of the TEDE.

Intervenors' concern, succinctly, is whether HRI's operations at Church Rock Section 8 will cause the total effective dose equivalent ("TEDE") to the individual likely to receive the highest dose from the licensed operation to exceed the annual dose limit. Since background radiation is excluded from the TEDE, it is important to understand the legal definition of background when calculating the TEDE for purposes of determining whether a project will be in compliance with NRC regulations.

The dose limits governing our inquiry for individual members of the public are set by the NRC in 10 C.F.R. § 20.1301(a)(1):

(a) Each licensee shall conduct operations so that—(1) The total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem (1 millisievert) in a year, *exclusive of the dose contributions from background radiation*, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released in accordance with § 35.75, from voluntary participation in medical research programs, and from the licensee's disposal of radioactive material into sanitary sewerage in accordance with § 20.2003; and
...

[Emphasis added.] In 10 C.F.R. § 20.1003, the NRC defines background radiation:

Background radiation means radiation from cosmic sources; naturally occurring radioactive material, including radon (except as a decay product of source or special nuclear material); and global fallout as it exists in the environment from the testing of nuclear explosive devices or from past nuclear accidents such as Chernobyl that contribute to background radiation *and are not under the control of the licensee*. "Background radiation" does not include radiation from source, byproduct, or special nuclear materials regulated by the Commission.⁴

⁴ The terms "source material" and "byproduct material", which are relevant for purposes of regulating *in situ* leach mining and milling, are defined in 10 C.F.R. § 20.1003 as follows:

[Emphasis added.]

As pointed out in LBP 99-15, this definition places a limit on the "total effective dose equivalent" and "then defines a class of contributions to dose that are excluded," e.g., background radiation. Based on this fact, the Presiding Officer concluded that "if the source of a dose is not excluded then it is included in the total effective dose equivalent from licensed operations, for the purpose of complying with 10 C.F.R. §§ 20.1301 and 20.1302." Id.

As Intervenors assert, "background" radiation does not include radiation from source or byproduct material. Although HRI would apply the phrase "regulated by the Commission" to each of the antecedent nouns, that is not the way English grammar treats subordinate clauses. The normal meaning of this sentence is that "regulated by the Commission" applies only to the last noun in the series, "special nuclear materials." To interpret it otherwise would be to find that the regulation contains a drafting error and should have said: "Background radiation" does not include radiation from *materials regulated by the Commission, including* source, byproduct, or special nuclear materials." I am not persuaded to interpret this language in such a stilted way.

Nevertheless, I disagree with Intervenors concerning the calculation of off site doses. I have reviewed Franke's worst case scenario from which he calculates a 50% probability that

Source material means— (1) Uranium or thorium, or any combination of uranium and thorium in any physical or chemical form; or (2) Ores which contain, by weight, one-twentieth of one percent (0.05 percent), or more, of uranium, thorium, or any combination of uranium and thorium. Source material does not include special nuclear material.

Byproduct material means— (1) Any radioactive material (except special nuclear material) yielded in, or made radioactive by, exposure to the radiation incident to the process of producing or utilizing special nuclear material; and (2) The tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by these solution extraction operations do not constitute "byproduct material" within this definition.

NRC regulations may be exceeded. Franke Testimony at 10-11. Franke can not properly utilize his worst case scenario to calculate a limit which is based on annual average exposures. See 10 C.F.R. § 20.1302(b)(2)(i) and Table 2 of Part 20 Appendix B. The probability that an individual will be present during the worst case scenario is less than 100 percent and it is therefore inappropriate to act as if the individual would definitely be there during a "worst case."

In addition, Franke does not show how the existing elevated levels from on-site have an impermissible impact on an individual off-site. Notwithstanding the corrections made by Franke to the calculation (see Franke Declaration at 14-16; McKenney April 21, 1999 Affidavit at 2-5), I understand McKenney's worst case dose calculation and consider it reasonable. It indicates that doses from radon released from operations at the Church Rock site will not exceed dose limits to a hypothetical individual 100 meters off site. I find that this conclusion is correct.

The issue of radiation from source materials is also addressed by the Staff, which concludes that some of the surface radiation on Churchrock Section 8 may be from source material. McKenney April 7 Affidavit ¶ 3, pp. 2-6. However, by making conservative assumptions (calculating the highest reasonable dose based on the information available), Mr. McKenney concludes that:

the total radon production [attributable to source material] . . . over one year would be 0.2 Ci. If I further assume that all of the radon escapes from this ground area into the atmosphere, the resulting annual TEDE exposure to the nearest resident would be a small fraction of one millirem.

Id. at 3. Accordingly, there is no substantial risk attributable to radium from source materials on Section 8.

Though there may be a risk associated with radium from source material on HRI's Churchrock Section 17, that question may be held in abeyance and not addressed in this portion

of the proceedings.⁵ In bypassing the issue of proper calculation of background radiation from Section 17, it has not yet been determined whether radiation released from the underground mine on Section 17 may be excluded from background. Staff and Licensee have argued, based on the Statement of Considerations (SOC) published with 10 C.F.R. § 20.1301, that material can be "background" only if it is "under the control of the licensee." *See* 56 Fed. Reg. 23,360, 23, 374 (May 21, 1991). However, there is an important defect in this argument. The cited language from the SOC was used to support the proposition that "dose should not be all-inclusive and should not include fallout from nuclear weapons tests, transportation of radioactive material, or other sources of radiation not under the control of the licensee." The comment does not focus on whether dose can come from underground sources on the licensee's land. Arguably, those sources are under the licensee's control because remedial measures may be taken to reduce radiation from those sources. In addition, licensee obtained its title from a prior land owner who is in the same chain of title and whose acts may reasonably be said to pass with the title, thus preventing a successor to the title from disassociating himself from actions of a prior owner.

⁵*See* Intervenors' Response to HRI's and NRC Staff's Answers to LBP-99-15, April 21, 1999, at 3. Under the Presiding Officer's interpretation, radon released from source material in Section 17 is excluded from background radiation.

CONCLUSION

On the basis of the analysis above, which rests on the interpretation of the relevant regulations (10 C.F.R. § 20.1301(a)(1) and 10 C.F.R. § 20.1003), I conclude that the HRI has demonstrated by a preponderance of the evidence that the air borne doses from the proposed operation of the Church Rock site will not exceed regulatory requirements.

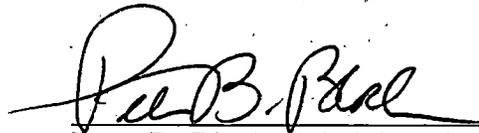
ORDER

For all the foregoing reasons and upon consideration of the entire record in this matter, it is this 13th day of May, 1999, ORDERED, that:

1. The relief requested by Eastern Navajo Diné Against Uranium Mining (ENDAUM) and the Southwest Research and Information Center (SRIC) in their Brief (Intervenors' Brief), accompanied by Testimony of Bernd Franke (Franke Testimony), on January 11, 1999, is *denied*.

2. There is no reason for further filings or for oral argument.

3. Pursuant to the Commission's order of May 3, 1999, no additional petitions for Commission review shall be filed in this proceeding until the Presiding Officer completes his consideration of all questions related to the "Section 8" property (currently expected by June 15, 1999). Within 14 days after the Presiding Officer issues his final decision related to the "Section 8" property, each party may file a single petition for review, not to exceed 30 pages, addressing all remaining challenges to decisions rendered by the Presiding Officer. Responses to such petitions for review shall be filed within 14 days after the petition is filed, and shall not exceed 30 pages.



Peter B. Bloch, Administrative Judge
Presiding Officer

Rockville, Maryland

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of
HYDRO RESOURCES, INC.

Docket No.(s) 40-8968-ML

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing PART. INIT. DECISION LBP-99-19 have been served upon the following persons by U.S. mail, first class, except as otherwise noted and in accordance with the requirements of 10 CFR Sec. 2.712.

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Docket No.(s)40-8968-ML
PART. INIT. DECISION LBP-99-19

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Dated at Rockville, Md. this
13 day of May 1999

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