

December 15, 2005

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

DOCKETED  
USNRC

ATOMIC SAFETY AND LICENSING BOARD

December 15, 2005 (4:16pm)

Before Administrative Judges:  
E. Roy Hawkens, Presiding Officer  
Richard F. Cole, Special Assistant  
Robin Brett, Special Assistant

OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

In the Matter of: )  
 )  
HYDRO RESOURCES, INC. )  
P.O. Box 777 )  
Crownpoint, NM 87313 )

Docket No. 40-8968-ML  
ASLBP No. 95-706-01-ML

**NOTICE OF ERRATA IN INTERVENORS' SUPPLEMENTAL BRIEF ON  
RADIOACTIVE AIR EMISSIONS**

Eastern Navajo Diné Against Uranium Mining and Southwest Research and Information Center (collectively "Intervenors"), by and through their undersigned attorneys, hereby notify the Presiding Officer and all parties of the following errata in their Supplemental Brief on Radioactive Air Emissions, filed on December 7, 2005:

1. Corrections to the Table of Authorities include:
  - a. All Federal Register citations have been separated from the Code of Federal Regulations;
  - b. Pages where 10 C.F.R. §§ 40.13 and 40.21 is cited now include page 6;
  - c. Proposed 10 C.F.R. § 20.1003(4), 51 Fed. Reg. 1032, 1126 (January 9, 1986) has been changed to 10 C.F.R. § 20.1003(4)

TEMPLATE = SECY-037 (proposed);

SECY-02

- d. 10 C.F.R. § 20.301 (proposed), page 10 has been added;
  - e. 55 Federal Register at 23, 274 (May 21 1991), page 11, has been deleted and has been listed correctly with 56 Federal Register at 23, 274 (May 21 1991), pages 9, 11, 13;
  - f. Pages where 62 Fed. Reg. 39, 083 is cited now include page 11;
  - g. Reference to "in the Matter of" in NRC case citations has been deleted;
- 2. Vertical lines in margins throughout the brief were deleted;
  - 3. Pagination was corrected so that the cover page is not numbered;
  - 4. p. 4, closed parenthesis was added to (hereinafter "Catawba").
  - 5. p. 8, an "s" was added to "occupational dose" in the definition of "public dose";
  - 6. p. 9, the beginning of the last sentence immediately prior to the quote beginning "*all known sources ...*" should read "The proposed version of the 1991 rule also succinctly states that the dose limits include", instead of "The 1991 rule also contained dose limits which succinctly stated in the proposed version of the rule considers ..".
  - 7. p. 11, the citation of the first quotation from the Federal Register at the top of the page was corrected from 55 Fed. Reg. 23,374 to 56 Fed. Reg. 23, 374. This change is reflected in the table of authorities (number 1.e, supra);
  - 8. p. 12, "and HRI" was added to "the Staff infers" and the word "infers" was corrected to "infer" in the third to the last sentence;
  - 9. p. 13, n. 4, the words "See" and "e.g." were underlined;

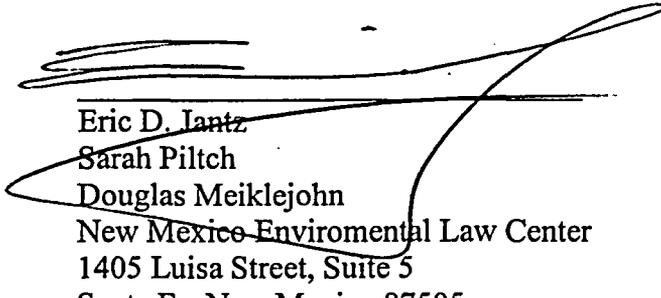
10. p.16, n. 8, in the second to last sentence, the word “whether” was deleted before the clause beginning “,if it does prevent ...”;

11. p.16, n. 9, the word “is” was replaced with the word “are” after the words “Further, what radon concentration data”;

12. p. 17, the “s” after the apostrophe in the word “Intervenors” in the second sentence was deleted.

Corrected copies of the Intervenors’ Supplemental Air Brief, Table of Contents, and Table of Authorities are attached hereto.

Dated December 15, 2005.



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EMISSIONS**

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**I. INTRODUCTION**

Pursuant to the Presiding Officer's Order (Directing Parties To Provide Supplemental Briefing In Phase II Radiological Air Emissions Challenges To In Situ Leach Uranium Mining License) (Nov. 15, 2005) (unpublished) (hereinafter "November 15 Order"), Intervenors Eastern Navajo Diné Against Uranium Mining ("ENDAUM") and Southwest Research and Information Center ("SRIC") (collectively, "Intervenors") hereby submit their supplemental brief addressing the meaning of the term "background radiation" as defined in 10 C.F.R. § 20.1003 and used in 10 C.F.R. § 1301(a)(1).

In the course of preparing this brief, Intervenors have conducted an extensive review of the history of the Part 20 regulations, dating back to their promulgation in 1957. While this review has slightly changed Intervenors' understanding of some

particular phrases in the regulations, as a general matter it has confirmed their position that the dose estimates submitted by Hydro Resources, Inc. ("HRI") in support of its license for the Church Rock Section 17 *in situ* leach ("ISL") mine site do not satisfy the requirements of 10 C.F.R. § 1301(a)(1). In particular, HRI has improperly categorized as "background radiation" significant levels of radioactivity caused by human activity that do not meet the regulatory definition of "background radiation" in 10 C.F.R. § 20.1003, and which therefore must be included in the total effective dose equivalent ("TEDE"). Moreover, the fact that the sources of this radioactivity are not licensed by the NRC does not exempt them from inclusion in the TEDE.

As Intervenors have previously pointed out, if HRI's dose estimates are revised to take into account radioactive emissions that may not lawfully be categorized as background radiation, HRI cannot demonstrate that it will operate in compliance with the dose limits in 10 C.F.R. § 1301(a)(1), and therefore its license must be revoked. Moreover, the Final Environmental Impact Statement ("FEIS") must be rejected for misleadingly characterizing the airborne radiological impacts of the Section 17 mining operation as negligible, based on the false assertion that the "primary radiological impact to the environment in the vicinity of the project results from naturally occurring cosmic and terrestrial radiation and naturally occurring radon-222 and its daughters." NUREG-1508, Final Environmental Impact Statement to Construct and Operate the Crownpoint Uranium Solution Mining Project, Crownpoint, New Mexico at 4-72 (February 1997).

## II. Relevant Regulations

In 10 C.F.R. Part 20, the U.S. Nuclear Regulatory Commission (“NRC” or “Commission”) establishes limits for the total effective dose equivalent (“TEDE”) for members of the public. Section 1301(a)(1) provides that:

- (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 mSv) in a year, exclusive of the dose contributions from background radiation, from any administration the individual has received, from exposure to individuals administered radioactive material and released under § 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.

10 C.F.R. § 20.1301(a)(1).

The licensee may show compliance with § 1301(a)(1) either by:

- (1) Demonstrating by measurement or calculation that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed operation does not exceed the annual dose limit;

or by:

- (2) Demonstrating that –
  - (i) The annual average concentrations of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed the values specified in table 2 of appendix B to part 20; and
  - (ii) If an individual were continuously present in an unrestricted area the dose from external sources would not exceed 0.002 rem (0.02 mSv) in an hour and 0.05 rem (0.5 mSv) in a year.

Id. at § 20.1302(b).

Section 20.1003 states “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.

10 C.F.R. § 20.1003.

### III. Relevant Canons of Construction

As with statutes, when inquiring into the meaning of a regulation, the starting point is the statute's or regulation's plain language. Wrangler Laboratories, et. al., ALAB-951, 33 NRC 505, 513-514 (1991) (hereinafter "Wrangler Laboratories"), quoting Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), ALAB-900, 28 NRC 275, 288 (1988). If the plain language is clear, giving the words and phrases their ordinary meaning, the inquiry ends. Cleveland Electric Illuminating Co. (Perry Nuclear Power Plant, Unit 1), LBP-95-17, 42 NRC 137, 145 (1995) (hereinafter "Cleveland Electric"). In analyzing the plain language of a statute or regulation, the context of the word or phrase in question must be considered in the statutory or regulatory scheme. King v. St. Vincent's Hospital, 502 U.S. 215, 221 (1991). The regulatory scheme must be "coherent and consistent." Duke Energy Corp. (Catawba Nuclear Station, Units 1 and 2), LBP-05-10, 61 NRC 241, 299 (2005), rev'd on other grounds, CLI-05-14, 61 NRC 359 (2005) (hereinafter "Catawba"). Moreover, the statute or regulation must be read as a whole and effect given to each word. Wrangler Laboratories, 33 NRC at 513.

When the language of the regulation and its context are ambiguous, external sources of information, such as statutory or regulatory history should be consulted. Cleveland Illuminating Co., 42 NRC at 145. A "primary tool for resolving . . . uncertainty" in the meaning of regulatory language is the regulatory history of the provision. Wrangler Laboratories, 33 NRC at 515. Ultimately, the intent of the drafter is

the dispositive factor in interpreting legislation or regulations, whether by using the statute's or regulation's plain language or based on extrinsic sources. Griffin v. Oceanic Contractors, Inc., 458 U.S. 564, 571 (1982).

#### IV. ARGUMENT

The questions raised in the November 15 Order can be essentially distilled to the inquiry of what sources of radiation HRI must include in its calculations of doses to the general public from its proposed operations at Section 17. Intervenors respectfully submit that the plain language of the applicable regulations, the place of those regulations in the regulatory framework, and Part 20's regulatory history demonstrate that the radiation that must be included in the estimate or calculation of TEDE, for purposes of showing compliance with public dose limits, consists of all radiation except cosmic radiation, fallout from nuclear weapons testing, and naturally occurring radioactive material. All anthropogenic sources of radiation must be considered, whether or not they are licensed by the NRC or within the licensee's control. Thus, HRI has no lawful basis for seeking to exclude from consideration either the spoilage from a previous uranium mine which lies on Church Rock 17, or offsite mine spoilage that affects radiation doses at HRI's fence line. Because HRI did not include the radiation from existing surface contamination on and near Section 17 in its TEDE calculations, and the Intervenors have shown that doing so would result in radiation exposure to members of the public above regulatory limits, HRI's license for Section 17 must be revoked. Finally, the FEIS for HRI's proposed operations misrepresents the levels of background radiation and is therefore invalid.

**A. Radiation From the Mine Spoilage on Section 17 Is Not Background Because It Is Not Naturally Occurring.**

**1. Under a Plain Reading of 10 C.F.R. § 20.1003, Radiation From the Mine Spoilage on Section 17 is not Background Because it is not Naturally Occurring.**

NRC regulations at 10 C.F.R. § 20.1003 state that “background radiation means” cosmic sources, global fallout, and naturally occurring radiation. Under standard principles of statutory construction, any source of radiation that does not fall into one of these categories does not qualify as background radiation. Colautti v. Franklin, 439 U.S. 379 (1978) (A definition that states what something “means,” rather than what it “includes,” excludes any meaning that is not stated). Because radiation emanating from the uranium, thorium, radium, and radon in spoilage from former mining operations that is present on the surface of the Church Rock Section 17 site is not “naturally occurring,” it does not qualify as “background radiation” under the plain language of the standard.

The Presiding Officer has asked the parties to explain the meaning of the language in the definition of “background radiation” which states that naturally occurring radioactive material includes radon “(except as a decay product of source material or special nuclear material).” Because radon is the single biggest contributor to background radiation, Intervenors believe that the Commission wanted to clarify the distinction between background radiation and anthropogenic radiation sources. Intervenors also believe that the Commission’s purpose in stating that radon as a decay product of source material does not constitute background material was to ensure that licensees would not attempt to exclude radiation from source material in amounts or concentrations too small to warrant licensing by the Commission from TEDE estimates or calculations. See 10

C.F.R. §§ 40.13 and 40.21. Notably, the definition of background radiation does not qualify in any way the meaning of “source material” in the parenthetical clause, for example, by explaining that source material only includes source material regulated by the Commission. Therefore, radiation from the decay of source material i.e, uranium or thorium in any physical or chemical form, whether or not regulated by the Commission, must be included in TEDE calculations.<sup>1</sup>

**2. The Regulatory Scheme of Part 20 Shows That the Commission Intended to Include in TEDE Estimates or Calculations All Anthropogenic Radiation Sources Except for Fallout From Weapons Testing and Nuclear Accidents.**

The exclusion from background radiation of all anthropogenic radiation sources (other than fallout from testing of nuclear weapons) is consistent with the entire scheme of the Part 20 regulations. For instance, in the “Purpose” section of the regulations, the Commission states that:

*It is the purpose of the regulations in this part to control the receipt, possession, use, transfer, and disposal of licensed material by any licensee in such a manner that the total dose to an individual (including doses resulting from licensed and unlicensed radioactive material and from radiation sources other than background radiation) does not exceed the standards for protection against radiation prescribed in the regulations in this part. . .*

10 C.F.R. § 20.1001(b) (emphasis added).

In addition, the regulations contain an expansive definition of “public dose”:

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<sup>1</sup> Intervenors also believe that the Commission did not mention byproduct material in the parenthetical because byproduct is so obviously anthropogenic in origin, being simply a processed form of source material. Intervenors note that in the proposed version of the 1991 rule where the definition of background radiation was first published, byproduct material was specifically excluded from the definition of background radiation. Proposed 10 C.F.R. § 20.1003(4), 51 Fed. Reg. 1032, 1126 (January 9, 1986). Although the Commission removed the reference to byproduct material from the definition in the final rule, it did not state that this represented any substantive change to the definition. Therefore, it is reasonable to assume that the Commission continued to consider that radiation from byproduct material is not background radiation.

*Public dose* means the dose received by a member of the public from exposure to radiation and to radioactive material released by a licensee, or to another source of radiation *either within a licensee's controlled area or in unrestricted areas*. It does not include occupational doses or doses received from background radiation, as a patient from medical practices, or from voluntary participation in medical research programs.

10 C.F.R. § 20.1003 (emphasis added). Thus, viewed in the context of the whole of Part 20, it is clear that the Commission intended licensees to include the radiation from all human-caused sources in their TEDE calculations.

**3. The Regulatory History Shows that the Commission Intended for All Anthropogenic Radiation at the Licensee's Fenceline to be Included in its TEDE Calculations.**

The principle that the TEDE includes all anthropogenic radiation sources that may contribute to the public dose is also reflected in the history of the Part 20 regulations, in several respects. When the Part 20 regulations were first promulgated in 1957, the Commission required licensees to include in their dose calculations only radiation from sources that were in their possession. For instance, in the 1957 version of the Part 20 rules, the purpose of the regulations was described as follows:

The use of radioactive material or other sources of radiation not licensed by the Commission is not subject to the regulations in this part. However, it is the purpose of the regulations in this part to control the possession, use, and transfer of licensed material by any licensee in such a manner that exposure to such material and to radiation from such material, *when added to exposures to unlicensed radioactive material and to other unlicensed sources of radiation in the possession of the licensee*, and to radiation therefrom, does not exceed the standards of radiation protection prescribed in the regulations in this part.

10 C.F.R. § 20.1(b), 25 Fed. Reg. 548, 549 (January 29, 1957) (emphasis added).<sup>2</sup> This statement of purpose was clarified and broadened over the years. The 1979 version of the

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<sup>2</sup> The 1957 Part 20 dose limit provisions were also consistent with this principle. Section 20.102(b) provided that with certain limited exceptions:

regulations, which remained in effect until the 1991 revisions, drops the “in the possession of the licensee” language, thereby broadening the scope of the regulations, to provide:

[I]t is the purpose of the regulations in this part to control the possession, use, and transfer of licensed material by any licensee in such a manner that the total dose to an individual (*including exposures to licensed and unlicensed radioactive material and to other unlicensed sources of radiation, whether in the possession of the licensee or any other person, but not including exposures to radiation from natural background sources or medical diagnosis and therapy*) does not exceed the standards of radiation protection described in the regulations in this part.

10 C.F.R. § 20.1(b), 44 Fed. Reg. 32,352 (June 6, 1979) (emphasis added).

In 1991, the Commission substantially reduced the dose limits in Part 20 and made other changes such as adding a definition of “background radiation.”<sup>3</sup> The new rule dropped any reference to possession of the licensee. 56 Fed. Reg. 23,361 (May 21, 1991). The new statement of purpose read:

[I]t is the purpose of the regulations in this part to control the receipt, possession, use, transfer, and disposal of licensed material by any licensee in such a manner that the total dose to an individual (including doses from licensed and unlicensed radioactive material and from radiation sources other than background radiation) does not exceed the standards of radiation protection prescribed in the regulations in this part.

56 Fed. Reg. at 23,391. The proposed version of the 1991 rule also succinctly states that the dose limits include “*all known sources* of both external and internal dose, other than

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No licensee shall possess, use, or transfer licensed material in such a way as to create in any unrestricted area from radioactive material *and other sources of radiation in his possession.*

25 Fed. Reg. at 551 (emphasis added). “Radioactive material” was defined as including “any such material *whether or not subject to licensing control by the Commission.*” 25 Fed. Reg. at 549 (emphasis added).

<sup>3</sup> Intervenors note that the proposed rule proposed two tiers of doses: an “annual dose limit” of 0.5 rem/year and a “reference dose limit” of 0.1 rem/year. Based on a clarification from the ICRP, the final rule set a “primary dose limit” of 0.1 rem/year. 56 Fed. Reg. at 23,374.

natural background and medical diagnosis and therapy.” 51 Fed. Reg. 1092, 1112 (January 9, 1986) (emphasis added), citing proposed 10 C.F.R. § 20.301 (which became § 20.1301 in the final rule).

Six years later, in defending its standard of 0.025 rem/year for release of sites after decommissioning, the Commission explained in even more detail the basis for the 0.1 rem/year dose limit it had promulgated in 1991:

... NCRP in its publication No. 116 (Chapter 15) recommends that, for continuous exposure, the effective dose to members of the public not exceed 1 mSv/y (100 mrem/y) from all man-made sources, other than medical and not including natural background sources. Similarly, ICRP, in Table 6 of ICRP Publication 60, recommends a limit of 1 mSv/y (100 mrem/y) as the dose limit for the public, and recommendation No. 3 of the draft EPA Federal Radiation Protection Guidance (FRG) indicates that the combined radiation doses incurred in any single year from all sources of exposure (excluding medical and natural background) should not normally exceed 1 mSv (100 mrem) and that continued or chronic exposure of an individual over substantial portions of a lifetime at or near 1 mSv (100 mrem) should be avoided. *Consistent with those bodies, the NRC issued 10 CFR Part 20 (56 FR 23360) in 1991 that established a public dose limit of 1 mSv/y (100 mrem) in 10 CFR 20.1301.*

These national and international bodies also note and agree that, although the limit for the public dose should be 1 mSv/y (100 mrem/y) from all man-made sources combined, it would seem appropriate that the amount that a person would receive from a *single source* should be further reduced to be a fraction of the limit to account for the possibility that an individual may be exposed to more than one source of man-made radioactivity, thus limiting the potential that an individual would receive a dose at the public dose limit.

62 Fed. Reg. 39,058, 39,062 (July 21, 1997) (emphasis added). Thus, the NRC endorsed ICRP’s reasoning that limiting a “single source” to 0.025 rem/year would ensure compliance with § 20.1301’s purpose of ensuring that radiation doses from *multiple sources* would not exceed the public dose limit of 0.1 rem/year.

**B. A Conflicting Statement in the Regulatory History Does Not Fatally Undermine the Purpose and Regulatory Scheme of Part 20.**

Intervenors note that a statement in the preamble to the 1991 rule appears to contract the scope of radiation sources subject to the TEDE as described in the Part 20 statement of purpose. In response to a comment that “the 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 licensees,” the Commission responded that:

The new lower dose limit for members of the general public (which was described as a “reference level” in the proposed rule) *applies only to doses from radiation and radioactive materials under the licensee's control.*

56 Fed. Reg. at 23,374 (emphasis added). Intervenors respectfully submit that this contradictory language should be discounted. Where explanatory language in the regulatory history contradicts the regulations themselves, the regulatory language must trump the history. Catawba, 61 NRC at 299. Moreover, as discussed, supra, at page 9-10, the subsequent regulatory history of release criteria following decommissioning confirms that the Commission intended to include all anthropogenic sources in the scope of the TEDE. Another statement made by the Commission in the course of that same rulemaking provides further clarification of how the Commission views the issue of a licensee’s control over radiation. In adding Chernobyl fallout to the list of materials qualifying as sources of background radiation, the Commission asserted:

After review of the comments, the Commission continues to believe that the inclusion in background of global fallout from weapons testing and accidents such as Chernobyl is appropriate. No compelling reason was presented that would indicate that remediation should include material over which the licensee has no control and that *is present at comparable levels in the environment both on and offsite.*

62 Fed. Reg. at 39,083 (emphasis added). In this case, there is a great disparity between natural background radiation levels and anthropogenically caused radiation levels.

Declaration of Bernd Franke at ¶¶ 15-16 (June 12, 2005) (“Franke Declaration”) (ACN ML051660423)

**C. The Second Sentence in the Definition of “Background Radiation” Does Not Establish a Requirement That Non-Background Sources of Radiation Must Be Regulated by the NRC to be Excluded from Background.**

The second sentence in the definition of “background radiation” excludes “radiation from source, byproduct or special nuclear materials which are regulated by the Commission.” This is the sentence relied on by the NRC Staff and HRI to argue that the emissions from the mine shaft and surface spoilage on Section 17 constitute “background radiation” because they are not regulated by the Commission. See, Hydro Resources, Inc.’s Response in Opposition to Intervenors’ Written Presentation Regarding Air Emissions (“HRI’s Air Emissions Response”) (July 29, 2005) (ACN ML052160144) at 19-20, and NRC Staff’s Response to Intervenors’ Presentation on Radiological Air Emissions (“NRC Staff’s Air Emissions Response”) (August 5, 2005) (ACN ML052210240) at 15-18. Based on the second sentence, the Staff and HRI infer that the first sentence contains an implicit assumption that radiation sources are by definition “background” if they are not licensed by the Commission. Id. Under standard principles of construction, however, the *entire* definition must also be read in a way that gives meaning to all of the language in the definition. Duncan v. Walker, 533 U.S. 167, 174 (2001). Thus, the first sentence cannot be ignored in favor of the second sentence.

Moreover, the regulatory history of the second sentence of the “background radiation” definition shows that the Commission’s purpose in adding the second sentence to the definition of “background radiation” was to ensure that radioactive emissions from other NRC-licensed facilities would be counted in the TEDE. In adding the sentence (which had not been included in the proposed rule), the Commission explained that:

The EPA’s generally applicable environmental radiation limit for nuclear power operations (40 CFR part 190) does apply to the total dose from all sources within the uranium fuel cycle. However, in its practical implementation, the sources would have to be located within a few miles of each other for the combined dose contributions to be significantly different from the dose from either facility alone.

56 Fed. Reg. at 23,274. Thus, as clarified in the preamble to the 1991 proposed rule, *in addition to* unlicensed radiation sources, the TEDE calculation encompasses *other* sources of radiation that are licensed by the NRC, such as neighboring facilities<sup>4</sup>.

**D. Based on the Definition of Background Radiation and 10 C.F.R. § 20.1301(a), the Radiation from Surface Spoilage on Section 17 Should Be Included in HRI’s TEDE Calculations.**

As Intervenors argued in their brief on radioactive air emissions, radioactive contamination on and near Section 17 is caused by source material, as defined by 10 C.F.R. § 20.1003, from UNC’s prior mining activities and thus should be included in HRI’s TEDE.<sup>5</sup> In light of the definition of background, Intervenors’ position remains

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<sup>4</sup> The regulatory history also cuts against the argument that the surface spoilage at Section 17 is technically enhanced naturally occurring radioactive material (“TENORM”) and therefore excluded from TEDE. See, e.g., NRC Staff’s Air Emissions Response at 20-22. The Commission has never adopted a definition of TENORM, and it is therefore entirely irrelevant to interpreting the definition of background radiation or determining what sources of radiation must be included in TEDE calculations.

<sup>5</sup> Intervenors Eastern Navajo Diné Against Uranium Mining’s and Southwest Research and Information Center’s Written Presentation in Opposition to Hydro Resources, Inc’s Application

unchanged. Moreover, in light of the Commission's intent for sources of human-caused radiation to be included in a licensee's TEDE calculations, HRI's failure to include radiation from surface spoilage at Section 17 in its TEDE calculations is clearly contrary to the regulations.

**1. Surface Spoilage on Section 17 is Source Material.**

As demonstrated in parts IV.A and B, above, radiation from anthropogenic source material, whether or not it is controlled by the licensee or regulated by the Commission, is clearly excluded from background radiation. In this case, the surface spoilage from UNC's past mining activity on Section 17 is source material. The regulations define source material as:

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

10 C.F.R. § 20.1003. By definition, any uranium or thorium in whatever chemical or physical form or ore containing more than 0.05 percent or greater of uranium or thorium is source material and excluded from background. Moreover, some of the spoilage on Section 17 constitutes "ore" as the term is defined in part (2) of the definition of source material. Thus, even source material in quantities or concentrations too low to regulate must be considered in the TEDE.

As previously explained by Intervenors' expert, Bernd Franke, elevated gamma and radon levels on and at the boundary of Section 17 are most likely caused by previous mining activities, which would have left waste containing uranium and waste ore with a

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for a Materials License with Respect to Radiological Air Emissions for Church Rock Section 17 at 21 (June 13, 2005) (ACN ML051660423) ("Section 17 Air Presentation").

concentration approaching 0.05 percent uranium. Franke Declaration at ¶¶ 15-16.

Moreover, HRI's own expert, Mark Pelizza, acknowledges that the current high gamma radiation levels at Section 17 are due to "residual uranium ore and waste rock" containing uranium.<sup>6</sup> Because the surface spoilage on Section 17 could fit into one or both definitions of source material, the radiation from that material, including radon, caused by the decay of that waste material, must be included in HRI's TEDE calculations.<sup>7</sup>

## 2. Section 17 and its Surface Spoilage Are Under HRI's Control.

While HRI did not cause the existing contamination at Section 17, it purchased the mineral rights and surface use rights from UNC with full knowledge of the radioactive contamination present on the property. See, e.g., Exhibit G to Intervenor's 2005 Air Presentation. Furthermore, HRI has a surface use agreement covering Section

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<sup>6</sup> Affidavit of Mark S. Pelizza, attached as Exhibit A to Hydro Resources, Inc.'s Response in Opposition to Intervenor's Written Presentation Regarding Air Emissions at ¶ 70 (June 26, 2005) (ACN ML052160144) ("Pelizza Affidavit"); see also, Id. at ¶¶ 69, 75.

<sup>7</sup> HRI's Environmental Report for the Church Rock Site contained concentrations of uranium in soil and sediment samples collected on both Section 8 and Section 17 in 1987. See, Pelizza Affidavit, Attachment 1, Table 2.9-1 (6<sup>th</sup> and 7<sup>th</sup> pages) and Table 2.9-2 (8<sup>th</sup> page). These concentrations are expressed in "ppm", or parts per million, which is the same as micrograms per gram ("ug/g"). Uranium concentrations for seven soil samples collected from Section 17 (Table 2.9-1) ranged from 2.2 ppm to 420 ppm. Uranium concentrations in four sediment samples collected from Section 17 (Table 2.9-2) ranged from 2.4 ppm to 140 ppm. (Sample locations for both soils and sediments are shown on a map from the Environmental Report, which is the 5<sup>th</sup> page of Attachment 1 to the Pelizza Affidavit.) The U.S. Department of Health and Human Service's Agency for Toxic Substances and Disease Registry's ("ATSDR") Toxicological Profile for Uranium, published in final form in 1999, reported that the average uranium soil concentration in the U.S. is 0.6 picoCuries per gram ("pCi/g"), or 0.9 ug/g, using the report's conversion factor of 1 pCi/g = 1.5 ug/g. (Relevant excerpts from this report are attached hereto as **Exhibit A**; the entire document can be reviewed and downloaded from the ATSDR website, <http://www.atsdr.cdc.gov/toxprofiles/tp150.html>.) For sedimentary rocks, such as sandstones and shales, the average uranium concentrations range from 0.3 pCi/g to 1.0 pCi/g, or 0.45 ug/g to 1.5 ug/g. Accordingly, uranium in soil and sediments on Section 17 ranged from about 2.4 times to 467 times greater than average U.S. "background" as set forth in the ATSDR report. The highest concentrations of uranium on Section 17 coincided with the location of surface spoilage from the Old Church Rock Mine. Pelizza Affidavit, Attachment 1, map on 5<sup>th</sup> page, and Attachment 2, map on 1<sup>st</sup> page. Thus, HRI's own uranium-in-soils data for Section 17 clearly show the presence of source material, i.e., uranium in any chemical or physical form.

17 and purports to have the right to use the land for mining and to restrict access. Pelizza Affidavit at ¶ 87 and attachment 8 thereto. HRI proposes to construct a fence to restrict access to its wellfield area as well as nearby areas.<sup>8</sup> Id. at ¶¶ 85-86 and Attachment 2. Further, while HRI asserts that it will remediate Section 17, it admits that it will not do so until after its operations cease. Id. at ¶ 71. Thus, during the period of HRI's operations, the area under HRI's control, i.e., Section 17, will continue to emit radiation in excess of Part 20's regulatory limits. Because HRI has control of the source material on Section 17, radiation from that material must be included in HRI's TEDE calculations.<sup>9</sup>

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<sup>8</sup> HRI will be unable to restrict access to the entirety of Section 17. State Highway 566 runs through Section 17 and HRI will not be able to fence or obstruct this highway. See Attachment 2 to Pelizza Affidavit. Further, Mr. Larry J. King has a grazing permit that allows him to graze livestock on Section 17. See, Intervenor's Section 17 Air Presentation, Exhibit N, ¶ 2 and Exhibit 2 attached thereto. HRI has not indicated whether it has the legal right to prevent Mr. King from grazing his livestock on Section 17 or, if it does prevent Mr. King from doing so, whether or not HRI will compensate Mr. King for the loss of his grazing rights.

<sup>9</sup> It is noteworthy that HRI has not demonstrated compliance with the Part 20 regulatory radiation limits with respect to radon because it has provided no site specific data on radon concentrations at Section 17. Further, what radon concentration data are available from Section 8 (with sample site 8R1 located on the boundary between Section 8 and Section 17), shows that the TEDE already exceeds the regulatory dose limits. See, Pelizza Affidavit, Attachment 1. Specifically, radon sample site 8R1, which is located on the boundary between Section 17 and Section 8, had the highest annual average radon concentration of the three radon monitors HRI operated in 1987 and 1988. Id., Attachment 1, map on 5<sup>th</sup> page and resulting ambient radon data for site 8R1 in Table 2.9-3. Here, the average annual ambient radon concentration is 3.1 picoCuries per liter-air ("pCi/l"), with a range of 0.3 pCi/l to 13.4 pCi/l. As pointed out by Intervenor's expert Franke in his January 1999 testimony, this average radon level exceeds by more than an order of magnitude the level of radon, i.e., 0.2 pCi/l-air, that would be produce an annual dose of 0.1 rem, or 100 millirem ("mrem"). See, Intervenor's Section 17 Air Presentation, Exhibit L.2 at 1-2 and 12. Furthermore, 8R1 is the *only* sample location next to Section 17. Since the 1987 ambient radon concentration measured at Station 8R1 was 5 to 30 times higher than ambient radon measured at several locations in the San Juan Basin not affected by uranium mining, the source of this high radon level can only be the source material present on Section 17. Id., Exhibit L, ¶ 16, and Exhibit L.2 at 4-7 and Table 1 at 13. Additionally, the local geology could not play a role in this high average level because the surface soils and rocks at Section 17 are not uraniferous. Id., Exhibit L, n. 3, citing Intervenor's expert Dr. Richard Abitz, a geologist and geochemist.

**3. Doses to the Nearest Resident, Mr. King, Already Exceed 100 mrem/yr From Gamma Radiation and Radon.**

If the language and spirit of the regulations are followed, HRI will violate Part 20's regulatory limits on radiation exposure to the general public. Intervenors' experts have already shown that gamma radiation contained in spoilage released from the Old Church Rock Mine site onto portions of Section 17 that are presently unrestricted — i.e., onto lands on both sides of State Highway 566 and on grazing lands inside resident Larry J. King's fenced grazing area — exceed the 0.1 rem (100 mrem) TEDE limit in 10 CFR 20.1301(a)(1). See, Intervenors' Section 17 Air Presentation, Exhibit K (declaration of health physicist Melinda Ronca-Battista), ¶¶ 29-35, and Exhibit L (declaration of Bernd Franke), ¶ 18. The maximum gamma rate observed on Mr. King's land in the 2003 CRUMP assessment of 180 microRoentgens per hour ("uR/hr") is equal to 1,576.8 mrem/yr,<sup>10</sup> assuming continuous occupancy of the location at which that dose rate was measured. Thus, even before HRI's proposed operation begins, doses on Mr. King's property exceed the standard. Mr. King noted that he grazes 22 head of cattle on his land, which includes the location where the 180 uR/hr gamma rate was detected. Id., Exhibit N, ¶ 3. Mr. King would have to spend only about 11 hours per week (occupancy rate of 0.065) tending to his livestock to receive an annual dose from gamma radiation *only* that would exceed the 100 mrem/yr TEDE limit.<sup>11</sup> Mr. King is also exposed to ambient radon from Section 17, as documented in HRI's own data. HRI's 8R3 radon monitoring station was located on Section 16 about one-half mile northeast of Mr. King's residence, and

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<sup>10</sup> This dose is derived from the following calculation: 180 uR/hr x 8760 hr/yr x (1 mrem/1,000 uR).

<sup>11</sup> The calculation here is [(11 hr/wk x 52 wk/yr) ÷ 8,760 hr/yr] = 0.065 occupancy rate x 1,576.8 mrem/yr = 102.96 mrem/yr.

those of his sisters. See, Pelizza Affidavit, Attachment 1, map on 5<sup>th</sup> page. The average annual radon level at this location was 2.2 pCi/l-air with a range of 0.8 pCi/l-air to 11.9 pCi/l-air. Id., Attachment 1, Table 2.9-3. Assuming for the sake of argument that “background” radon at this location is at the low end of the range and therefore is subtracted from the average, the resulting average “non-background” concentration of 1.4 pCi/l-air (i.e., 2.2 – 0.8) results in a dose far greater than the 100 mrem/yr TEDE limit of Part 20.1301(a)(1). Thus, not only would Mr. King’s TEDE exceed 100 mrem/yr simply from minimal activities associated with tending to his cattle, but it would also exceed the limit from radon alone, and certainly exceeds the limit *when all radiation sources of exposure are combined*. Hence, radioactive materials and emissions on Section 17 already exceed the NRC’s TEDE limit *without* contributions from HRI’s expected releases of radon from ISL mining operations.

**E. Another Licensee Included Existing Radiation From Source Material In Its TEDE Calculation 24 Years Ago.**

In addition to the regulatory text and history supporting the Intervenors’ interpretation of background radiation and the application of § 20.1301(a), an historical application supports Intervenors’ position. UNC’s Church Rock mill and tailings facility was licensed by the state of New Mexico because the state was an agreement state pursuant to the AEA. 42 U.S.C. § 2021. In its December 1981 license renewal application, relevant portions of which are attached hereto as **Exhibit B**, UNC included several radiation source terms in its MILDOS model:

The source contributing to air particulates and radon gas releases at a mill site are; stack releases, dust and radon gas from tailings, dust and radon gas from *ore piles*, transportation of *ore from mine to mill*, and dust from *ore-crushing operations*.

Exhibit B at C4-1 (emphases added). UNC did not exclude contributions from ore and mining-related activities from its dose calculations simply because the state then (and the NRC today) does not regulate conventional (i.e., underground) uranium mining. Rather, UNC included all radiation sources from its *existing* operations at the mill and tailings in its annual dose calculations. This practice was used by UNC *before* the 1991 amendments to Part 20 of the NRC regulations were adopted, indicating that it was the practice of agreement states, in interpreting the requirements of federal law, to require calculations of the *totality* of radiation releases from both licensed operations and other anthropogenic sources. Since the intent and substance of Part 20 regulations have not changed substantially since 1981, HRI should have included all radiation at Section 17 in its TEDE calculation.

**F. The FEIS Must be Rejected Because it Misrepresents Radiation Doses From Anthropogenic Sources as “Natural Background Radiation”.**

Finally, HRI’s failure to include anthropogenic sources of radiation in its TEDE calculations also implicates the accuracy of the Final Environmental Impact Statement (“FEIS”). In the FEIS, the NRC Staff asserts:

*The primary radiological impact to the environment in the vicinity of the project results from naturally occurring cosmic and terrestrial radiation and naturally occurring radon-222 and its daughters. The average whole-body dose rate to the population in this part of New Mexico includes a dose of 1.5 mSv/year (150 mrem/year) from local natural background radiation and 0.75 mSv/year (75 mrem/year) from medical procedures, based on national average. Therefore, total background is estimated to be about 2.25 mSv/year (225 mrem/year). Dose estimates and airborne concentrations of radionuclides from the proposed project do not include natural background and are incremental values.*

Id., NUREG 1508 at 4-72 (emphasis added). In making this assertion, it is obvious that the Staff relied on a mischaracterization of anthropogenic sources of radiation as background radiation. In reality, the primary radiological impact of the project, at least

with respect to Church Rock Section 17, derives from radiation levels that exceed federal standards for protection of public health and safety. As a result, the FEIS should be rejected for providing misleading information regarding the degree to which HRI's mining operation threatens public health.

**V. CONCLUSION**

For the foregoing reasons, HRI's license should be revoked.

Dated December 7, 2005.

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:  
E. Roy Hawkens, Presiding Officer  
Richard F. Cole, Special Assistant  
Robin Brett, Special Assistant

In the Matter of	)	
	)	Docket No. 40-8968-ML
HYDRO RESOURCES, INC.	)	ASLBP No. 95-706-01-ML
(P.O. Box 777	)	
Crownpoint, New Mexico 87313)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of " NOTICE OF ERRATA IN INTERVENORS' SUPPLEMENTAL BRIEF ON RADIOACTIVE AIR EMISSIONS." in the above-captioned proceeding have been served on the following by U.S. Mail, first class, and via email to those persons indicated by an asterisk this 15<sup>th</sup> day of December, 2005:

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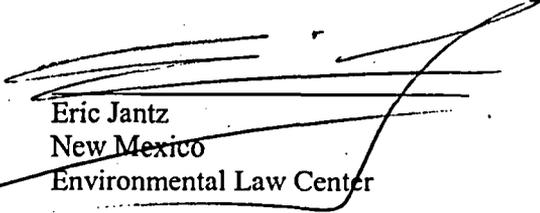
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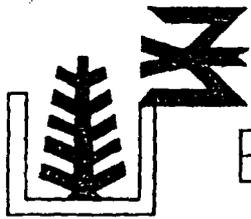
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December 15, 2005

**BY ELECTRONIC MAIL AND U.S. FIRST CLASS MAIL**

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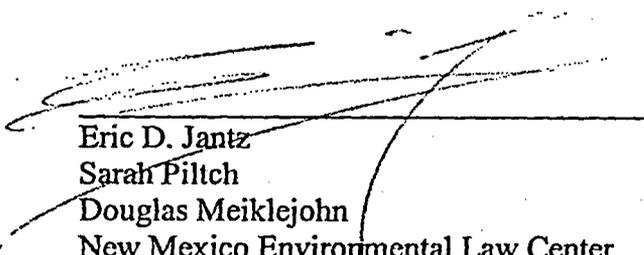
Re: In the Matter of: Hydro Resources, Inc.; Docket No: 40-8968-ML

Dear Sir or Madam:

Please find enclosed for filing "Notice of Errata in Intervenor's Supplemental Brief on Air Emissions". Copies of the enclosed have been served on the parties indicated on the enclosed certificate of service. Additionally, please return a file-stamped of the enclosed filing in the attached self-addressed, postage prepaid envelope.

If you have any questions, please feel free to contact me at (505) 989-9022.  
Thank you for your attention to this matter.

Sincerely,



Eric D. Jantz  
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Enclosures

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