

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

DOCKETED  
USNRC

ATOMIC SAFETY AND LICENSING BOARD

April 28, 2005 (3:45pm)  
OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

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

In the Matter of:

Hydro Resources, Inc.  
P.O. Box 777  
Crownpoint, NM 87313

)  
)  
) Docket No.: 40-8968-ML  
)  
) Date: April 26, 2005  
)  
)

**HYDRO RESOURCES, INC.'S RESPONSE IN OPPOSITION TO  
INTERVENORS' WRITTEN PRESENTATION REGARDING  
GROUNDWATER, GROUNDWATER RESTORATION AND FINANCIAL  
ASSURANCE**

**NOTICE OF ERRATA**

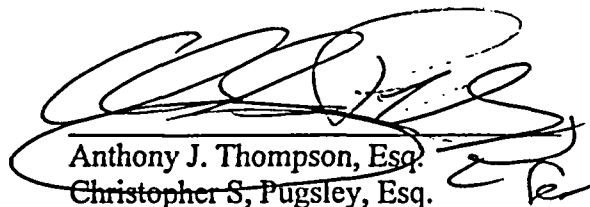
Hydro Resources, Inc. (HRI), by its undersigned counsel of record, hereby submits this Notice of Errata for HRI's filing of April 21, 2005 entitled *Hydro Resources, Inc.'s Response in Opposition to Intervenor's Written Presentation Regarding Groundwater, Groundwater Restoration and Financial Assurance.*

In this filing, HRI hereby re-submits its legal brief with revisions only to citations and grammatical or syntax errors. No substantive changes have been made to the legal brief attached to this filing. A complete copy of the revised brief is attached to this notice.

Further, HRI has sought and received the Presiding Officer's approval to file one additional errata containing several attachments referred to by HRI in its April 21, 2005, expert affidavits. Copies of the attachments currently available were not readable and, in

the interest of fairness, HRI requested additional time to produce and submit "first generation" copies so that such attachments could be clear and understandable. This second errata shall be filed no later than Friday, April 29, 2005.

Respectfully Submitted,

A large, stylized handwritten signature in black ink, appearing to read 'AJT', is written over the printed name of Anthony J. Thompson. The signature is fluid and somewhat abstract, with loops and flourishes.

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NUCLEAR REGULATORY COMMISSION  
ATOMIC SAFETY AND LICENSING BOARD**

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

In the Matter of:	)	
Hydro Resources, Inc.	)	Docket No.: 40-8968-ML
P.O. Box 777	)	
Crownpoint, NM 87313	)	Date: April 26, 2005

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**CERTIFICATE OF SERVICE**

**THIS IS TO CERTIFY** that a copy of the foregoing Hydro Resources, Inc.'s Response in Opposition to Intervenors' Written Presentation Regarding Groundwater, Groundwater Restoration and Financial Assurance, Notice of Errata in the above-captioned matter has been served upon the following via electronic mail and U.S. First Class Mail on this 26<sup>th</sup> day of April, 2005.

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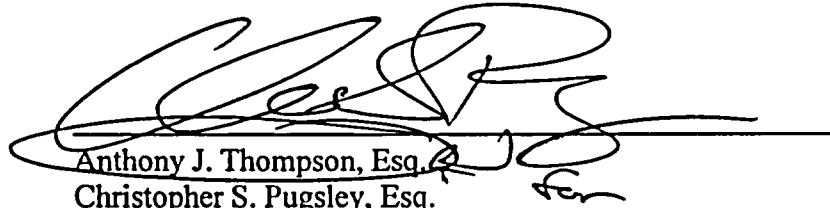
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A large, stylized handwritten signature in black ink, appearing to read 'Chris Pugsley', is written over a horizontal line. The signature is highly cursive and loops around the line.

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Admitted in MD

April 21, 2005

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

U.S. Nuclear Regulatory Commission  
Office of the Secretary  
Attn: Rulemaking and Adjudications Staff  
Mail Stop: OWFN-16C1  
Washington, DC 20555

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

Dear Sir or Madam:

Please find attached for filing Hydro Resources, Inc.'s Response in Opposition to Intervenor's Written Presentation Regarding Groundwater, Groundwater Restoration and Financial Assurance in the above-captioned matter. Copies of the enclosed have been served on the parties indicated on the enclosed certificate of service. Additionally, please return a file-stamped copy in the self-addressed, postage prepaid envelope attached herewith.

If you have any questions, please feel free to contact me at (202) 496-0780.  
Thank you for your time and consideration in this matter.

Sincerely,



Anthony J. Thompson, Esq.  
Christopher S. Pugsley, Esq.  
Thompson & Simmons, PLLC.  
Counsel of Record to HRI

Enclosures

(hydro resourcesCOVERLETTTER.doc)

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
ATOMIC SAFETY AND LICENSING BOARD

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

In the Matter of:

Hydro Resources, Inc.  
P.O. Box 777  
Crownpoint, NM 87313

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) Docket No.: 40-8968-ML  
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) Date: April 21, 2005  
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**HYDRO RESOURCES, INC.'S RESPONSE IN OPPOSITION TO  
INTERVENORS' WRITTEN PRESENTATION REGARDING  
GROUNDWATER, GROUNDWATER RESTORATION AND FINANCIAL  
ASSURANCE**

**I. INTRODUCTION**

Hydro Resources, Inc. (HRI), by its undersigned counsel of record, hereby submits this Response in Opposition to Intervenor's Written Presentation Regarding Groundwater, Groundwater Restoration, and Financial Assurance with respect to HRI's Nuclear Regulatory Commission (NRC) source material license to operate an *in situ leach* (ISL) uranium recovery facility at Church Rock and Crownpoint, New Mexico. For the reasons discussed below, HRI respectfully requests that the Presiding Officer reject each of Intervenor's arguments regarding groundwater, groundwater restoration, and financial assurance.

## II. BACKGROUND AND PROCEDURAL HISTORY

HRI applied for an NRC source material license to operate an ISL uranium mining facility at the Crownpoint Uranium Project (CUP) consisting of the Church Rock Sections 8 and 17, Unit One, and Crownpoint uranium recovery sites. On November 14, 1994, NRC Staff prepared a draft environmental impact statement (DEIS) and published a notice in the Federal Register detailing its availability. *See* 59 Fed. Reg. 56,557 (November 14, 1994). This Federal Register notice provided potentially affected parties with an opportunity to request a hearing in accordance with 10 CFR § 2.1205. Several parties filed hearing requests with NRC and a Presiding Officer was designated by the Atomic Safety and Licensing Board on December 21, 1994. *See* 59 Fed. Reg. 66,979 (January 8, 1995). However, the Presiding Officer held all aspects of the proceeding, including final determinations of standing for a hearing, in abeyance until NRC Staff completed its review of HRI's license application and issued its final environmental impact statement (FEIS). On February 29, 1997, NRC Staff issued its FEIS and, on January 5, 1998, NRC Staff approved HRI's license application and granted HRI License No. SUA-1508.

On May 13, 1998, the Presiding Officer permitted several parties, including the Eastern Navajo Dine Against Uranium Mining (ENDAUM), the Southwest Research Information Center (SRIC), and Grace and Marilyn Sam (hereinafter the "Intervenors"), to intervene to challenge HRI's license under NRC's 10 CFR Part 2, Subpart L provisions for "informal hearings." *See In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), LBP-98-9, 47 NRC 261 (May 13, 1998). Additionally, in September of 1997, NRC Staff requested leave to participate as a party in the hearing



process in accordance with 10 CFR §§ 2.1213 & 2.1237. During the hearing, the Presiding Officer bifurcated the proceeding to address HRI's four proposed uranium mining sites under its NRC license separately: (1) Church Rock Section 8; (2) Church Rock Section 17; (3) Unit One; and (4) Crownpoint.

**A. Groundwater Area of Concern**

As part of the Subpart L hearing process, Intervenors were required to submit a list of contentions to the Presiding Officer to determine which areas of concern, if any, were germane to this proceeding. The Presiding Officer admitted the following areas of concern regarding groundwater as germane: (1) degradation of the Crownpoint and Church Rock water supplies, threatening public health in violation of the Safe Drinking Water Act (SDWA); (2) inadequate monitoring for excursions; (3) improper guidance defining excursions, resulting in inadequate protection of drinking water; (4) inadequate groundwater restoration standards; and (5) failure to demonstrate that adequate restoration can be achieved. *See id.* at 268, fn 46-50.

With respect to groundwater and groundwater restoration issues, on January 11, 1999, Intervenors filed their initial written presentation and argued, *inter alia*, that HRI's NRC license should be suspended or revoked based on alleged deficiencies in HRI's license application and NRC Staff's review of such application. *See Intervenors' Written Presentation in Opposition to Hydro Resources, Inc.'s Application for a Materials License with Respect to Groundwater Protection, (January 11, 1999) (ACN ML9901200072)*. On January 18, 1999, Intervenors filed an amended written presentation which included additional information and argument. *See Intervenors' Amended Written Presentation in Opposition to Hydro Resources, Inc.'s Application for*

a Materials License with Respect to Groundwater Protection, (January 18, 1999) (ACN 9901210089). On February 19, 1999, HRI submitted its response to Intervenors' written presentation arguing that its license application satisfied relevant NRC regulatory requirements for ISL uranium recovery operations. *See HRI's Response to Intervenors' Brief with Respect to Groundwater Issues*, (February 19, 1999) (ACN ML9903010016).

On August 20, 1999, the Presiding Officer determined that Intervenors' arguments with respect to groundwater and groundwater restoration issues were without merit and that HRI's license application satisfied NRC regulations for groundwater protection and restoration during licensed ISL uranium recovery operations. *See In the Matter of Hydro Resources, Inc.*, 50 NRC 77, LBP-99-30 (August 20, 1999). More specifically, the Presiding Officer determined that Intervenors' characterization of the geologic features of the proposed Section 8 site was incorrect and that HRI's license application provided for ample protection of public health and safety with respect to groundwater issues. *See generally id.*

After the Presiding Officer issued his decision in LBP-99-30, Intervenors appealed the decision to the Commission. On July 10, 2000, the Commission declined review of Intervenors' appeal stating that, where Licensing Board decisions are dependent on fact-specific submission and the Presiding Officer's interpretation of such submissions, "[b]ecause the Presiding Officer has reviewed the extensive record in detail, with the assistance of a technical advisor, the Commission is generally disinclined to upset his findings and conclusions, particularly on matters involving fact-specific issues or where the affidavits or submissions of experts must be weighed." *In the Matter of Hydro Resources, Inc.*, CLI-00-12, 52 NRC 1, \*3 (July 10, 2000) quoting *In the Matter*

*of Hydro Resources, Inc.*, CLI-99-22, 50 NRC 3 (1999). Thus, with respect to groundwater issues, HRI's license application to conduct ISL uranium recovery activities at Section 8 has been upheld.

**B. Groundwater Restoration & Financial Assurance Area of Concern**

On March 9, 1999, the Licensing Board issued LBP-99-13 in which the Presiding Officer opined that the provisions of 10 CFR § 40.36 do not apply to HRI's license application, that the portions of 10 CFR Part 40, Appendix A regarding permanent isolation of tailings and the long-term surveillance of such tailings and other milling wastes are not applicable to HRI's license application, and that HRI's license specifically mandates financial assurance cost estimates using nine (9) pore volumes for groundwater restoration with the requirement that the pore volume estimate be adjusted after a mandatory wellfield restoration demonstration should the pore volume estimate be deemed insufficient.

Intervenors appealed the decision in LBP-99-13 to the Commission. In CLI-99-22, the Commission determined that further briefing was required on the issue of (1) whether HRI submitted sufficient financial assurance information for groundwater restoration and decommissioning and (2) whether the submission of a financial assurance plan is a prerequisite to receiving an NRC license for ISL uranium mining. *See In the Matter of Hydro Resources, Inc.*, CLI-99-22, 50 NRC 3, \*42 (July 23, 1999).

After reviewing the parties briefs, on May 25, 2000, the Commission determined that 10 CFR Part 40, Appendix A, Criterion 9 requires that HRI submit restoration action plans (RAPs) detailing financial assurance cost estimates for groundwater restoration in order to be granted a license. *See generally In the Matter of Hydro Resources, Inc.*

(Crownpoint Uranium Project), CLI-00-08, 51 NRC 227 (May 25, 2000). Declining to revoke the license, the Commission ordered HRI to submit RAPs for each of its four (4) proposed ISL uranium recovery sites for NRC Staff review and approval.

In accordance with the Commission's Order in CLI-00-08, HRI submitted RAPs for each of its proposed CUP ISL uranium recovery sites. Subsequently, over the course of 2001 & 2002, NRC Staff approved HRI's RAPs and determined that its accompanying financial assurance cost estimates were sufficient to effectuate groundwater restoration and decommissioning at each site.

In the interim, this proceeding was held in abeyance pending settlement discussions between Intervenors and HRI. The Licensing Board appointed a Settlement Judge to oversee the negotiations. After nearly two years of unsuccessful negotiations, the Presiding Officer reconvened this proceeding and reviewed each of the parties' submissions regarding the Church Rock Section 8 RAP and accompanying financial assurance costs estimates.

On February 27, 2004, the Presiding Officer issued LBP-04-03 stating that HRI's Church Rock Section 8 RAP required three (3) specific revisions prior to conducting any ISL uranium recovery operations at the site: (1) the RAP's financial assurance cost estimates could not assume the availability of major site equipment at the time of restoration; (2) the RAP's financial assurance cost estimates could not assume that site employees would perform multiple, unrelated tasks (i.e., wearing "multiple hats"); and (3) the RAP must be revised to reflect the "tremie line" method of well-plugging.

HRI appealed the Presiding Officer's ruling in LBP-04-03 to the Commission arguing that LBP-04-03's conclusion that a RAP financial assurance cost estimate could

not assume the availability of major site equipment or the performance of multiple, unrelated tasks by site employees was incorrect and was inconsistent with NRC regulations and standard ISL uranium recovery industry practices. In CLI-04-14, the Commission granted review of HRI's appeal and ordered substantive briefs to be submitted.

On December 8, 2004, the Commission issued CLI-04-33 finding that the Presiding Officer's conclusions in LBP-04-03 regarding HRI's appealed issues (1) and (2) above were incorrect and, as such, reversed the Presiding Officer's findings. Thus, the Commission's decision in CLI-04-33 signaled the end of the proceedings regarding the Section 8 site.

On November 5, 2004, the Presiding Officer issued a scheduling order requiring HRI and Intervenors to proceed with litigation of all germane areas of concern regarding the three remaining CUP sites in the CUP: (1) Churchrock Section 17; (2) Unit One; and (3) Crownpoint. On January 19, 2005, the Presiding Officer approved a joint motion filed by Intervenors and HRI to amend the briefing schedule as set forth in the Presiding Officer's November 5, 2004 Order. After approving the parties' requested amendments to the briefing schedule, on February 3, 2005, the Presiding Officer issued a new scheduling order reflecting such amendments. More specifically, as agreed by the parties, the new scheduling order eliminated three germane areas of concern from the litigation (i.e., environmental justice, financial and technical qualifications, and liquid waste disposal and surface water protection) and limited one additional area of concern (i.e., air emissions) to the Church Rock Section 17 site.

In response to the Presiding Officer's November 5, 2004, scheduling order, as revised by his February 3, 2005, order and Intervenor's March 7, 2005, written presentation, HRI hereby submits this written presentation and respectfully requests that the Presiding Officer reject each of Intervenor's arguments with respect to groundwater, groundwater restoration, and financial assurance.

### III. STANDARD OF REVIEW

#### A. Scope of Licensing Board Review

Normally, the Licensing Board is charged with compiling a factual record in a proceeding, analyzing the record, and making a determination based upon the record. The Licensing Board performs the important task of judging factual and legal disputes between parties and has the responsibility for appraising *ab initio* the record developed before it and for formulating the agency's initial decision based on that appraisal. See *Wisconsin Electric Power Co. (Point Beach Nuclear Plant, Unit 2)*, ALAB-78, 5 AEC 319, 322 (1972). A Licensing Board is not required to do independent research or conduct *de novo* review of an application in a contested proceeding, but may rely upon uncontradicted Staff and applicant evidence. See *Consumers Power Co. (Midland Plant, Units 1 & 2)*, ALAB-123, 6 AEC 331, 334-35 (1973).

With respect to the jurisdiction of the Licensing Board, a Licensing Board has only the jurisdiction and power which the Commission delegates to it. See *e.g., Public Service Co. of Indiana (Marble Hill Nuclear Generating Station, Units 1 & 2)*, ALAB-316, 3 NRC 167 (1976). While the Licensing Board possesses the power to provide initial reviews of license applications in contested proceedings, it does not possess the power to overrule Commission holdings. Where a matter has been considered by the

Commission, it may not be reconsidered by a Board. *Virginia Electric & Power Co.* (North Anna Nuclear Power Station, Units 1 & 2), ALAB-584, 11 NRC 451, 463-65 (1980). A Licensing Board for an operating license proceeding is also limited to resolving matters that are raised therein as *legitimate* contentions by the parties or by the Board *sua sponte*. See e.g., *Dairyland Power Cooperative* (LaCrosse Boiling Water Reactor), LBP-88-15, 27 NRC 576, 579 (1988) (emphasis added).

### B. Collateral Estoppel

Principles of *collateral estoppel*, like those of *res judicata*, may be applied in administrative adjudicatory proceedings. *U.S. v. Utah Construction and Mining Co.*, 384 U.S. 394, 421-422 (1966). Collateral estoppel precludes re-litigation of issues of law or fact which have been finally adjudicated by a tribunal of competent jurisdiction. *Toledo Edison Co.* (Davis-Besse Nuclear Power Station, Units 1, 2, and 3), ALAB-378, 5 NRC 557 (1977). The application of collateral estoppel does not hinge on the correctness of the decision or interlocutory ruling of the first tribunal. *Id.* It is enough that the tribunal had jurisdiction to render the decision, that the prior judgment was rendered on the merits, that the cause of action was the same, and that the party against whom the doctrine is asserted was a party to the earlier litigation or in privity with such a party. *Id.* Collateral estoppel requires the presence of at least four elements in order to be given effect: (1) the issue sought to be precluded must be the same as that involved in the prior action, (2) the issue must have been actually litigated, (3) the issue must have been determined by a valid and final judgment, and (4) the determination must have been essential to the prior judgment. See e.g., *Houston Lighting & Power Co.* (South Texas Project, Units 1 & 2), LBP-79-27, 10 NRC 563, 566 (1979).

**C. Statutory and Regulatory Pre-Conditions for ISL Uranium Recovery Pursuant to an NRC License**

**1. EPA's Safe Drinking Water Act Underground Injection Control Program**

To assure safe and effective underground injection throughout the United States, in 1974, the United States Congress enacted the SDWA, which, in part, authorized establishment of the Underground Injection Control (UIC) program so that injection wells would not endanger current and future underground sources of drinking water (USDWs). The SDWA empowered the United States Environmental Protection Agency (EPA) with the primary authority to regulate underground injection to protect current and future sources of drinking water. EPA also was authorized to provide States with the opportunity to assume primary authority over UIC programs in accordance with final regulations promulgated by EPA in 1980, which set minimum standards for State programs to meet to be delegated primary enforcement responsibility (primacy) over such programs.<sup>1</sup> UIC regulations establish specific performance criteria for each well class (ISL uranium mining wells for the CUP are Class III wells) to assure that drinking water sources, actual and potential, are not rendered unfit for such use by underground injection of the fluids common to that particular category of wells.

Between 1981 and 1996, EPA granted primacy to 34 States for all injection wells (except those on Tribal lands). EPA implements the UIC program directly in 10 States and shares responsibility in six (6) other States. The State of New Mexico has primacy for the UIC program, but EPA directly implements UIC programs for all Native

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<sup>1</sup> See 42 U.S.C. § 300h(1) (2005).



American lands. Unless authorized by rule or by permit, any underground injection is unlawful and is in violation of the SDWA and UIC regulations.

Before NRC-licensed ISL uranium recovery operations can commence at any CUP site, HRI must have obtained two authorizations: (1) an aquifer exemption for the aquifer or portion of the aquifer wherein ISL mining operations will occur and (2) a UIC permit. Underground injection is broadly defined as the technology of placing fluids underground in porous formations of rocks through wells or other similar conveyance systems. Thus, all ISL uranium recovery injection well activities require these relevant authorizations.

## 2. Aquifer Exemptions

As noted above, the UIC program was created to protect current or future USDWs. A USDW is defined as an aquifer, or portion thereof, which serves as a source of drinking water for human consumption, or contains a sufficient quantity of water to supply a public water system, and contains fewer than 10,000 mg/liter of total dissolved solids (TDS). The broad definition of a USDW was mandated by Congress in Section 1421(d)(2)<sup>2</sup> of the SDWA to ensure that future USDWs would be protected, even where those aquifers were not currently being utilized as a drinking water source or could not be used without some form of water treatment.

Within this regulatory framework, however, some aquifers or portions of aquifers, which can meet the broad regulatory definition of a USDW, may not reasonably be expected to serve as a current or future source of drinking water. As a result, the UIC program regulations allow EPA to *exempt* portions of an aquifer from delineation as a

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<sup>2</sup> See 42 U.S.C. § 300h(b)(1) (2005).

USDW and allow for injection into such aquifers or portions thereof. EPA regulations at 40 CFR § 144.8 specifically state:

“An aquifer or a portion thereof which meets the criteria for an ‘underground source of drinking water’ in § 146.3 may be determined under 40 CFR § 144.8 to be an ‘*exempted aquifer*’ if it meets the following criteria:

- a. It does not currently serve as a source of drinking water; and
- b. It cannot now and will not in the future serve as a source of drinking water...or
- c. The total dissolved solids content of the ground water are more than 3,000 and less than 10,000 mg/L and it is not reasonably expected to supply a public water system.”<sup>3</sup>

According to EPA, aquifers meeting these criteria are generally associated with *in situ* mineral recovery and enhanced oil recovery. If an operator, licensee or permittee wishes to inject into a USDW for the purpose of recovering minerals (e.g., uranium), a demonstration must be made that the proposed aquifer meets at least one of the exemption criteria. EPA has issued guidance on the standards that must be satisfied to qualify for an aquifer exemption. To the best of HRI’s knowledge, there is no provision in the SDWA authorizing revocation of an aquifer exemption granted pursuant to 40 CFR § 144.8 nor has EPA promulgated regulations establishing criteria for revocation of an aquifer exemption nor has it ever actually revoked such an exemption.

In addition, EPA does not prescribe specific groundwater restoration standards for exempted aquifers, because such exempted aquifers will not be used as drinking source at any point after ISL operations are complete. However, as described in 40 CFR § 146.7, EPA does require corrective action/remediation for any contamination of adjacent, non-

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<sup>3</sup> See 40 CFR § 144.8 (2005) (emphasis added).

exempt aquifers in accordance with the purpose of the SDWA and the UIC program to protect USDWs.<sup>4</sup>

### 3. Underground Injection Control Permits

To obtain a permit for a new Class III well, the owner/operator or licensee must file an application with the UIC Director for the relevant jurisdiction containing specific information listed in 40 CFR Part 146 or in applicable State requirements. Once a UIC permit application has been reviewed, the applicant will be notified of the items needed to complete the application, if any. After a complete application is received, an initial decision to grant or deny the permit is issued. UIC regulations also provide opportunities for public participation and comment.

A UIC permit for each site is a necessary prerequisite for the operation of an ISL uranium recovery project such as the CUP. Such a permit necessarily assumes that the aquifer or portion thereof to be used for underground injection *cannot now or in the future be used as a USDW*. Without this fundamental assumption, a UIC permit for ISL uranium mining will not be issued.

Pursuant to its NRC license, HRI will be required to restore mining zone groundwater (exempted aquifer groundwater) consistent with *pre-mining water quality* or *secondary standards* (e.g., maximum contaminant levels (MCLs)) prescribed for given constituents under the SDWA. Additionally, if neither restoration goal referenced above can be satisfied, a licensee is permitted to request an exemption for a constituent upon a

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<sup>4</sup> For further discussion on this issue, please see HRI Exhibit A at ¶¶ 12-18.

showing that there will be no adverse impacts on public health and safety.<sup>5</sup> This requirement is permissible, because the aquifer exemption concept assumes that the exempted aquifer or portions thereof *will not serve as a drinking water source at any time.*

Thus, EPA's UIC program recognizes that many aquifers or portions thereof cannot now or ever in the future serve as viable USDWs. In many cases, the contamination in such water sources is created by the presence of high concentrations of minerals (e.g., uranium) that may be recovered using underground injection methods. As such, the UIC program provides for aquifer exemptions, *which must be obtained prior to the commencement of underground injection* for the purposes of ISL uranium recovery.

#### **IV. ARGUMENT: GROUNDWATER: CHURCH ROCK SECTION 17, UNIT ONE, & CROWNPOINT**

To promote better organization, HRI has prepared Sections IV, V, and VI of this written presentation to encompass all three remaining HRI uranium recovery sites. Should any argument require HRI to differentiate between uranium recovery sites, HRI will provide separate subheadings in accordance with the Presiding Officer's Order of November 5, 2004. As many of Intervenors' site-specific arguments are addressed in HRI's expert affidavits, specific references to such affidavits will be provided where relevant.

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<sup>5</sup> This procedure is similar to that provided for conventional uranium milling licensees in 10 CFR Part 40, Appendix A, Criterion 5 which allows groundwater remediation to background or MCLs, whichever is higher, or to constituent-specific *alternate concentration limits (ACLs)* upon a demonstration that the latter will not result in any adverse impacts on public health, safety, and the environment.

**A. HRI Concedes that the Secondary Groundwater Standard May Be Set At 0.03 mg/L for All CUP Sites**

Initially, Intervenors argue that the secondary groundwater restoration standard of 0.44 mg/L for uranium at each of the three (3) remaining CUP mining sites (i.e., Church Rock Section 17, Unit One, and Crownpoint) should be revised to reflect the new SDWA maximum contaminant level of 0.03 mg/L (MCL) for uranium in *drinking water sources*. More specifically, Intervenors allege that implementation of the 0.44 mg/L will result in various harmful effects to groundwater in the mining zone portion of the aquifer and to nearby *non-exempt* aquifers that potentially may serve as a USDW under EPA regulations.

Intervenors allege that each of the aquifers, or portions thereof, at Church Rock Section 17, Unit One and Crownpoint where uranium recovery will occur currently serve as drinking water sources and that ISL uranium recovery in such aquifers will result in permanent contamination of a USDW. *See* Intervenors' March 7, 2005, Written Presentation at 22, 31, & 33. This allegation includes assertions that the current secondary groundwater restoration standard is not intended to protect USDWs and that HRI should be required to restore groundwater in the mining zone to the SDWA MCL for uranium. *See id.* at 59-60. In support of these arguments, Intervenors offer the testimony of John Fogarty, Donald Molony, and Richard Abitz, as well as citations from and discussions on numerous treatises and studies. *See id.* at 22-39 & Intervenors' Exhibits N, Q, & R.

Intervenors arguments are without merit for several reasons. Initially, Intervenors assumption that the aquifers or portions thereof in the Church Rock Section 17, Unit One,

and Crownpoint uranium recovery zones can be classified as USDWs under the SDWA<sup>6</sup> ignores the fact that HRI is not permitted to conduct ISL uranium mining operations in *any* aquifer without an aquifer exemption. As stated above, EPA's UIC program requires the issuance of aquifer exemptions prior to the commencement of injection into aquifers where minerals may be recovered (e.g., uranium). EPA does not issue aquifer exemptions for aquifers that potentially may serve as a drinking water source presently or in the future. As a result, HRI cannot conduct ISL mining activities in the aquifers at the three remaining sites unless EPA determines that the water in the recovery zone *cannot* serve as a potential source of drinking water. The issue of whether these particular aquifers can serve as drinking water sources will be decided when HRI applies for aquifer exemption. Presumably, these aquifer exemptions will be based on the high concentrations of uranium (and uranium progeny; radium, and radon) that make the water in these aquifers or portions thereof unfit to be a USDW.<sup>7</sup> Therefore, Intervenor's contentions are not a matter for this Licensing Board to adjudicate and need not be addressed.

Further, even if the Licensing Board determines that Intervenor's arguments should be addressed, HRI does not contest Intervenor's request to amend the secondary groundwater restoration standard to reflect the 0.03 mg/L SDWA MCL for uranium.

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<sup>6</sup> Intervenor also allege that the Cow Springs aquifer will serve as an USDW for the proposed Springstead Estates Project near the Church Rock Section 17 mining site. Intervenor's March 7, 2005, Written Presentation at 23. Prior to the submission of their written presentation, Intervenor requested that the Licensing Board, and later the Commission, direct NRC Staff to supplement the FEIS to account for the potential construction and occupancy of the SEP. In both cases, Intervenor's request was rejected, because the SEP is merely in a conceptual stage and should not be part of the NRC's evaluation of the CUP. See *In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), 2004 NRC LEXIS 203 (October 22, 2004).

<sup>7</sup> For addition discussion on this issue, please see HRI Exhibit A at ¶¶ 35-39 & Attachment A.

When HRI submitted its license application (1988) and NRC Staff drafted and issued the DEIS (1994) and the FEIS (1997), EPA had not yet promulgated an MCL for uranium for drinking water sources. As a result, NRC Staff and HRI reviewed the various potential secondary standards for groundwater from different regulatory authorities. After this review was complete, NRC Staff and HRI agreed to select the 0.44 mg/L standard for uranium for the CUP's secondary groundwater restoration standard. By selecting this standard, HRI and NRC Staff sought to ensure that groundwater in the relevant mining zone aquifers would either be restored consistent with pre-mining water quality or be compliant with a relevant regulatory standard.

In the time period between the issuance of the FEIS and the present, EPA promulgated its final rule for uranium in drinking water and set the MCL for uranium at 0.03 mg/L. Since the promulgation of this standard occurred after the submission of HRI's license application and the creation and issuance of the DEIS and FEIS for the CUP, such standard was not among the potential options considered by NRC Staff and HRI when determining the proper secondary groundwater restoration standard. As a result, HRI agrees that now it is proper to set the CUP's secondary groundwater restoration standard at 0.03 mg/L.

In summary, Intervenor's arguments relating to the potential impacts to public health and safety and the environment<sup>8</sup> as a result of setting the CUP's secondary groundwater restoration standard need not be evaluated by the Licensing Board because the aquifers or portions thereof where mining operations will occur require EPA aquifer

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<sup>8</sup> Although HRI does not dispute the application of the new SDWA MCL for uranium to the CUP, HRI does not necessarily agree with Intervenor's interpretation of the potential health and safety impacts of uranium in drinking water.

exemptions and UIC permits. These exemptions and permits require, by regulation, a determination by EPA or other relevant regulatory authorities that such aquifers cannot now nor in the future be considered a USDW. Further, even if such arguments are evaluated by this Licensing Board, HRI does not object to setting the CUP's secondary groundwater restoration standard at 0.03 mg/L. Therefore, based on the requirements of EPA's SDWA UIC program and HRI's concession to Intervenors' request to revise the secondary groundwater restoration standard discussed above, Intervenors arguments regarding the potential adverse impacts of the 0.44 mg/L standard are moot.

**B. Intervenors Have Failed to Demonstrate that HRI's Proposed ISL Uranium Recovery Operations Will Result in Migration of Contaminants to Adjacent, Non-Exempt Aquifers**

Next, Intervenors offer several arguments alleging that HRI's proposed ISL uranium recovery operations at the Church Rock Section 17, Unit One, and Crownpoint sites will result in the migration of contaminants from each respective uranium recovery zone to adjacent non-exempt aquifers and the contamination of a USDW; particularly the existing Crownpoint municipal wells. Specifically, Intervenors allege: (1) that HRI's groundwater flow model is improperly calibrated for the calculation of potential migration times, (2) that HRI has improperly characterized the Westwater Formation as "homogeneous," (3) that the study of outcrops at the Westwater provides more relevant geological data than tests used by HRI, (4) that HRI's pump test data demonstrates that the aquifer is "heterogeneous at each mining site, and (5) that HRI has misinterpreted its own pump test data and geophysical logs. Intervenors' March 7, 2005, Written Presentation at 73-74, 78-81, & 85-86. Intervenors also allege that the Westwater Formation in the uranium recovery zones is not vertically confined and that the



“Recapture Shale” does not exist at the Church Rock Section 17 site. *Id.* at 77, 83-84, & 87-89. In support of these allegations, Intervenor offer the testimony of Spencer Lucas (Lucas), Richard Abitz (Abitz), and Michael Wallace (Wallace) to demonstrate that migration of contaminants will occur outside the mining zone.<sup>9</sup>

**1. Intervenor’s Expert Testimony Regarding Its Groundwater Model and the Presence of “Channels” Should Be Rejected**

Intervenor’s main focus is on the alleged existence of “channels” in the Westwater Formation that will promote the rapid, uncontrolled migration of groundwater contaminants and mining solutions from the exempted aquifer in the uranium recovery zone to adjacent, non-exempt USDWs. Intervenor’s expert, Wallace, alleges that the groundwater model used by HRI to demonstrate that the migration of mining solutions will not endanger non-exempt USDWs is flawed. In response to HRI’s model, Wallace offers testimony involving a new groundwater model that allegedly is “better calibrated” than HRI’s model. Using this model, Intervenor’s allege that groundwater contaminants will migrate more quickly from each of the proposed mining sites to non-exempt USDWs than originally estimated by HRI and NRC Staff in the FEIS. *Id.* Further, Intervenor offer additional testimony to refute HRI’s statements that these alleged “channels” do not exist.

As will be discussed below, Intervenor’s “channel” concept is without merit and is not supported by any of the data or other information currently in the record. Indeed, in LBP-99-30, Judge Bloch determined that Intervenor’s “channel” theory was not applicable to the CUP. *See generally* LBP-99-30. More specifically, Judge Bloch stated:

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<sup>9</sup> It is worth noting at the outset that none of Intervenor’s “experts” has had any recent “hands-on” experience with ISL uranium recovery pre-mining characterization, production or groundwater restoration.

“For the Intervenor’s concerns about channelways to be relevant to this proceeding, there must be narrow channelways that transport water much faster than surrounding rock, possibly causing water to bypass monitoring wells and to create rapid excursions, much as if there were underground pipes that somehow manage to avoid all the monitoring wells....I conclude, based on a review of the entire record, that the Westwater does not contain channelways.”

LBP-99-03 at \*14.

Since Intervenor’s rest many, if not all, of their allegations regarding groundwater contamination in adjacent USDW’s from HRI operations on this “channel” concept, if Judge Bloch’s decision as affirmed by the Commission and HRI’s written presentation and expert testimony effectively demonstrate that Intervenor’s channel theory is without merit, then their entire case fails and must be rejected.

a. **Wallace Testimony Regarding Model Calibration and the Existence of “Channels” in the Westwater**

Contrary to Intervenor’s assertions, “channels” promoting groundwater excursions do not exist at the CUP. Intervenor allege that HRI’s groundwater model for demonstrating retarded groundwater migration is improperly calibrated and that Wallace’s new groundwater model is “better calibrated”<sup>10</sup> and more accurately depicts the potential for groundwater excursions and travel times to adjacent, non-exempt USDWs.

Initially, HRI’s expert, Mr. Bartels, analyzes the model presented by Wallace with respect to the Westwater and determines that they lack proper foundation:

“[I]acking the specific data input for those models, the assumptions of the basic models themselves can be neither verified nor validated. Rather than specifics of the models, cell by cell (layers and thickness, size in 3-D, boundary conditions, K, storage, porosity, well locations, open intervals, flowrates, etc.), Wallace provides

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<sup>10</sup> HRI Exhibit B at ¶¶ 130-139 also provides detailed analyses of Wallace’s “animation” and “predictive” models.

only generalized information (Wallace Figures 5, 6, and 23 from Exhibit B, and Table 1 at ¶ 32).”

HRI Exhibit B at ¶¶ 135-136.

Without this information, Mr. Bartels concludes that Wallace’s model can only be evaluated “generally” and not with any specificity. Given that “each of the cells and stem parameters are important in assessing their claims,” Wallace’s model lacks the proper foundation to be considered viable. *See id.* at ¶ 136.

Wallace also assumes that his model is “more closely calibrated to HRI’s pump test data than HRI’s model.” However, Mr. Bartels strongly disputes this conclusion when he states, “[t]here is no justification for suggesting that detail is know about the Crownpoint site to the extent shown in his [Wallace] Exhibit B at Figures 5 and 17 [attached here as Exhibit N]....” HRI Exhibit B at ¶ 134. With respect to the data and input actually provided by Wallace for his SEP model, Mr. Bartels states, “[a] close examination of that data, in trying to validate his model, shows some values to be hugely exaggerated (despite his claims that the model was ‘conservative’).” *Id.* at ¶ 130. Mr. Bartels also asserts that Wallace failed to use the correct data in several instances, such as with respect to the proposed SEP:

“his calculated drawdown is too low by 60 (10 X 6) times; instead of 200 feet drawdown calculated by Wallace, it should be 12,000 feet of drawdown....Wallace...simply ignores scientific evidence that is inconvenient for his argument....”

*Id.* at 88.

Wallace’s failure to use the correct data is compounded by his reliance on assumptions with no evidence:

“His scenario...requires these unproven assumptions...(1) that the SEP will ever be constructed, or even started before HRI has finished mining at Church Rock Section 8 and 17, (2) that there is sufficient transmissivity in Cow Springs to pump 417 gpm, (3) that there is sufficient water in the area to pump 417 gpm, (4) that a ‘*set of blocks is postulated to form an effectively continuous ‘field’ from Section 17 to an anticipated municipal well field at the north end of the proposed Springstead community, approximately 18,000 feet away*’ leaking from above but not to the sides, (5) that monitor wells do not exist at Church Rock, or are ignored by NRC or other regulatory agencies for 150 years, [and] (6) that his model is credible.”

*Id.* at ¶ 88.

By relying primarily on assumptions without supporting evidence, Wallace’s testimony does not convey any credibility.

Then, Mr. Bartels analyzed the general premise underlying Wallace’s testimony which he determined to be that “Wallace is attempting to recast his original *single pipeline theory*...into a heterogeneous system model shown as his Figure 5 (see Attachment N).” HRI Exhibit B at ¶ 92 (emphasis in original). As a general proposition, Mr. Bartels states that, “his [Wallace] ‘pipelines’ were shown to be nonsensical” by Judge Bloch in 1999. *See id.* More specifically, Mr. Bartels notes that, “Wallace...discussed the ‘pipeline’ fault as if it existed without noting the evidence to the contrary [Bartels (2004) at ¶ 25].” *Id.* at ¶ 78. When evaluating Wallace’s SEP testimony from 2004 using available evidence, Mr. Bartels determined that:

“[w]e are expected to defend ourselves against the imaginary concept that buried sedimentary blocks formed and bounded an 18,000 foot ‘pipeline’ that...goes exactly where Wallace wants it, from [Church Rock] Section 17 to Springstead municipal wells, even though no such wells exist, and no one knows if SEP will ever be constructed, or if, or where municipal well will ever be drilled.”

*Id.* at ¶ 83.

According to Mr. Bartels, the same inconclusive, convenient conclusions without supporting evidence reached by Wallace with respect to the SEP can be projected over his analysis of the CUP at Unit One and Crownpoint:

“[j]ust as he does now for the SEP, Wallace (1999) proposed single ‘pipeline’ channels containing all of the flow from the Crownpoint municipal wells....[However], the barriers or boundaries of the channel that Wallace...proposes would be evident from the pump tests of the area, and have never been observed, not at Church Rock, Unit 1, or Crownpoint.”

*Id.* at ¶¶ 84 & 92.

Based on this lack of practical evidence, Wallace’s “channel” concept should be rejected.

Moreover, according to Mr. Bartels, Wallace’s (and Abitz’s) testimony focuses generally on discussions of *heterogeneous, fluvial* systems versus homogeneous systems. However, based on their fundamental misunderstanding of the critical differences between the two systems, they fail to recognize that “the fluvial and heterogeneous nature of the sands in New Mexico have been repeatedly and extensively discussed, and the sands in New Mexico are no different from most other ISL settings,”—that is, they behave *hydrologically* as a homogeneous unit. *Id.* at ¶ 94. Based on a comprehensive review of multiple ISL uranium recovery facilities in the United States, Mr. Bartels agrees with Judge Bloch’s decision from 1999:

“The conclusion was reached in 1999:

“Bloch (1999) at p. 15: “I agree with HRI expert Bartels that if lengthy channelways exist at Church Rock, they should occur in other ISL uranium sites which have a very similar fluvial environment. (Bartels Affidavit at 10-14.). Channelways have not been reported elsewhere, so far as I am not aware, nor do the Intervenor provide evidence of them.”

LBP-99-30 at \*19.

Therefore, based on the discussion above, Wallace's testimony regarding the presence of "channels" in the Westwater should be rejected.

**b. Lucas Testimony Regarding the Existence of "Channels" at the Westwater**

Next, Lucas cites Cowan in an attempt to demonstrate that the Westwater Member is *heterogeneous* and that such "channels" exist. However, Mr. Lichnovsky refutes Lucas as follows:

"Cowan's paper specifically demonstrates that at the small scale that the Westwater Canyon Member *is not lithologically heterogeneous* and does not consist [sic] of numerous, interlaced ribbon-like sandstone bodies and lenses of conglomerate and mudstone *but does consist [sic] of amalgamated and coalesced sandstone sheets.*"

HRI Exhibit C at ¶ 73 (emphasis added).

According to Mr. Lichnovsky, Cowan's writing "certainly excludes ribbon-like permeability channels being present at any of the HRI sites....The small-scale ribbon-like channels that Lucas and Wallace envision simply are not present." *Id.* at ¶¶ 74 & 77.

Further:

"[t]he ore deposits occur at the edge of a large body of oxidized sandstone, not in long ribbon-like sandstone pointing away from the outcrop....The small lithofacies (sand depositional features) Lucas sees on the outcrop do not act *hydrologically* independent from the enclosing sandstones. As can be seen by Cowan's references to aquifer conduits...."

*Id.* at 77 (emphasis in original).

Mr. Lichnovsky's conclusions are also verified by the natural groundwater flow pattern at the CUP uranium recovery sites. As stated by Mr. Lichnovsky:

"[t]he groundwater flow pattern that helped create the deposits [at the CUP sites] is the one that is still active today...The deposits occur at the interface between oxidized sandstone and reduced sandstone....As the groundwater moves down gradient through the coalesced and amalgamated sandstone sheets the uranium is

continuously deposited at the oxidation/reduction interface. Thus, the one controlling factor in the location of the ore body is geochemistry.”

*Id.* at ¶ 91.

The ore body or “roll front” is labeled based on its relationship to the others that are present. In the case of the Westwater, “[t]he roll fronts trends are *perpendicular* to the regional groundwater gradient. It also trends perpendicular to the original direction of sand deposition.” HRI Exhibit C at ¶ 91 (emphasis added). Contrary to Intervenors’ assertions that “channels” exist, Mr. Lichnovsky concludes, “the ore does not occur in small ribbon-like channels that would be perpendicular to the cross section.” *Id.* at ¶ 89. Thus, Intervenors allegation that “channels” exist to promote groundwater excursions from the mining zone to non-exempt USDWs should be rejected.

Further, in order to bolster their “channel” theory, in view of HRI’s expert, Mr. Dan W. McCarn, Intervenors have gone to great length to mischaracterize his expert testimony on this issue. In HRI’s February 19, 1999, written presentation, Mr. McCarn presented expert testimony and several analytical figures describing the geological conditions at the CUP. After reviewing technical documents, including geophysical well logs prepared by HRI and the natural depositional conditions in the Westwater Formation, Mr. McCarn presented expert testimony stating<sup>11</sup> that he was unable to find evidence of discrete channeling, and the development of the specific sand units appeared to be continuous over considerable distances. HRI Exhibit D at ¶¶ 39-76

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<sup>11</sup> As will be discussed below, Mr. McCarn’s findings are consistent with HRI’s characterization of the Westwater at the CUP as acting *hydrologically* like a *homogeneous fluvial system*.

Mr. McCarn also notes that Abitz mischaracterizes each of his findings with respect to the existence of “channels” in the Westwater at the CUP. For example, as stated by Mr. McCarn:

“Abitz quotes McCarn as an important source to his and Wallace’s affidavits. He does so, however, *disregarding the most important regional ore control which is the extensive development of a regional redox front which extends continuously for 10s of kilometers in the Westwater Canyon Member and has been well-documented by such sources as Saucier (1980).*”

*Id.* at \_\_.

Intervenors’ mischaracterization of Mr. McCarn’s testimony also extends to Intervenors’ claim that his testimony supports the potential for groundwater excursions and that HRI’s proposed groundwater monitoring program is insufficient to detect such excursion. In response to Abitz’s statement that Mr. McCarn’s testimony supports this statement, Mr. McCarn states, “I categorically refute this statement, and I have categorically refuted this simplification of my paper since 1999...McCarn (1999) refuted this interpretation of Figure 8 and presented to the court the original paper, which has since been published by the IAEA [International Atomic Energy Agency] (2001).” Further, as stated by Mr. McCarn, “[i]f groundwater flow was being channeled through narrow, discontinuous channels as suggested by Abitz and Wallace, continuous mineralization could not occur in the vicinity of Crownpoint and Church Rock.”<sup>12</sup>

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<sup>12</sup> Mr. Lichnovsky’s expert testimony also supports Mr. McCarn’s findings. As stated by Mr. Lichnovsky when discussing the creation of uranium ore deposits that may be mined using ISL uranium recovery techniques:

“This type of deposition requires that the sandstone aquifer is continuous and expansive because oxidized water must pass through large volumes of rock that contains small amounts of uranium and then travel uninterrupted to the redox contact where accumulation or deposition can ultimately occur.”

HRI Exhibit C at \_\_.



Based on his analysis of Intervenors' experts and their improper use of his expert testimony, Mr. McCarn concludes:

“[s]ince the NRC hearing in 1999, SRIC has continued to use my publication as if the 1999 hearing never occurred, namely, to continue to use the reference to McCarn (1997) as support in their campaign to convince, the public, and the Navajo population that their health and water quality were at stake and under attack by HRI.”

HRI Exhibit D at 49.

Thus, any attempts by Intervenors' experts to use Mr. McCarn's testimony to demonstrate the existence of “channels” in the Westwater at the CUP should be rejected.

## **2. The Westwater Acts Hydrologically as a Homogeneous Fluvial System**

As stated above, Intervenors' initially challenge HRI's statements that the Westwater acts as a “homogeneous” fluvial system and that their expert testimony demonstrates that channels exist that will allow contaminants to migrate rapidly from exempt aquifers to non-exempt USDWs. Further, Intervenors contend that the “Recapture Shale” of the Morrison Formation does not serve as a confining layer to prevent the migration of contaminants from the uranium recovery zone aquifer at each CUP site to adjacent USDWs and that HRI's experts misinterpreted the geophysical well logs used to determine the presence of the Recapture Shale. Intervenors' claim that the potential for migration of contaminants to non-exempt aquifers demonstrates that HRI's license should be revoked.

### **a. HRI's Alleged Characterization of Westwater as “Homogeneous”**

First, Intervenors completely mischaracterize HRI's description of the Westwater Formation's geological features. Intervenors allege that HRI has characterized the

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Based on this information, Mr. Lichnovsky concludes, “[c]hannels would not provide the necessary source rock.” *Id.*

Westwater Formation as a "homogeneous pile of sand." At no point has HRI referred to the Westwater Formation in this manner. In fact, as stated by Mr. Pelizza, "HRI has characterized the Westwater Formation as a fluvial system." See HRI Exhibit A at ¶ 134-147. For example, HRI's Crownpoint Technical Report of 1993, §§ 2.2.1.1 & 2.6.2 and the Church Rock Revised Environmental Report of 1993, § 2.6.2 both characterize the Westwater Formation as a "fluvial system" and demonstrate that HRI has not characterized the Westwater Formation as *physically* homogeneous. See *id.* On the contrary, HRI has consistently stated that, *hydrologically*, the Westwater Formation acts as a homogeneous, fluvial system for the purposes of HRI's ISL uranium recovery operations. See *id.*

Further, as stated by Mr. Lichnovsky, the Westwater has been characterized as a homogeneous, fluvial system by multiple experts:

"the Westwater Canyon was deposited as a broad alluvial fan sequence with a preponderance of thick arkosic sandstone on the west side of the San Juan Basin, shaling out to the east and northeast of the fan system (Galloway 1980 p. 60)."

HRI Exhibit C at ¶ 72.

Based on these findings and the statements of other experts, Mr. Lichnovsky concludes, "[t]he Westwater Canyon was deposited as sheet sandstones, with each sheet overlying and scouring into another sheet. These sandstone sheets are coalesced and amalgamated into thick sandstone bodies [sic] that *function hydrologically as one unit.*" *Id.* (emphasis added).<sup>13</sup>

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<sup>13</sup> It is worth noting that the sandstone sheets to which Mr. Lichnovsky refers are present throughout the entire San Juan Basin, and the CUP uranium recovery sites are part of the San Juan Basin. See *generally* HRI Exhibit C.

In addition, the issue of whether the Westwater acts, hydrologically, as a homogeneous unit already has been addressed by this Licensing Board. In LBP-99-30, Judge Bloch reviewed Intervenor's allegations that HRI mischaracterized the Westwater as "homogeneous" and HRI's assertions that its characterization of the Westwater was that it acted hydrologically as a "homogenous" unit. Judge Bloch determined that the "most reasonable characterization" was that the Westwater acted *hydrologically* as a homogeneous unit. See LBP-99-30 at \*21-22. Based on this finding, Intervenor's effectively are collaterally estopped from arguing this issue for the remaining uranium recovery sites without some concrete evidence that circumstances are *significantly* different (which each of HRI's experts demonstrate does not exist), Judge Bloch's opinion should apply to the portions of the CUP outside of Church Rock Section 8, and, therefore, Intervenor's arguments regarding this issue should be rejected.

**b. The Presence of the Recapture Shale, Geophysical Well Log Interpretations, and Pump Tests**

Second, Intervenor's allegation that the "Recapture Shale" of the Morrison Formation is not present as a confining layer composed of shale and does not assist in the prevention of groundwater migration is incorrect. As stated by Mr. Lichnovsky, "HRI had designated the underlying interval of mudstone and siltstone (of the Recapture Member) as the Recapture Shale." HRI Exhibit C at ¶ 25. With respect to Lucas' analysis, Mr. Lichnovsky states:

"[t]he references...that Lucas...cites, plus all published descriptions of the Recapture Member, state that the Recapture member consists of sandstone, claystone, mudstone, and siltstone. *A continuous layer of mudstone, claystone or clayey siltstone that overlies or underlies the production zones is an aquatard*

*(confining layer) and will prevent mining solutions from contaminating overlying or underlying water bearing zones.”*

*See id.* at 24 (emphasis added).

Using this information, HRI uncovered the existence of “a confining layer of mudstone and siltstone below the ore bearing section of the Westwater Canyon at all four HRI sites.” *See id.* at ¶ 25. Whether or not it is fully composed of “a true shale,” the Recapture Shale still functions as a confining aquitard. As stated by Mr. Lichnovsky, there are varying degrees of permeability in materials that function as aquitards and the Recapture Shale unquestionably will serve as an aquitard for the five to seven years of ISL uranium recovery. *Id.* at ¶¶ 17, 24-25. This conclusion was supported in 1999 by Judge Bloch when he stated, “many drill holes penetrated the Recapture Shale to varying degrees and in every case its characteristics are those of an aquitard.” *See* LBP-99-30 at \*23.

Further, Intervenors’ allegation that HRI’s expert misinterpreted the geophysical well logs used to determine the presence of the Recapture Shale is also incorrect. Intervenors assert that an analysis of the geophysical logs provided by HRI demonstrates that the Recapture Shale does not occur at the proposed mining sites and that, based on these logs, the potential for groundwater migration is increased. With respect to the geophysical logs, Mr. Lichnovsky states, “[a]t all of the sites there are many exploration drill holes, each with its own geophysical log. These geophysical drill hole logs record the lithology of subsurface rocks.” *Id.* at ¶ 25. After reviewing Intervenors’ testimony, Mr. Lichnovsky states that their interpretations of these geophysical logs are fundamentally flawed. For example, Mr. Lichnovsky states:

“Comparing Cretaceous Shale to a Jurassic mudstone and siltstone sequence

and expecting them to match exactly is foolish....Lucas in saying the SP values in drill hole 53/41 in the Recapture correspond to SP values in the Westwater Canyon is unbelievable...Geophysical logging is no 'black box' science, these geophysical logs have been used by the petroleum industry since the 1930s. ”

HRI Exhibit C at ¶ 30.

Based on his analysis of the technical aspects (i.e., geophysical log curves), Mr. Lichnovsky concludes that the Recapture Shale is indeed present and that “to interpret the Recapture Member as not being present below the Westwater Canyon in Section 17, Church Rock, Crownpoint, or Unit One sites or as ‘almost wholly sandstone’ questions the credibility Lucas’ testimony.”<sup>14</sup> *Id.* at ¶ 34 (emphasis in original). This conclusion is supported by several authors who have produced publications describing the Recapture Shale:

“[m]ost authors show the Westwater Canyon is underlain by the Recapture Member across the entire Grants Uranium Region (Galloway 1980...Wentworth 1980...Ristorcelli 1980...Place 1980...Kirk and Condon 1986...and so on)....*The important fact is that an aquitard of claystone and siltstone is present below the production zone at Section 17 and Church Rock.*”

*Id.* at ¶ 36 (emphasis added).

With respect to a “thinning” of the Recapture Shale at the outcrop near the Cow Springs Aquifer, Mr. Lichnovsky states, “one can not assume this is the case 4 or 15 miles down dip from the outcrop,....” *Id.* at ¶ 22. Using standard industry practices of analyzing geophysical well logs, Mr. Lichnovsky confirms that “geophysical logs at the sites indicate the presence of an overlying and underlying aquitard at the Section 17,

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<sup>14</sup> See also HRI Exhibit F for further discussion on this point.

Church Rock [sic], Unit One and Crownpoint sites.”<sup>15</sup> *Id.* Further, additional safeguards are in place to detect and prevent migration of contaminants as “monitor wells will be placed in overlying and underlying aquifers to insure these zones are not being affected [sic] during mining and restoration.” *Id.* at ¶ 17. Therefore, based on these factors, Intervenors’ allegations regarding the presence of the Recapture Shale and the analysis of geophysical well logs should be rejected.

Finally, with respect to Wallace’s characterization and critique of HRI’s pump tests and models, Mr. Bartels states generally:

“Wallace does not appear to have ever designed, conducted, or performed the original analysis of a pump test on the scale of ISL ‘site characterization,’ and most obviously on the scale of an ISL wellfield....Wallace appears to have no actual experience in either drilling or re-completion of wells, deep or shallow, so lacking such experience, he has no basis to characterize a well re-completion as either ‘typical’ or otherwise.”

HRI Exhibit B at ¶ 142 & 148.

However, with respect to the pump tests, despite Wallace’s statements to the contrary, Mr. Bartels states, “the test design is sound, resulting in reasonable distances between pumping and monitoring wells at each phase of the program...” *Id.* at ¶ 152.

In addition, with respect to Wallace critique of HRI’s “well re-completion,” based on his experience in oil drilling and as a drilling engineer, Mr. Bartels states, “I tried to convey the difficulty and riskiness of re-completing wells on page 5 of the original pump test report...(Attachment J)...I have found that it is generally easier, more straightforward, and less prone to complications to drill and complete a new well, than it is to re-complete a well....” *Id.* at ¶ 148. Further, Wallace has offered no direct evidence

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<sup>15</sup> In addition, Mr. Lichnovsky notes that, “[i]n log 02.8/17.7 some of the local limestone beds are present in the Brushy Basin section. The SP indicates no mud invasion (*no permeability*) and the resistivity indicates resistance to electrical current flow.”

that HRI's procedures and results regarding pump tests or well recompletion indicate that potential adverse impacts to public health and safety exist. Thus, Intervenor's allegations regarding this issue should be rejected.

**c. Previous ISL Uranium Mining Geological Case Studies**

Indeed, nowhere in the massive record of this proceeding or in the technical literature is there any evidence of adverse impacts on USDWs from ISL uranium recovery operations over the past 40 years in the United States. *See generally* LBP-99-30. HRI has reviewed and presents *data* from several different ISL uranium mining facilities across the United States with nearly identical fluvial geology to that of the CUP ore bodies and has determined that no impediments to environmentally protective uranium recovery exist. For example, Mr. Pelizza states:

“all of URI South Texas operations are within fluvial type deposits with multiple stacked ore sands...Both the Kingsville Dome and Rosita ISL Project are in the fluvial Goliad Formation that is stratigraphically similar to the CUP ore zones. Detailed pump testing has confirmed that the formation is functionally a single hydrological unit. Successful operations have [followed].”

*See* HRI Exhibit A at ¶ 124.

In addition, several ISL uranium projects in the States of Wyoming and Nebraska have been installed and operated without the migration of contaminants from exempt aquifers to non-exempt aquifers occurring. *Id.* at ¶¶ 125-126, Attachments N & O). Intervenor's have presented no evidence demonstrating that their theory on “channel-like” conduits have ever occurred in production scale ISL uranium recovery operations in the United States. Thus, uranium geology combined with the horizontal results of past and present standard ISL uranium recovery industry practices designed to control migration of contaminants from uranium recovery zones to adjacent USDWs (including well-field

design, well-field balancing, groundwater monitoring wells, and “bleed” during operations)<sup>16</sup> demonstrate that Intervenor’s allegations regarding potential migration of contaminants are not accurate.

**3. Intervenor’s Expert Analysis Regarding the Use of Outcrops to Analyze Geology is Flawed**

Intervenor’s submit the testimony of Lucas to support their allegation that studies of rocks at outcrops in geological structures provide a more detailed and accurate assessment of geological features than bore hole data and geophysical well logs.

Intervenor’s contend that Lucas’ analysis demonstrates that the Westwater Formation is “heterogeneous” at Church Rock Section 17 and that there is no vertical confinement at Unit One and Crownpoint. *See* Intervenor’s March 7, 2005, Written Presentation at 75-76, 83-84, & 87-89.

As a general proposition, Lucas’ analysis regarding outcrops and their usefulness in studying geology is incorrect. Initially, Mr. Lichnovsky states that Lucas’ statement that ““geologists have long known that much more can be learned from the study of rocks at outcrops than can be learned from subsurface data from bore holes and geophysical well logs”” is incorrect.” HRI Exhibit C at ¶19 (emphasis in original). The inability of this methodology to properly account for the geologic structure of a proposed uranium recovery area and its failure to address how fluvial systems work make this methodology less attractive for use as standard industry practice.

Instead, using standard industry geophysical well logs, ISL uranium recovery licensees can better determine the geologic conditions in a proposed uranium recovery area. As stated by Mr. Lichnovsky, “[t]he geophysical logs from all of HRI sites consists

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<sup>16</sup> *See* HRI Exhibit A at ¶ 44 & 115.



of three curves, the natural gamma, the SP, and the resistivity.” *Id.* at ¶ 30. When interpreting geophysical well log data, “[t]he natural gamma records the amount of uranium in each drill hole. When the SP curve is compared to the resistivity curve, *relatively* permeable beds (sandstone) can be differentiated from *relative* impermeable beds (claystone, shale, and mudstone).” *Id.* By correlating standard industry geophysical log data, drill cuttings, and drilling rates “one can easily determined the types of rocks encountered.” *Id.* at ¶ 30.

Based on this, Mr. Lichnovsky’s critique of Lucas’ theory is focused on the fundamental presumption that “[a]n outcrop [in a formation] provides weathered and therefore altered information of the sediments present....A description of the outcrop isn’t able to tell the lateral extent of the sediments of whether they pinch-out or thicken in the subsurface downdip of the outcrop, or the hydrological characteristics of the sediments downdip.” *Id.* at ¶ 21. This conclusion leads Mr. Lichnovsky to conclude that the use of outcrop mapping is unreliable in the context of ISL uranium recovery.

In addition, Intervenors claim that the Brushy Basin Member of the Morrison Formation is not present at Church Rock, that it is actually the Dakota Formation, and that it is a combination of sandstone and shale. However, several experts writing on the presence of the Brushy Basin Member at Church Rock have described that Member as “mostly mudstone with moderately high gamma-ray, moderately spontaneous potential (SP) and low resistivity log values” and as “60 feet thick at Church Rock and Section 17 and 140 feet thick at Crownpoint and Unit One.” HRI Exhibit C at ¶ 44.

Further, Lucas’ concern that the Brushy Basin is non-existent at the outcrop and is 60 feet thick at Church Rock is addressed by Mr. Lichnovsky when he states: “the Dakota

Formation (Cretaceous) lies with angular unconformity on the Morrison rocks in the Church Rock area.” *Id.* at ¶ 49. Based on this, Mr. Lichnovsky concludes, “[t]his relationship represents simple erosional planation of Mesozoic strata that was tilted north prior to deposition of the Dakota.” *Id.* Even though this analysis demonstrates that groundwater excursions are highly unlikely, “[a]t Church Rock and Section 17, URI [HRI] has committed to placing monitor wells in the sandstone unit of the Brushy Basin and in the overlying Dakota sandstone to monitor for unlikely leakage from the mining zone.” *Id.* at ¶ 51. Based on this, Intervenor’s allegations regarding the use of outcrops should be rejected.

**4. HRI Has Properly Demonstrated that Natural Attenuation Will Assist in Preventing Contamination of Non-Exempt Aquifers**

Intervenor’s argument that HRI’s assertion that natural attenuation of contaminants will assist in groundwater restoration has not been adequately demonstrated. This argument includes allegations that the natural geochemistry in the Westwater Formation prevents reduction of high uranium concentrations and will not lead to precipitation of uranium out of pregnant lixiviant. *Id.* at 58.

First, as stated by Mr. Pelizza:

“[t]he area that is subject to mineral recovery is extremely small as compared to the size of the regional aquifer....These [CUP] wellfields will be completed in a small fraction of the regional Westwater aquifer, will be restored so that uranium and other radionuclides are consistent with premining values *to minimize or eliminate the potential for post mining migration to adjacent USDWs.*”

HRI Exhibit A at ¶ 117. (Emphasis added)

As a result of the small relative size of the CUP's proposed uranium recovery operations when compared with the size of the regional aquifer, Mr. Pelizza concludes that Abitz's contentions on natural attenuation are "not logical." *Id.*

Further, Mr. Pelizza states, "[t]he aquifer has shown the regional capacity to reduce and precipitate uranium over a frontal length that extends from west of the Church Rock area, through Crownpoint, over to the Ambrosia Lake area, 60 or more miles, a much larger area than is planned at the CUP sites." *Id.* In conjunction with this factor, "natural mineralization in water is present in uranium ore zones that is indigenous to groundwater locally and has been present in the aquifer locally for millions of years, which is strong evidence that these minerals in groundwater stay in proximity to the source." *Id.* at ¶ 116.

Moreover, Mr. Bartels' review of Abitz testimony regarding geochemical conditions at the CUP sites lends further support to Mr. Pelizza's testimony. In reviewing Abitz's testimony, Mr. Bartels states that not only does Abitz fail to cite an example of an uncontrolled "*toxic groundwater plume*," but he also does not cite "a single instance of contamination of water wells near ISL projects," which are closer than adjacent, non-exempt USDWs. HRI Exhibit B at ¶ 30.

Further, with specific reference to Abitz's contentions on natural attenuation, Mr. Bartels states that Abitz's analyses cannot be considered plausible because they are based on "his conclusions on his generic geochemistry discussion, his flawed analyses of (¶ 65-68), and his assertion that the rock is completely oxidized at the end of leaching." *Id.* at ¶ 33. Based on the natural processes involving "reducers" in creating an ore body which are generally accepted industry premises, Mr. Bartels concludes, "[i]f there were not

enough reducers in the rock to re-precipitate that ore body , the uranium would stay in solution, and there would be no 'ore body....Otherwise, at some point, the ore body would cease to exist as the uranium stayed in solution.'" *Id.* at ¶ 33. Thus, according to Mr. Bartels, "Abitz is wrong about natural attenuation." *Id.* Based on this, Intervenors' allegations regarding natural attenuation should be rejected.

**C. HRI Written Presentations and Testimony Regarding Church Rock Section 8 Groundwater Issues**

To date, HRI has submitted the following written presentation(s) and testimony regarding Church Rock Section 8 groundwater issues.

**1. HRI's Response to Intervenors' Brief in Opposition to HRI's Application for a Materials License With Respect to Groundwater Issues, (February 19, 1999) (ACN ML9903010016)**

HRI's written presentation with respect to groundwater issues is composed of the legal brief and a series of five (5) expert affidavits addressing multiple technical issues. Initially, HRI's legal brief summarized each of the arguments presented in opposition to Intervenors' written presentation regarding groundwater issues, including arguments refuting the written testimony offered by Intervenors.

**2. Affidavit of Mark S. Pelizza Pertaining to Water Quality Issues, (February 19, 1999) (ACN ML9903010024)**

The Affidavit of Mark S. Pelizza addressed several of Intervenors' arguments, including the testimony of Richard J. Abitz, Michael G. Wallace, William P. Staub. Mr. Pelizza's expert testimony started with a discussion of the development and use of "pore volumes" in the ISL uranium recovery industry and an explanation of the parameters used by HRI to create the nine pore volume estimate for groundwater restoration. Mr. Pelizza then presented an argument that Intervenors' characterization of water quality

data for the Church Rock Section 8 site was internally inconsistent. This discussion involved a refutation of Abitz's claim that HRI has not properly established baseline water quality standards for the site by stating that HRI has never claimed that the wells and preliminary analysis done at Church Rock Section 8 was intended to establish baseline for operations or restoration. Based on HRI's performance-based license, baseline water quality does not need to be established until just prior to the commencement of ISL uranium recovery operations.

Mr. Pelizza also compared the water quality characteristics of the CUP with those of other ISL uranium recovery sites in the United States. This comparison included a discussion refuting Intervenors' claim that uranium mineralization occurs outside the ore zone at the CUP. Further, Mr. Pelizza directly refuted Abitz's assertion that HRI should restore groundwater in the ore zone to water quality levels outside the ore zone. Mr. Pelizza stated that forcing an ISL uranium recovery licensee to restore groundwater to water quality levels more stringent than baseline or pre-mining quality would be to "defy natural conditions."

Mr. Pelizza also discussed the issue of EPA aquifer exemptions for ISL uranium recovery licensees and the fact that ISL uranium recovery occurs within the confines of exempted aquifers. Mr. Pelizza cited several examples of ISL uranium recovery facilities operated by HRI's parent company, Uranium Resources, Inc. (URI), as well as those operated by several other licensees.

Then, Mr. Pelizza stated that the Westwater is a *hydrologically homogeneous* fluvial system and that HRI has never represented that the Westwater was physically *completely homogeneous*. The fluvial nature of the Westwater also would not affect

HRI's groundwater monitoring protocol and that, based on the geological features of the Westwater and the nature of the uranium deposits therein, the posited existence of "channels" that promote the rapid, uncontrolled flow of fluids was incorrect.

Mr. Pelizza also provides detailed discussions of the following issues: (1) statistical analysis methods (§ 14.4), (2) Church Rock Sections 8 and 17 simultaneous operations (§ 16.2), (3) excursions at existing mines (§ 17), (4) the presence of mineshafts at the Church Rock Section 17 site (§ 18), and (5) and an analysis of the development of groundwater restoration standards and surety (§ 20-27).

**3. Affidavit of Dan W. McCarn Regarding Michael Wallace Testimony, (February 19, 1999) (ACN ML9903010035)**

The Affidavit of Dan W. McCarn was focused on the limited issue of Intervenors' use of a figure produced by Mr. McCarn regarding uranium deposits at the CUP. Mr. McCarn stated that Wallace's depiction of this figure as supporting Intervenors' theory that "channels" exist to promote the rapid, uncontrolled flow of fluids in the Westwater to adjacent, non-exempt aquifers was incorrect. Mr. McCarn's affidavit included an attachment showing the above-mentioned figure.

**4. Affidavit of Maryann Wasiolek and Michael P. Spinks, P.E. Regarding Hydrology and Geology, (February 19, 1999) (ACN ML9903010039)**

The Affidavit of Maryann Wasiolek and Michael P. Spinks focused on the limited issue of Intervenors' contention that "channels" exist that will promote the rapid, uncontrolled flow of fluids in the Westwater to adjacent, non-exempt aquifers. The affiants stated that typical descriptions of the Westwater demonstrate that it is characterized as acting *hydrologically* like a homogeneous unit rather than containing

“channels” pursuant to Intervenor’s contentions. The affiants further state that they were unaware of any literature characterizing the Westwater as represented by Wallace.

**5. Affidavit of Frank Lee Lichnovsky Regarding Hydrology and Geology, (February 19, 1999) (ACN ML9903010033)<sup>17</sup>**

The Affidavit of Frank Lee Lichnovsky focused on Intervenor’s characterization of the geologic conditions of the Westwater. Initially, Mr. Lichnovsky reviews and critiques Intervenor’s characterization by comparing their assertions with published literature on the Westwater. For example, Mr. Lichnovsky uses the writing of several geologists and other professionals to demonstrate that Intervenor’s “channel” theory is incorrect and inconsistent with published literature on the Westwater. These writings include an analysis of the geologic conditions of the San Juan Basin, including the proposed CUP portions of the Westwater, which is universally composed of stacked sandstone beds and not “channels.”

Mr. Lichnovsky also states that Intervenor mischaracterized HRI’s data regarding well-field control of subsurface solutions. Mr. Lichnovsky concluded that Intervenor failed to understand the ISL uranium recovery process and that their assertion that ISL mineral recovery can only occur in stream channels is incorrect. Further, in support of this conclusion, Mr. Lichnovsky offered a discussion of the origins of “roll-front” uranium deposits and how the presence of such deposits do not support the existence “channels” at the CUP. Additionally, Mr. Lichnovsky opined that the use of standard industry geophysical logs and data is the most accurate way to collect subsurface data and to analyze the potential subsurface effects of ISL uranium recovery operations. Mr. Lichnovsky includes a detailed description of the types of data provided

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<sup>17</sup> A revision to this affidavit was filed by HRI on February 26, 1999 (ACN ML03040091).

by geophysical logs and how such data is analyzed to determine the geologic features of a given area.

Mr. Lichnovsky also includes a detailed discussion of the HRI groundwater monitoring protocol and why such protocol is effective for the Westwater. This discussion addresses the presence of the Recapture Shale and the fact that it is not "shale," but it is a series of *discontinuous* sandstone lenses that act as an aquitard to prevent rapid, uncontrolled migration of fluids from the exempt portion of the Westwater to adjacent, non-exempt aquifers. This discussion led Mr. Lichnovsky to conclude that the potential for rapid, uncontrolled migration of groundwater fluids was negligible, even without taking into account HRI's proposed groundwater monitoring protocol. Mr. Lichnovsky supported his conclusion by comparing the CUP to the sandstone deposits of other geologic structures in States of New Mexico, Texas, Wyoming, and Nebraska.

**6. Affidavit of Craig S. Bartels Regarding Hydrology and Geology, (February 19, 1999) (ACN ML9903010029)<sup>18</sup>**

The Affidavit of Craig S. Bartels began with statements that a considerable portion of intervenors' testimony was not directly applicable to Church Rock Section 8. Mr. Bartels states that, as a general proposition, intervenors' contention that groundwater migration from ISL uranium recovery operations in fluvial systems cannot be controlled is incorrect. Mr. Bartels specifically notes that intervenors' testimony did not account for the industry evidence provided by other ISL uranium recovery operations.

Mr. Bartels begins his analysis of intervenors' testimony by stating that a conceptual geologic model, similar to that offered by intervenors', does not reflect the actual geologic and hydrological features of the Westwater and does not serve as an

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<sup>18</sup> A revision to this affidavit was filed by HRI on February 26, 1999 (ACN ML03040091).



accurate indicator of subsurface conditions. Mr. Bartels' expert testimony also includes reference to the use of regional pump tests prior to licensing and site-specific pump tests prior to production as the NRC-approved industry standard for ISL uranium recovery operations, each of which has been proposed by HRI and approved by NRC Staff.

Then, Mr. Bartels supports the assertions by HRI's other experts that the Westwater is a fluvial system and that most uranium ore in the United States is contained in fluvial systems. Based on this assertion, Mr. Bartels concludes that Intervenors' "channel" theory is incorrect and is not supported by the fact that uranium deposits in the Westwater and the entire San Juan Basin are "roll-front" deposits. These "roll-front" deposits, by their very nature, defy Intervenors' "channel" theory based on natural geochemical conditions in such deposits. Mr. Bartels also provides additional discussion on other factors leading him to conclude that Intervenors' "channel" theory is incorrect.

Mr. Bartels also offers discussion on how the Westwater is a "confined" aquifer (i.e., is overlaid and underlaid by aquitards) and that Intervenors' conclusions for Church Rock pump tests are inappropriate. Specifically, Mr. Bartels questioned Intervenors' understanding of how pump tests contribute to the analysis of geologic conditions at a proposed ISL uranium recovery site.

Finally, Mr. Bartels offers a discussion of the re-injection of "bleed" at the Church Rock Section 8 site. The "bleed" at each ISL uranium recovery site is designed to create a "cone of depression" in ISL well-fields to contain ISL lixiviant and prevent groundwater excursions. The design of the well-field to account for the proper re-injection of "bleed," which minimizes the loss of water resources, is not available until

the uranium deposit is fully understood and the proposed uranium recovery site is fully developed.

**7. Affidavit of V. Steve Reed (February 19, 1999) (ACN ML9903010042)**

The Affidavit of V. Steve Reed is focused primarily on Wallace's critique of his report regarding the feasibility of maintaining hydrodynamic control during production and restoration of the Church Rock and Crownpoint sites. Mr. Reed refutes Wallace's attacks on the validity of his modeling for the CUP sites. He specifically notes that Wallace's contentions fail to account for the successful history of the ISL uranium recovery industry, the rigorous agency review process, and does not offer any substantive rebuttal of his modeling.

Mr. Reed provides an explanation of the fundamental bases for the conclusions in his report and offers additional explanation regarding the types of models used in reaching such conclusions.

**D. Licensing Board and Commission Decisions on Groundwater for Church Rock Section 8**

**1. LBP-99-13: 49 NRC 233 (March 9, 1999)**

With respect to Section 8 groundwater issues, both the Licensing Board and the Commission have issued decisions supporting HRI's technical assessment of groundwater and geology at the Section 8 site. In LBP-99-13, the Presiding Officer addressed issues related to groundwater restoration and financial assurance. In addition to ruling on the applicable regulations and requirements for HRI's financial assurance offering, the Presiding Officer determined that the nine pore volume estimate would be a satisfactory initial estimate to project restoration costs for groundwater at the Church Rock Section 8 site.

## 2. LBP-99-30: 50 NRC 77 (August 20, 1999)

In LBP-99-30, the Presiding Officer addressed groundwater issues for the Church Rock Section 8 site and the technical analyses offered by HRI, Intervenors, and NRC Staff. Initially, the Presiding Officer determined that the Westwater Formation at the Section 8 mining site operates *hydrologically* like a homogeneous aquifer and does not contain channels through which contaminants may migrate to adjacent, non-exempt aquifers. In addition, the Presiding officer found that Intervenors' groundwater expert, Mr. Wallace questions regarding the assumption of the Westwater's hydrologic homogeneity were unfounded and that "homogeneity appears to be the most reasonable characterization."

Further, the Presiding Officer determined that HRI did not misrepresent groundwater pathways and divides as lixiviant barriers or aquitards. Specifically, the Presiding Officer noted that "[a]ll arguments are presented for Crownpoint and are, therefore, not directly relevant for this [Church Rock] phase of the hearing...." However, the Presiding Officer noted that "the method employed by HRI is a commonly used method for evaluating *in situ* mines...and do not misrepresent groundwater pathways." The Presiding Officer also noted that HRI does not misrepresent the Westwater's baseline water quality as such water quality will be "set according to the protocol in COP Rev. 2.0, § 8.6."

Finally, the Presiding Officer determined that proper data and pump testing was conducting to determine that vertical excursions will not occur between the exempted uranium recovery zone portion of the Westwater and other non-exempt aquifers. HRI's

and NRC Staff agreed upon monitor well configuration was deemed sufficient to monitor for any such excursions should they occur.

**3. CLI-00-08: 51 NRC 227 (May 25, 2000)**

In CLI-00-08, the Commission received briefs regarding the application of specific regulations to HRI's financial assurance offering. The Commission determined that 10 CFR Part 40, Appendix A, Criterion 9 applied to HRI's license and that HRI would be required to submit RAPs for each of its mining sites prior to engaging in ISL uranium recovery operations.

**4. CLI-00-12: 52 NRC 1 (July 10, 2000)**

Intervenors appealed the Presiding Officer's decision in LBP-99-30 to the Commission. The Commission declined Intervenors' appeal and stated that it was unwilling to disturb the Presiding Officer's findings, "particularly on matters involving fact-specific issues or where affidavits or submissions of experts must be weighed." The Commission's decision also declined to grant review on Intervenors' motion to re-open the record to offer additional evidence on HRI's secondary groundwater restoration standard because it is unlikely that the secondary standard would ever be applied.

**5. LBP-04-03: 59 NRC 84 (February 27, 2004)**

After the Commission remanded the issue of the submission of RAPs for each uranium recovery site to the Licensing Board, the Presiding Officer reviewed HRI's NRC-approved Church Rock Section 8 RAP and determined that it was acceptable with three specific exceptions. As they apply directly to groundwater restoration and financial assurance, these exceptions are addressed in greater detail in Section V of this brief.

**6. CLI-04-33: 2004 NRC LEXIS 254 (December 8, 2004)**

Both HRI and Intervenors appealed specific portions of LBP-04-03 to the Commission. The Commission reversed the Presiding Officer's findings with respect to HRI's two appealed issues and affirmed such findings with respect to Intervenors' appealed issues. The Commission's decision is reviewed in greater detail in Section V of this brief.

**V. ARGUMENT: GROUNDWATER RESTORATION AND FINANCIAL ASSURANCE: CHURCH ROCK SECTION 17, UNIT ONE, & CROWNPOINT**

**A. Intervenors Have Failed to Demonstrate that HRI's RAPs and Proposed Financial Assurance Cost Estimates for Groundwater Restoration Are Inadequate**

Intervenors also have presented several arguments alleging that HRI's NRC-approved RAPs for the Church Rock Section 17, Unit One, and Crownpoint mining sites and their accompanying financial assurance cost estimates are inadequate to effectuate groundwater restoration at each site. Each of Intervenors' arguments is without merit and will be addressed individually in the sections below.

**1. HRI's Nine Pore Volume Estimate is Adequate for Groundwater Restoration**

First, Intervenors allege that HRI's nine (9) pore volume estimate for groundwater restoration and for calculation of financial assurance for the Church Rock Section 17, Unit One, and Crownpoint RAPs is insufficient. More specifically, Intervenors allege that the use of nine pore volumes is unsupported by HRI's and NRC Staff's technical analyses. *See* Intervenors' March 7, 2005, Written Presentation at 51-55. Intervenors also incorporate this argument by reference for the Unit One and Crownpoint sites. *See id.* at 64-65. Further, Intervenors' challenge the actual RAP financial assurance cost estimate for each uranium recovery site with respect to the use of nine pore volumes. *Id.*

As a general proposition, Intervenor's challenges to the use of nine pore volumes for groundwater restoration at and the calculation of financial assurance cost estimates for the Church Rock Section 17, Unit One, and Crownpoint sites ignore Judge Bloch's and the Commission's findings that nine pore volumes is adequate. This estimate was found to be adequate, because groundwater restoration demonstration will further refine the estimate up or down, and annual surety updates will provide for any necessary adjustments to financial assurance at these sites.

Moreover, prior to commencing ISL uranium recovery activities at the CUP, HRI must submit water quality and other data to NRC Staff for the purpose of creating an initial estimate of the volume of water that must be circulated in the uranium recovery zone to restore groundwater consistent with pre-mining quality and, thereby, to determine the actual value of the financial assurance mechanism that must be in place in accordance with 10 CFR Part 40, Appendix A Criteria and pursuant to the Commission's directive in CLI-00-08. Thus, absent some evidence of compelling differences between Church Rock Section 8 and the other CUP uranium recovery sites, Intervenor's assertions regarding the nine pore volume estimate should be rejected.

With respect to groundwater restoration, as stated by Mr. Pelizza in his affidavit of February 19, 1999, "plots of total dissolved solids, and specific conductivity values (an indirect measure of TDS) show little improvement with continued pumping after eight to ten pore volumes." Affidavit of Mark S. Pelizza, February 19, 1999 at 77 (ACN ML9903010024). Further, Mr. Pelizza states regarding the Mobil demonstration project, which is the largest restoration demonstration in the local area to date, "[d]uring groundwater restoration activities, after 6.9 and 9.7 pore volumes, TDS concentrations

were close to the TDS secondary restoration goal of 500 mg/L.” *Id.* Based on this and other accompanying data submitted by HRI in its license application, NRC Staff and HRI determined that “practical production scale ground water restoration activities will require no more than a nine pore volume restoration effort.” *Id.* Using each of the relevant parameters for calculating pore volumes (i.e., porosity, flare factors, etc.) and all available data for the Church Rock site, NRC Staff and HRI selected nine pore volumes as an *initial* estimate.

As noted above, the selection of nine pore volumes for groundwater restoration and financial assurance calculations is merely the first step in a larger, iterative process. ISL uranium mining, by its nature, is a performance-based form of mineral recovery. That is, ISL uranium recovery operations cannot finalize performance criteria for a given uranium recovery site until a well-field is installed and all well-field-specific data is gathered. Without such well-field-specific data, licensees cannot develop appropriate restoration goals and criteria and calculate necessary financial assurance cost estimates.

As a result, NRC Staff and HRI have created an iterative, performance-based process, which is consistent with standard ISL uranium recovery industry practice, through which groundwater restoration will be effectuated using accurate pore volume estimates and allowing for calculation of proper financial assurance cost estimates in compliance with applicable NRC regulations. Both NRC Staff and HRI realize that “absolute proof [of the pore volumes required for groundwater restoration] can only come from a field level test of commercial scale.” *Id.* In the FEIS, NRC Staff specifically states that, prior to mining outside of the Church Rock sites, “more site-specific information would be necessary to actually demonstrate that restoration standards could

in fact be achieved at the HRI sites on a large or "production-scale level." See CLI-04-33 at \*6, quoting FEIS at 4-62 & 4-113. To this end, as stated by Mr. Pelizza in his February 19, 1999 affidavit, HRI's NRC license and the Crownpoint Operations Plan (COP) Revision 2.0, § 10.4.4 does not permit the commencement of ISL uranium recovery operations, much less groundwater restoration, at the Unit One or Crownpoint sites until a commercial-scale, bonding level restoration demonstration project<sup>19</sup> is completed.<sup>20</sup> More specifically, Mr. Pelizza states that the COP requires that:

"Prior to the injection of lixiviant at either the Unit 1, or Crownpoint site the licensee shall submit NRC-approved results of a groundwater restoration demonstration conducted at the Church Rock site. The demonstration shall be conducted at a large enough scale, acceptable to the NRC to determine the number of pore volumes that will be required to restore a production-scale wellfield."<sup>21</sup>

However, prior to engaging in this demonstration project, NRC Staff and HRI were required to select a pore volume estimate for groundwater restoration based on available data so that an initial financial assurance cost estimate could be calculated for their RAPs. Thus, the nine pore volume estimate currently is used by HRI to calculate its financial assurance cost estimates for each mining site based on the directive from the Commission to submit RAPs for each mining site prior to engaging in any mining operations. See generally *In the Matter of Hydro Resources, Inc.*, CLI-00-08, 51 NRC 27 (May 25, 2000). Again, while the nine pore volume estimate serves as a *preliminary* estimate for each RAP, the actual pore volume estimate and, therefore, the financial assurance cost estimate for each CUP site will be adjusted to reflect site-specific

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<sup>19</sup> Please see Mr. Pelizza's February 19, 1999 Affidavit at 78 for an explanation of the parameters for the demonstration project.

<sup>20</sup> See HRI NRC License No. SUA-1508, License Condition 10.28.

<sup>21</sup> See Crownpoint Uranium Project, Consolidated Operations Plan Revision 2.0, § 10.4.4 (attached as "HRI Exhibit A, Attachment C").



conditions at each site. Thus, Intervenor has no basis to challenge the use of nine pore volumes for the Church Rock Section 17, Unit One or Crownpoint mining sites, because the pore volume estimate can be adjusted based on data to be compiled after the completion of the Church Rock Section 8 demonstration project and other site testing.

Further, in order to prevent an underestimate of financial assurance for groundwater restoration, HRI's license requires that the financial assurance cost estimates for groundwater restoration be adjusted to reflect *any* change in the number of pore volumes to be used after the Church Rock Section 8 demonstration project and prior to commencing uranium recovery operations at any specific CUP site. *See* HRI License No. SUA-1508, License Condition 9.5. NRC regulations at 10 CFR Part 40, Appendix A, Criterion 9 also require *mandatory* annual surety updates to reflect any adjustment in costs at an NRC-licensed facility, including maintenance and/or repair or replacement of site equipment and changes in the parameters for site decommissioning and groundwater restoration, such as pore volume estimates. These safeguards ensure that HRI will be required to post adequate financial assurance for each CUP site prior to uranium recovery operations and post-mining groundwater restoration. The combination of these factors discussed above results in an iterative, performance-based process using the best available water data to adequately protect public health and safety and the environment.

## **2. HRI's RAPs Properly Account for the Availability and Costs of Radiological Technicians**

Intervenor asserts that HRI has failed to properly account for specific cost items in their RAPs for the Church Rock Section 17, Unit One, and Crownpoint sites. First, Intervenor alleges that HRI underestimates the availability and cost of radiological technicians for site decommissioning and that HRI does not include the costs for such

technicians in its RAPs. Intervenor's March 7, 2005, Written Presentation at 61 & 63-64. Specifically, Intervenor's state that, "should HRI not be the operator at the time of site closure, there needs to be an estimate of the costs to acquire trained individuals to conduct contamination surveys. *Id.* at 61 & Exhibit DD at ¶ 23. Additionally, Intervenor's state that HRI must include the rates and lodging expenses for trained professionals to conduct contamination surveys. *Id.*

Konwinski ignores the inclusion of salary for the Environmental Manager in the Crownpoint RAP, in addition to the \$45,000 budgeted for the RSO. Currently, HRI has budgeted an additional \$104,000 for an Environmental Manager for the CUP in its Crownpoint RAP. HRI Exhibit A at ¶ 254. As stated by Mr. Pelizza, the Environmental Manager for the CUP will perform a wide range of duties including having "responsibility over radiological surveys and technician level responsibilities described for the RSO [radiation safety officer]. In addition, the Environmental Manager shall share in the responsibility of conducting surveys and other RSO functions as part of the HRI plan to share responsibilities among staff." *Id.* This factor demonstrates that the cost requirement for conducting radiological surveys has been addressed by HRI with the budgeting of a substantial salary for the Environmental Manager.

**3. HRI's RAPs Properly Account for the Costs Associated With the Disposal of 11e.(2) Byproduct Material Wastes**

**a. Disposal Fees**

Next, Konwinski asserts that HRI's RAPs have failed to properly account for the disposal of 11e.(2) byproduct material wastes from the Church Rock Section 17, Unit One, and Crownpoint sites at a licensed NRC facility. Konwinski evaluated three potential disposal locations and determined that HRI's most likely disposal location

would be the International Uranium (USA) Corporation's White Mesa Mill in Blanding, Utah and that HRI's estimated costs for disposal at this site are well below actual disposal costs. *See* Intervenor March 7, 2005, Written Presentation at 61, 63-64.

HRI's License Condition 9.6 and COP Revision 2.0, § 1.5 require HRI to "develop and maintain an agreement for the disposal of 11e.(2) byproduct material with a facility licensed by the NRC or an Agreement State to accept such material." *See* COP Revision 2.0, § 1.5. This agreement is to be developed and executed *prior to the commencement of mining operations* at the CUP and must be replaced if it expires or is terminated within 90 days or mining operations must cease. Since mining operations have not commenced at any of the CUP's mining sites, the contract does not need to be in place at this time.

Additionally, Konwinski's testimony is flawed in several respects. First, Konwinski evaluated only *three* potential disposal locations for HRI's 11e.(2) byproduct material; (1) Envirocare, Inc.'s disposal facility in Tooele County, Utah, (2) COGEMA Mining's Shirley Basin Mill Tailings facility, and (3) International Uranium (USA) Corporation's White Mesa Mill facility in Blanding, Utah. *See* Intervenor's Exhibit DD at ¶ 12. However, as noted by Mr. Pelizza, Mr. Konwinski fails to account for the availability of two alternate disposal locations at the Cotter Corporation Canon City, Colorado facility and the Waste Control Specialists' Texas facility. *See* HRI Exhibit A at ¶ 247. These facilities also can be consulted by HRI to secure a contract for the disposal of 11e.(2) byproduct material. Thus, Mr. Konwinski's conclusion that the White Mesa Mill is the likely disposal location for HRI's 11e.(2) byproduct material is based on incomplete information and analysis.

Second, Mr. Konwinski states that the disposal fee for HRI's 11e.(2) byproduct material at the White Mesa Mill is approximately \$100-125 per cubic yard and, as a result, HRI's disposal cost estimates are too low. However, Mr. Pelizza states that, "Cotter [Corporation] has quoted URI, Inc. in writing a fee of \$50 per cubic yard." *Id.* at ¶ 248. Thus, Mr. Pelizza concludes that, "Konwinski's subsequent recalculation of costs [for HRI's RAPs] is overstated." *Id.* Therefore, Mr. Konwinski's statement that HRI's disposal costs must be increased to reflect White Mesa Mill disposal fees is incorrect.

Third, assuming that the White Mesa Mill is the disposal location selected by HRI, Mr. Konwinski states that this facility is limited to 500 cubic yards of solid material *per year* and that the site would not be big enough to accept solid materials if HRI cannot decontaminate all of its buildings and concrete. *See* Intervenors' Exhibit DD at ¶ 15. The White Mesa Mill's limit is 5,000 *cubic yards from a single source* (i.e., HRI's CUP) and not 500 cubic yards as stated by Mr. Konwinski. *See* HRI Exhibit A at ¶ 250. In any event, there are other disposal options but, if necessary, facilities such as the White Mesa Mill are permitted to pursue license amendments from NRC or the relevant Agreement State to accept additional 11e.(2) byproduct material wastes in excess of existing license conditions. Thus, Mr. Konwinski's assessment of this limitation is misguided.

**b. Transportation, Packaging, Surveying and Other Costs Associated with Disposal of 11e.(2) Byproduct Material**

Konwinski alleges that HRI either underestimates or does not include relevant costs associated with transportation and packaging of 11e.(2) byproduct material wastes to the disposal site and unloading of such wastes and decontamination of transport vehicles and containers at the disposal site. *See* Intervenors' March 7, 2005, Written

Presentation at 63-65, Exhibit DD at ¶ 22. Intervenors' allegation is expressed or incorporated by reference for each of the three remaining mining sites. *Id.*

With respect to the containerization (packaging) of the 11e.(2) byproduct material wastes, Mr. Pelizza has personally supervised the decommissioning of several ISL uranium recovery projects and has not encountered any instance where 11e.(2) byproduct materials required containerization prior to transport. *See* HRI Exhibit A at ¶ 255. As stated by Mr. Pelizza, "URI has always shipped in bulk because it is more efficient" as it is desirable to limit the weight of truck shipments to decrease potential risk from accidents. *Id.* Further, if 11e.(2) byproduct material is stored on-site prior to shipment, HRI will empty the storage containers into a bulk shipment and flatten the drums to effectuate disposal of all contaminated materials. *Id.* This disposal procedure is common to URI's licensed ISL uranium recovery operations and Intervenors have offered no evidence as to why such procedures are not applicable to HRI's ISL uranium recovery operations.

Konwinski also expresses a concern that HRI did not account for the cost of disposing of wellhead casing, reverse osmosis (RO) reject, and brine concentrator solids. Mr. Pelizza asserts that his experience in ISL uranium project decommissioning has not demonstrated that "wellhead contamination" is a decontamination issue. *Id.* at 256. The removal of surface contamination from a wellhead usually is completed using an acid/pressure wash process common to the uranium recovery industry. HRI Exhibit A at ¶ 252. Further, with respect to RO reject, "all RO reject is processed through the brine concentrator so there will only be solids from the brine concentrator." HRI Exhibit A at ¶ 252; *see also* Crownpoint RAP at § 2.3. With respect to brine concentrator solids, "HRI

budgeted \$ 8,291 per month for brine concentration disposal (\$99, 492 per year or \$696, 444 over the 7 year restoration period).” HRI Exhibit A at ¶ 252; *see also* Crownpoint RAP, Attachment E-2-1, line 88. Thus, Intervenor’s allegations regarding the costs associated with disposal of a wellhead casing, RO reject, and brine concentrator solids should be rejected.

Further, Konwinski claims that HRI has not accounted for the amount of concrete and other building waste materials that will be generated during decommissioning. This allegation is based on HRI’s alleged inability to fully decontaminate concrete and building structures for release and that HRI would be forced to dispose of such materials at an NRC-licensed facility. As stated by Mr. Pelizza:

“[i]n 2004, URI, Inc. reconstructed buildings at its Kingsville Dome process facility including the contaminated dryer enclosure. The dryer enclosure is arguably the most contaminated structure at the facility. Even so, *all scrap was routinely decontaminated and decommissioned and released for unrestricted use. Similarly, HRI plans that all buildings will be decontaminated at the CUP.*”

HRI Exhibit A at ¶ 257; *see also* HRI Exhibit F.

Intervenor’s have provided no evidence that decontamination of the concrete and building structures after completion of uranium recovery operations cannot be effectuated in this manner. Further, HRI is required to update its surety to reflect any changes in decontamination plans, such as disposal of concrete and/or building structures at licensed facilities. Thus, Konwinski’s allegation regarding HRI’s estimate of waste to be generated at the CUP after decommissioning should be rejected.

Moreover, similar to many of Intervenor’s allegations in their brief, Mr. Konwinski ignores the iterative nature of HRI’s financial assurance assessment. As stated by Mr. Pelizza, Mr. Konwinski fails to account for HRI’s requirement to refine

financial assurance cost estimates immediately prior to the commencement of uranium recovery operations and the 10 CFR Part 40, Appendix A, Criterion 9 requirement to update such estimates annually. Based on these factors, HRI has properly accounted for the costs associated with the disposal of 11e.(2) byproduct material and, as such, Intervenor's allegations regarding HRI's cost estimates should be rejected.

**B. HRI Written Presentations for Church Rock Section 8 Regarding Groundwater Restoration and Financial Assurance**

To date, HRI has submitted the following written presentations and exhibits regarding groundwater restoration and financial assurance:

**1. Response of Hydro Resources, Inc. to Commission's Questions in CLI-00-12 (August 9, 2000) (ACN ML003740334)**

In response to a list of specific questions issued by the Commission regarding the submission of financial assurance for ISL uranium recovery operations, HRI submitted a response to such questions. Paraphrased, the Commission asked four (4) specific questions: (1) did the Presiding Officer rely on an EPA aquifer exemption or UIC permit when making technical groundwater findings; (2) if so, would any of these findings be undermined if Church Rock Section 8 were deemed to fall under the "Indian Country" classification; (3) was it necessary for the Presiding officer to address whether HRI complied with the SDWA; and (4) what practical effects does the Tenth Circuit's decision on jurisdiction have on ISL uranium recovery operations at the Church Rock Section 8 site?

First, HRI stated that, after evaluating the testimony of multiple experts, the Presiding Officer recognized that the portion of the aquifer at the Church Rock Section 8 site was *already exempted* while finding, separately, that HRI's license should not be

invalidated on a technical basis. As a result, HRI argued that the Presiding Officer did not rely on any aquifer exemptions or UIC permits when making technical groundwater findings.

Second, HRI argued that the effects of the jurisdictional dispute over Church Rock Section 8 is limited to determining which is the proper regulatory entity from which a UIC permit must be granted. Thus, HRI asserted that the jurisdictional dispute over this proposed site would not be greatly affected if the site was classified as "Indian Country."

Third, HRI argued that NRC was not required to determine whether HRI's proposed ISL uranium recovery operations complied with the SDWA. Since ISL uranium recovery licensees cannot inject lixiviant into an underground ore body without the relevant EPA SDWA aquifers exemption(s) and UIC permit, HRI asserted that NRC should not decide this issue. Further, HRI noted that its NRC license (License Condition 9.14) specifically notes that it must obtain all relevant permits and licenses from appropriate regulatory entities prior to injection any lixiviant at any of its proposed uranium recovery sites.

**2. Response of HRI to Commission's Order in CLI-00-08 Requiring Submittal of a Financial Assurance Plan (November 21, 2000) (ACN ML003772549)**

This filing served as the cover statement for the submission of HRI's Church Rock Section 8 RAP. HRI stated that its RAP was compliant with applicable NRC regulations and with NRC-approved license conditions.

**3. Hydro Resources, Inc., Church Rock Section 8/Crownpoint Process Plant Restoration Action Plan, License No. SUA-1508 (November 17, 2000) (ACN ML003772549);**

HRI's RAP for the Church Rock section 8 uranium recovery site was



submitted in response to the Commission's directive in CLI-00-08. HRI's Church Rock Section 8 RAP includes all financial assurance cost estimates prior to the construction and development of the Church Rock Section 8 uranium recovery site. Included in these cost estimates are the estimated costs for groundwater restoration based on a nine pore volume estimate, for payment of labor costs during such restoration, and for the maintenance, repair, and/or replacement of major site equipment. After the completion of litigation before the Licensing Board and the Commission, HRI's Church Rock Section 8 RAP was approved with one specific exception.

**4. Reply of Hydro Resources, Inc. to Intervenors' Response to Hydro Resources, Inc.'s Cost Estimates for Decommissioning and Restoration Action Plan (January 22, 2001) (ACN ML010250426);**

HRI filed its written presentation supporting its Church Rock Section 8 RAP and argued several points. First, HRI argued that its Church Rock Section 8 RAP adequately satisfied the Commission directive in CLI-00-08 and NRC regulations applicable to ISL uranium recovery licensees. In support of this argument, HRI provided expert affidavits stating that Intervenors' testimony was based on mere speculation and did not involve any practical, "real-world" experience at ISL uranium recovery facilities. On the contrary, HRI argued that its expert testimony was based on experience at URI-operated and/or restored ISL uranium recovery facilities and that all licensed operations will occur pursuant to NRC-approved license conditions, protocols, and commitments. These operations also require revisions when and if necessary, including annual surety updates pursuant to NRC regulations.

**5. Affidavit of Mark S. Pelizza Responding to Affidavits of Steven Ingle and Richard Abitz (January 22, 2001) (ACN ML010250426);**

The Affidavit of Mark S. Pelizza was submitted to directly refute the testimony of Ingle and Abitz. Mr. Pelizza reiterated his testimony from February 19, 1999, when he described the development of the "pore volume" concept and the process in which HRI arrived at its nine pore volume estimate. Mr. Pelizza reaffirmed that the pore volume estimate would be adjusted, pursuant to license condition, to reflect any necessary increase or permissible decrease in water levels to be re-circulated during groundwater restoration. In addition, Mr. Pelizza notes that HRI's nine pore volume estimate is conservative because it includes the *entire* ore zone and not just the well patterns. Thus, it is possible that the required number of pore volumes may be reduced if the well-field is constructed to reduce dispersion further than originally anticipated.

Mr. Pelizza specifically refutes Abitz's and Ingle's testimony regarding the adequacy of HRI's financial assurance cost estimates. In his testimony, Ingle did not assess the *conservative* number of pore volumes required of HRI by NRC Staff as compared to the number used by other ISL uranium recovery licensees. Mr. Pelizza also discusses brine concentrator efficiency and states that the figures used in the RAP are adequate to address use of the brine concentrator during restoration.

Mr. Pelizza also addresses the capital costs of reverse osmosis and the use of a brine concentrator, the method for well-plugging, and the procedures to be used during restoration such as operating twenty-four hours per day and seven days per week. Each point raised by Mr. Pelizza was supplemented with an analysis of the relevant financial assurance cost estimate from the Church Rock Section 8 RAP.

**6. Affidavit of Richard A. Van Horn Responding to the Affidavits of Steven Ingle and Richard Abitz (January 22, 2001) (ACN ML010250426)**

The Affidavit of Richard A. Van Horn presented industry knowledge and data regarding URI's current ISL uranium recovery operations in South Texas. Mr. Van Horn's affidavit provided a description of the procedures applicable to URI groundwater restoration operations, the required manpower for such operations, and operating costs necessary to continue such operations. Mr. Van Horn specifically noted that Abitz's analysis regarding the costs at the Fernald site cannot be compared to those at URI South Texas sites and that HRI's estimated costs are feasible.

**C. Licensing Board and Commission Decisions on HRI's Pore Volume Estimate, Groundwater Restoration, and Financial Assurance**

**1. LBP-99-13: 49 NRC 233 (March 9, 1999)**

The selection of nine pore volumes as the preliminary groundwater restoration estimate for the CUP and the viability of HRI's process for determining financial assurance have been addressed by this Licensing Board and the Commission in the context of Church Rock Section 8. First, in LBP-99-13,<sup>22</sup> the Licensing Board took its first look at the adequacy of the nine pore volume estimate and the applicability of specific NRC regulations to HRI's license. Intervenors raised a number of arguments including: (1) that 10 CFR § 40.36's requirements for financial assurance apply to HRI's license and (2) that 10 CFR Part 40, Appendix A requirements apply to HRI's license. See 49 NRC at \*4-6. The Presiding Officer determined that 10 CFR § 40.36 does not apply to HRI's license because "pregnant lixiviant" (i.e., source material) exempts HRI

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<sup>22</sup> See *In the Matter of Hydro Resources, Inc.*, (Crownpoint Uranium Project), LBP-99-13, 49 NRC 233 (March 9, 1999).

from the regulation. *Id.* However, 10 CFR Part 40, Appendix A, Criterion 9's requirements for financial assurance do apply to HRI's license and, as a result, HRI would be required to post adequate financial assurance prior to beginning licensed operations in accordance with License Condition 9.5. *Id.* The Presiding Officer also determined that the use of nine pore volumes was adequate based on NRC Staff's "professional judgment." *Id.* at \*6.

**2. CLI-99-22: 50 NRC 3 (July 23, 1999)**

Intervenors' appealed LBP-99-13 and, in CLI-99-22,<sup>23</sup> the Commission granted review on the limited issues of whether a financial assurance plan is a prerequisite to the issuance of a license and whether the financial assurance information submitted by HRI was sufficient to meet licensing requirements. After submission of briefs from all parties, in CLI-00-08,<sup>24</sup> the Commission, while recognizing that a financial assurance mechanism does not have to be in place until uranium recovery operations begin, reversed the Presiding officer's finding that HRI was not required to submit a RAP for its mining sites prior to licensing. Declining to revoke HRI's license, the Commission required that HRI submit RAPs for each of its four CUP sites. As discussed in Section II, HRI submitted the required RAPs in 2001.

**3. CLI-00-08: 51 NRC 227 (May 25, 2000)**

As discussed above, the Commission issued CLI-00-08 in response to Intervenors' appeal of LBP-99-13. In CLI-00-08, the Commission received briefs regarding the application of specific regulations to HRI's financial assurance offering.

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<sup>23</sup> See *In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-99-22, 50 NRC 3 (July 23, 1999).

<sup>24</sup> See *In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-00-08, 51 NRC 227 (May 25, 2000).

The Commission determined that 10 CFR Part 40, Appendix A, Criterion 9 applied to HRI's license and that HRI would be required to submit RAPs for each of its mining sites prior to engaging in ISL uranium recovery operations.

However, the Commission also determined that financial assurance must be established by the licensee prior to the commencement of operations. As a result, the Commission imposed an additional condition on HRI's license requiring that RAPs be submitted outlining the proposed financial assurance cost estimates for restoration and decommissioning of each of HRI's proposed mining sites. The Commission specifically stated that HRI could not commence ISL uranium recovery operations until such RAPs were submitted and approved.

**4. LBP-04-03: 59 NRC 84 (February 27, 2004)**

After submission and NRC Staff approval of the Section 8 RAP, in LBP-04-03,<sup>25</sup> the Presiding Officer determined that the RAP was sufficient with three (3) specific exceptions: (1) the RAP could not account for the availability of major site equipment during decommissioning by an independent contractor, (2) the RAP's labor cost estimates could not account for site employees performing multiple, unrelated tasks at the site, and (3) HRI's well-plugging method should be revised to reflect the "tremie line" method.

**5. CLI-04-14: 59 NRC 250 (May 20, 2004) & CLI-04-33: 2004 NRC LEXIS 254 (December 8, 2004)**

HRI appealed LBP-04-03 to the Commission and challenged two of the Presiding Officer's three findings; (1) that HRI's Section 8 RAP properly accounts for the availability of major site equipment and (2) that HRI's Section 8 RAP can rely on site

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<sup>25</sup> See *In the Matter of Hydro Resources, Inc. (Crownpoint Uranium Project)*, LBP-04-03, 59 NRC 84 (February 27, 2004).

employees performing multiple, unrelated tasks at the site. The Commission granted review on HRI's appealed issues, and issues appealed by Intervenors, in CLI-04-14<sup>26</sup> and, in CLI-04-33,<sup>27</sup> the Commission reversed the Presiding Officer's findings regarding HRI's Section 8 RAP with respect to the availability of major site equipment and proposed labor cost estimates. Further, the Commission specifically noted that:

“[t]he reasonableness of 9 pore volumes as an estimate was challenged in earlier portions of this proceeding. The Presiding Officer's initial decisions on these issues went against the intervenors. The decisions nonetheless noted that ‘the requirement does not end at 9 pore volumes,’ if in fact it is shown that more than 9 pore volumes are needed and likewise that the ‘surety amount may be increased if ‘at any time’ it is determined that wellfield restoration requires greater pore volumes or a higher surety.”

CLI-04-33 at \*6-7.

Thus, the Commission's decision in CLI-04-33 specifically recognizes the iterative nature of HRI's continuing duty to revise pore volume estimates and to update, if necessary, its financial assurance cost estimates for groundwater restoration under its license. As such, HRI's Section 8 RAP was approved pending revision of its proposed well-plugging method to reflect the Presiding Officer's decision in LBP-04-03.

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<sup>26</sup> See *In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-04-14, 2004 NRC LEXIS 99 (May 20, 2004).

<sup>27</sup> See *In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), CLI-04-33, 2004 NRC LEXIS 254 (December 8, 2004).

**VI. ARGUMENT: MISCELLANEOUS PROCEDURAL ISSUES: CHURCH ROCK SECTION 17, UNIT ONE, & CROWNPOINT**

- A. Intervenors Hearing Rights Have Not Been Violated By Permitting HRI to Determine Baseline Water Quality Standards After the Close of the Hearing**
- 1. Intervenors Misinterpret NRC's In Situ Leach Uranium Recovery Standard Review Plan**

Intervenors allege that NRC Staff has violated their hearing rights by granting HRI two specific license conditions, License No. SUA-1508, License Conditions 10.21 and 10.22, and that NRC Staff has imposed two additional license conditions, License Conditions 10.23 and 10.31, which allow HRI to determine "whether the Westwater Canyon aquifer is vertically confined and free of fractures." Intervenors' March 7, 2005, Written Presentation at 39-40. Intervenors' also allege that NUREG-1569, NRC's Standard Review Plan for In Situ Extraction License Applications ("ISL SRP"), classifies the establishment of baseline water quality standards for groundwater restoration as a "material" part of HRI's license. *Id.* at 41-42. Further, Intervenors claim that establishment of such standards does not qualify as "preoperational testing" for the purposes of licensed activities and that they should be permitted to challenge HRI's determination of "interaquifer communication" and "fracturing." *Id.* at 42-45. Intervenors conclude that each of these factors demonstrate that their hearing rights have been violated.

Based on standard NRC and industry practice, Intervenors' interpretation of the ISL SRP is misguided. Intervenors argue at great length that the establishment of baseline water quality standards is "material" to licensing. However, as a general proposition, the establishment of baseline water quality standards is a part of the "phased-

in” approach to the licensing of ISL uranium recovery facilities explicitly recognized in the ISL SRP. For purposes of this discussion, the two relevant portions of the ISL SRP are Section 2 entitled *Site Characterization* and Section 5 entitled *Operations*. As discussed by Mr. Pelizza in his affidavit:

“With respect to groundwater, the Site Characterization section recommends ‘reasonably comprehensive chemical and radiological analysis obtained within and at locations away from the mineralized zone. The Operations section recommend much more detail ‘for each new wellfield’”

HRI Exhibit A at ¶ 196.

Given this recommendation, Mr. Pelizza states:

“SRP § 5 is based on standard industry practice when the wellfield is to be installed and the test wells will be available. Any change in this approach would require a complete re-engineering of the methods upon which the ISL industry has operated since its inception.”

*Id.* at ¶ 201 (emphasis added).

Given the differences between the *Site Characterization* and *Operations* Sections of the ISL SRP, as stated by Mr. Pelizza, “[i]t is inappropriate [of Intervenors] to treat the purposes of these two provisions as being the same.” *Id.* at ¶ 197. With respect to the *pre-licensing Site Characterization* portion of ISL uranium recovery operations, Section 2 of the ISL SRP “provides guidance for ‘reasonably comprehensive’ analysis to determine baseline conditions” (i.e., *Site Characterization*). *Id.* This assessment includes evaluation of general baseline water quality conditions using the best available data but *without* the installation of well-fields necessary to determine detailed baseline values for restoration goals and other parameters. Moreover, HRI is not permitted to engage in the construction of well-fields and sampling operations at such well-fields during the *Site Characterization* phase or the licensee risks having its license denied or revoked. *See*



HRI Exhibit B at ¶ 39. If the licensing phase is not complete, HRI cannot engage in *Operations* activities.

With respect to the Section 5 *Operations* phase of the CUP, HRI must install well-fields at each of the proposed mining sites to determine or conduct “restoration goals, excursion upper control limits, and pump testing for vertical and horizontal confinement.” *Id.* As stated by Mr. Pelizza, “[a]ll of these tests can only be performed once the wells that are part of operations are installed.” HRI Exhibit A at ¶ 197. This statement is further supported by Mr. Bartels when he states, “[t]his sequential treatment [*Site Characterization and Operations*] of ISL wellfields...is the standard NRC methodology, developed over decades, used to protect groundwater and the environment.” HRI Exhibit B at ¶ 41. Contrary to Abitz’s conclusions, Mr. Bartels states, “[t]his sequential treatment of ISL well fields was decidedly not ‘NRC Staff’s decision....” *Id.* Based on this, Mr. Pelizza concludes that, “[i]t is inappropriate to treat the purposes of these two provisions as being the same.” HRI Exhibit A at ¶ 197.

Further, “[a]t this stage in the CUP project, the litigation cannot reach beyond the adequacy of the protocol on the operating plan (Consolidated Operations Plan Rev. 2.0 or COP) because the mine must be built before the plan can be implemented and compliance is then left to inspection.” *Id.* at ¶ 198 As stated by Mr. Pelizza, “[i]t takes years of continuous study to plan and develop an ISL uranium mine through its operational life to closure....This process is sequential, with each mine unit developed and tested as the mineral is progressively depleted from different parts of the ore body.” *Id.* at ¶ 214. ISL uranium recovery operations must be done in this manner, because “[t]he installation of mine units prior to satisfying the requirements of [ISL] SRP § 5 guidance and after SRP §

2 characterization and licensing is completed would be a direct violation of NRC regulations and SRP Guidance.” *Id.* at ¶ 216.

For example, with respect to statistical analyses,<sup>28</sup> “HRI’s COP and...LC 10.22 require HRI to eliminate outliers consistent with EPA’s 1989, ‘Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Interim Guidance.’ This NRC required methodology for outlier determination requires a rigorous statistical approach and has an accepted scientific basis. HRI will utilize the stated statistical analysis guidance for outlier analysis or method required by NRC.” *Id.* at ¶ 219. HRI’s license and the COP also prescribe standard operating procedures (SOPs) for activities involving radioactive materials, instructions for sequential well and well-field installation, determination of UCLs, and the establishment of restoration goals. The validity and feasibility of these *protocols* and prescriptive requirements are at issue here and not necessarily site-specific data.

Based on the incorporation of the COP, HRI’s performance-based NRC license is specifically tailored to reflect this sequential treatment of ISL well-fields so that all proper well-field installation, testing, and monitoring is complete prior to the injection of *any* lixiviant into the proposed uranium recovery zones. Several of HRI’s license conditions and the COP establish prescriptive requirements for constructing well-fields, establishing upper control limits (UCLs), pump testing requirements, and groundwater monitoring. *See* HRI Exhibit A at ¶ 206. Intervenors were given ample opportunity to challenge the performance-base nature of HRI’s license in the Church Rock Section 8 proceeding and, in LBP-99-10, the Licensing Board determined that HRI’s performance-

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<sup>28</sup> For further discussion on the viability of HRI’s proposed statistical analysis protocol, *please see* the Affidavit of Mr. Ronald Christensen (attached as “HRI Exhibit E”).

based license complies with NRC regulations. See *In the Matter of Hydro Resources, Inc.* (Crownpoint Uranium Project), LBP-99-10, 49 NRC 145 (February 19, 1999).

Specifically, the Licensing Board responded to Intervenors' broad allegation that HRI's license leaves HRI practically unregulated by quoting License Condition 9.3 which states:

“[t]he licensee shall conduct operations in accordance with all commitments, representations, and statements made in its license application submitted by cover letter dated April 25, 1988...and in the Crownpoint Uranium Project Consolidated Operations Plan (COP), Rev. 2.0, dated August 15, 1997-except where superseded by license conditions contained in this license. Whenever the licensee uses the words 'will' or 'shall' in the aforementioned licensee documents, it denotes an enforceable license requirement.”

Thus, HRI is granted no “latitude” to operate the CUP in a manner outside the prescriptive requirements of its license and its commitments in the CUP. Therefore, Intervenors' reliance on the ISL SRP to demonstrate a deprivation of hearing rights is misguided.

Moreover, Intervenors' claim that NRC Staff does not have to approve relevant activities at the CUP sites is incorrect. Intervenors ignore the basic fundamental premise behind performance-based licensing which is that all licensed activities are subject, in one form or another, to NRC approval. Initially, as stated above, HRI's license, its conditions, and all incorporated procedures and commitments were subject to NRC approval and currently are being evaluated in this proceeding. After approval of these items, HRI is permitted to perform all *Site Characterization, Operations*, and other relevant activities associated with construction of a well-field and preparation for uranium recovery operations in accordance with the prescriptive requirements of its license and associated conditions, procedures, and commitments. These activities are

conducted and finalized by a Safety and Environmental Review Panel (SERP), which is a fundamental component of a performance-based license, and the results of these activities are maintained on-site. As a further check on HRI's licensed activities, the SERP's findings and the results of licensed activities pursuant to license conditions and other requirements are subject to NRC inspection. Should NRC be dissatisfied with the SERP's actions, HRI would be required to rectify any problems or be subject to NRC enforcement action.

In summary, HRI's NRC performance-based license, including all incorporated procedures (e.g., the COP) and commitments (e.g., EPA Guidance for statistical analysis), provides prescriptive requirements for the construction, operation, and restoration of well-fields at each CUP site. HRI is not permitted to engage in *Site Characterization* or *Operations* activities outside of these prescriptive requirements. Further, NRC approval of HRI's license and associated requirements is only the first stage of the process. NRC retains authority to inspect all activities engaged in by the SERP, to require corrective action and, if necessary, to impose enforcement. These premises are the fundamental basis for the concept of performance-based licensing, which already has been litigated before Judge Bloch and approved. Based on this, Intervenor should be collaterally estopped from challenging the performance-based nature of HRI's license and, as such, Intervenor's allegations that they have been deprived of hearing rights should be rejected.

## **2. Intervenor's Reliance on Case Law is Misguided**

Intervenor also rely on several case citations to demonstrate that they have been deprived of their hearing rights to challenge HRI's performance-based license.

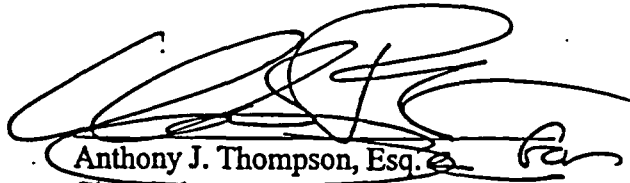
Specifically, Intervenors rely on the cases of *Union of Concerned Scientists v. NRC*, *In the Matter of Consolidated Edison Co. of New York*, and *In the Matter of Wisconsin Power Co. and Wisconsin-Michigan Power Co.* to support their conclusions. See Intervenors' March 7, 2005, Written Presentation at 42 & 45.

Intervenors' reliance on these cases to support their argument is misguided as they address a type of adjudicatory proceeding that is vastly different from the instant proceeding. Each of Intervenors' cited cases involve "formal" "on-the-record" proceedings for nuclear power reactor applicants or licensees and are directly related to the Administrative Procedure Act's (APA's) provisions for such proceedings. See 5 U.S.C. § 554 \_\_. However, the instant proceeding is being conducted under NRC's Subpart L regulations for "informal" materials licensing proceedings. As a general proposition, NRC materials licensing proceedings, such as the instant proceeding regarding HRI's license, are conducted as "informal" proceedings and, as such, are not subject to the holdings in Intervenors' cited cases. Thus, Intervenors' reliance on these cited cases provide no support for their allegations.

**VII. CONCLUSION**

For the reasons discussed above, HRI respectfully requests that the Presiding Officer reject each of Intervenors' arguments regarding groundwater, groundwater restoration, and financial assurance.

Respectfully Submitted,



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**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
ATOMIC SAFETY AND LICENSING BOARD**

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

In the Matter of:	)	
Hydro Resources, Inc.	)	Docket No.: 40-8968-ML
P.O. Box 777	)	
Crownpoint, NM 87313	)	Date: April 21, 2005
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**CERTIFICATE OF SERVICE**

**THIS IS TO CERTIFY** that a copy of the foregoing Hydro Resources, Inc.'s Response in Opposition to Intervenors' Written Presentation Regarding Groundwater, Groundwater Restoration and Financial Assurance in the above-captioned matter has been served upon the following via electronic mail and U.S. First Class Mail on this 21<sup>st</sup> day of April, 2005.

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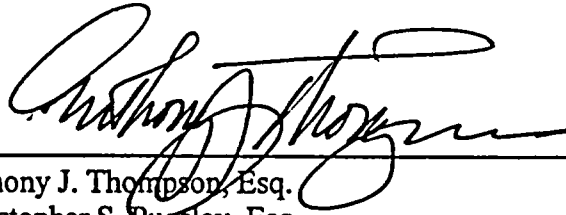
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UNITED STATES OF AMERICA  
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Before Administrative Judges:  
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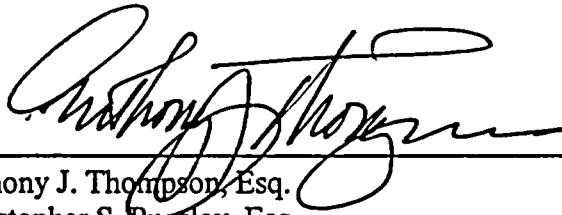
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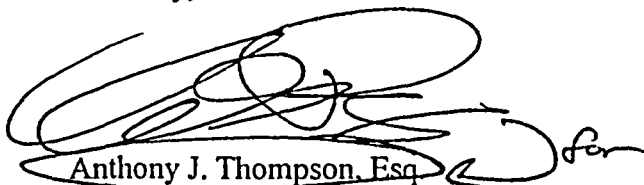
Re: In the Matter of: Hydro Resources, Inc.  
Docket No: 40-8968-ML

Dear Sir or Madam:

Please find attached for filing Hydro Resources, Inc.'s Response in Opposition to Intervenor's Written Presentation Regarding Groundwater, Groundwater Restoration and Financial Assurance, Notice of Errata in the above-captioned matter. Copies of the enclosed have been served on the parties indicated on the enclosed certificate of service. Additionally, please return a file-stamped copy in the self-addressed, postage prepaid envelope attached herewith.

If you have any questions, please feel free to contact me at (202) 496-0780.  
Thank you for your time and consideration in this matter.

Sincerely,



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Enclosures

(hydro resourcesCOVERLETTTER.doc)