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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ATOMIC SAFETY AND LICENSING BOARD

SERVED 07/20/05

Before Administrative Judges:

E. Roy Hawkens, Presiding Officer
Dr. Richard F. Cole, Special Assistant
Dr. Robin Brett, Special Assistant

In the Matter of	Docket No. 40-8968-ML
HYDRO RESOURCES, INC. P.O. Box 777 Crownpoint, New Mexico 87313	ASLBP No. 95-706-01-ML July 20, 2005

PARTIAL INITIAL DECISION
(Phase II Challenges To In Situ Leach Mining Materials License Regarding Groundwater Protection, Groundwater Restoration, And Surety Estimates)

I. INTRODUCTION

This protracted proceeding involves challenges by multiple intervenors to a license application by Hydro Resources, Inc. (HRI) to perform in situ leach (ISL) uranium mining. On January 5, 1998, while the intervenors' challenges were pending, the NRC Staff granted the license, SUA-1508, which authorizes HRI – after several preliminary requirements are satisfied – to perform ISL uranium mining at the following four sites in McKinley County, New Mexico: Section 8 and Section 17 in Church Rock, and Crownpoint and Unit 1 in Crownpoint.

Although HRI has held this license for nearly eight years, it has not yet started mining at any of the sites, due, at least in part, to profitability concerns related to the fluctuating price of uranium. Notwithstanding HRI's tardigrade pace in commencing mining operations, this adjudication has gone forward, focusing first – in what was characterized as Phase I – on issues specific to Section 8, because HRI represented that it ultimately would begin its mining operations there.

In February 2004, the then-Presiding Officer completed adjudicating the Phase I challenges to HRI's license relating to prospective mining operations at Section 8, see Hydro Re-

sources, Inc., LBP-04-03, 59 NRC 84 (2004), and the Commission sustained the validity of that aspect of HRI's license. See Hydro Resources, Inc., CLI-04-33, 60 NRC 581 (2004).

What remains to be adjudicated in Phase II are the challenges to HRI's license insofar as it authorizes mining at the other three sites – Section 17, Crownpoint, and Unit 1. For litigative efficiency, the remaining challenges were grouped into the following four categories: (1) groundwater protection, groundwater restoration, and surety estimates; (2) historic preservation; (3) air emission controls; and (4) adequacy of environmental impact statement.

This decision resolves the issues embodied in the first category of challenges. For the reasons set forth below, I find – with the concurrence of Dr. Richard Cole and Dr. Robin Brett, who have been appointed Special Assistants – that HRI has demonstrated by a preponderance of the evidence that the intervenors' challenges relating to groundwater protection, groundwater restoration, and surety estimates do not provide a basis for invalidating HRI's license to perform ISL uranium mining at Section 17, Crownpoint, and Unit 1. However, I direct that (1) HRI's license be revised to reduce the secondary groundwater restoration standard for uranium from 0.44 mg/L to 0.03 mg/L, and (2) HRI's Restoration Action Plan be revised to include a cost estimate for expenses associated with disposal site unloading, surveying, and decontamination.

II. BACKGROUND

A. A GENERAL DESCRIPTION OF THE ISL MINING AUTHORIZED BY HRI's LICENSE

HRI's materials license authorizes it to perform ISL uranium mining at four proximately clustered sites in McKinley County, New Mexico: Section 8 and Section 17 in Church Rock, and Crownpoint and Unit 1 in Crownpoint. The targeted mining zone will be discrete portions of an expansive aquifer, called the Westwater Aquifer, that underlies the entire region. The Westwater Aquifer ranges in thickness from Gallup, New Mexico to the continental divide between 175 and 275 feet, but it is known to be considerably thicker locally. See Final Environmental

Impact Statement To Construct and Operate the Crownpoint Uranium Solution Mining Project, Crownpoint, New Mexico, NUREG-1508 at 3-8 (Feb. 1997) [hereinafter FEIS]. In the Church Rock area, the top of the Westwater Aquifer ranges in depth from 460 to 760 feet; in the Crownpoint area, the top of the Westwater Aquifer is at an average depth of about 1840 feet. See FEIS at xix.

At the Section 8 mining site (and allegedly at the other three sites as well), the Westwater Aquifer is sandwiched between two aquitards, which are containing layers that confine the flow of water in the Westwater Aquifer from overlying and underlying aquifers. The Brushy Basin Aquitard lies above the Westwater Aquifer and separates it from the overlying Dakota Aquifer. The Recapture Aquitard lies below the Westwater Aquifer and separates it from the underlying Cow Springs Aquifer. See Hydro Resources, Inc., LBP-99-30, 50 NRC 77, 89-91 (1999); FEIS at 3-7 to 3-11; Affidavit of Frank Lee Lichnovsky at 5-6 (Apr. 21, 2005) [hereinafter Lichnovsky Affidavit].

The portion of the Westwater Aquifer that will be mined pursuant to HRI's license is extremely small compared to the overall size of the aquifer. For example, assuming that the Westwater underlies 50% of McKinley County, it encompasses 1,742,080 acres there. San Juan County is down-gradient of HRI's mining sites, and if the Westwater acreage in San Juan County is included in this example, that would increase the relevant regional area of the aquifer by 3,530,240 acres. In contrast, HRI's well fields, when fully developed at all four sites, will encompass only about 435 acres. The alleged significance of this comparison is that – given the Westwater's demonstrated capacity to precipitate uranium – it may reasonably be concluded that the Westwater's regional reducing capability will contribute to the attenuation of any small pockets of residual uranium that may remain in solution after HRI's mining operations and groundwater clean-up efforts are complete. Affidavit of Mark S. Pelizza at 30 (Apr. 21,

2005) [hereinafter Pelizza Affidavit]; see Hydro Resources, Inc., LBP-99-30, 50 NRC 77, 102 (1999); Lichnovsky Affidavit at 17-18; FEIS at 3-6 to 3-9.

HRI's ISL uranium mining will involve two principal steps. During the first step (the injection process), HRI will inject a leach solution called "lixiviant" – which is a mixture of groundwater that is charged with oxygen and bicarbonate – through wells into a targeted zone containing uranium oxide. The uranium oxide, which is in solid form and is immobile because it is attached to a host rock, dissolves when it comes into contact with the lixiviant solution. See FEIS at 2-2, 2-5.

Near the injection wells, HRI also will operate production wells located in a pattern around the individual injection wells. The production wells create a negative pressure, or "cone of depression," in the mined region by withdrawing slightly more water from the ground than is injected, thus containing the horizontal spread of the pregnant lixiviant (i.e., the lixiviant that now contains dissolved uranium oxide) and causing it to flow toward the production wells where it is pumped to the surface. See FEIS at 2-2 to 2-3.[1]

The second step of the ISL mining operation (the extraction process) occurs after the pregnant lixivant is pumped to the surface. HRI will pipe the pregnant lixiviant through columns of ion exchange resin, the uranium oxide will attach to the resin, and the now-barren lixiviant will then be re-charged and re-injected into the mining zone. When the ion exchange capacity of a column of resin is depleted, that column is taken off-line and a chemical process is used to strip

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[1] HRI will encircle the well field with monitor wells to detect any horizontal excursions of lixiviant outside the cone of depression. See License Condition (LC) 10.17. HRI will also install monitor wells to check for vertical excursions outside the Westwater Aquifer. See LC 10.18 to LC 10.20. An excursion requires immediate corrective action to draw the lixiviant back to the cone of depression; if the corrective action is unsuccessful, HRI must terminate injection of lixiviant within that well field, or increase the surety above the amount originally contemplated in the Restoration Action Plan to compensate for the increase in restoration cost caused by the excursion. See LC 10.13; Crownpoint Uranium Project Consolidated Operations Plan (Rev. 2.0) § 8.7 (Aug. 15, 1997) [hereinafter Consolidated Operations Plan].

the uranium oxide from the resin. The resulting slurry is filtered and dried to produce the finished product – uranium oxide concentrate, or yellowcake – which is packaged and stored for final shipment. See FEIS at 2-6 to 2-12.

After HRI completes mining at a site, it is required to return groundwater parameters in the Westwater Aquifer to the average pre-mining baseline conditions of the mine field. This is accomplished by repeatedly flushing the affected groundwater with non-contaminated groundwater, followed by treatment and/or disposal of the contaminated groundwater. If HRI is unable to achieve the primary groundwater restoration goal for a particular parameter, the secondary groundwater restoration goal is to return water quality to the maximum concentration limit specified in the United States Environmental Protection Agency (EPA) drinking water regulations or, for certain parameters, to New Mexico or NRC standards. See LC 10.21; FEIS at 2-16 to 2-18, 2-20, A-36 to A-38.

The NRC Staff determined that groundwater restoration would require flushing the mined sites with 9 "pore volumes," and the Commission affirmed this determination as applicable to the Section 8 site. See Hydro Resources, Inc., CLI-00-08, 51 NRC 227, 244-45 (2000). A pore volume is not a fixed unit; rather, HRI calculates a pore volume by multiplying the mine's well field area by the ore zone thickness and the porosity of the rock. The result is then converted to gallons. Additionally, to account for lixiviant that may have "flared," or migrated outside the boundaries of the calculated ore pore volume, lateral and vertical "flare factors" are used as further multipliers. See Hydro Resources, Inc., CLI-04-33, 60 NRC 581, 589 n.32 (2004).

Before HRI may inject lixiviant at Section 17, Crownpoint, or Unit 1, it must submit to the NRC for approval the "results of a groundwater restoration demonstration conducted at the [Section 8] site. The demonstration shall be conducted on a large enough scale, acceptable to

the NRC, to determine the number of pore volumes that shall be required to restore a production-scale well field" (LC 10.28; see also Hydro Resources, Inc., LBP-04-03, 59 NRC 84, 96 (2004)). The "Section 8 production well field demonstration [will] give . . . the absolute best information" to make any necessary adjustments to the number of pore volumes required for groundwater restoration at the other sites (LBP-04-03, 59 NRC at 95; see also id. at 93-94 n.46). "If the demonstration results confirm the [9 pore volume] estimate, no revision to the pore volume estimate will be necessary. Conversely, if HRI is unable to successfully complete the restoration demonstration using up to 9 pore volumes, it 'can't use that same number [as the estimate] for the remaining sites'" (CLI-04-33, 60 NRC at 593).

After concluding the groundwater restoration process, the ISL mining wells will be plugged, processing facilities will be decontaminated, all contaminated materials will be removed to a licensed waste disposal site, and all affected areas will be surveyed, recontoured and revegetated, and released for unrestricted use (FEIS at xx).

B. SUMMARY OF THE RELEVANT ADMINISTRATIVE PROCEEDINGS IN THIS CASE

1. Phase I

This proceeding – which is being litigated pursuant to the NRC's since-superseded procedural rules in 10 C.F.R. Part 2, Subpart L[2] – involves challenges by the Eastern Navajo Diné Against Uranium Mining, the Southwest Research and Information Center, Grace Sam, and Marilyn Morris [hereinafter referred to collectively as the Intervenors] to HRI's application for a 10 C.F.R. Part 40 source and byproduct materials license, which the NRC Staff issued to HRI on January 5, 1998 (SUA-1508). The license authorizes HRI to perform ISL uranium mining at

[2] In 2004, the NRC amended its adjudicatory procedural rules in 10 C.F.R. Part 2. See 69 Fed. Reg. 2182 (Jan. 14, 2004). Because the new rules apply only to proceedings noticed on or after February 13, 2004, they have not been applied here.

four sites in McKinley County, New Mexico: Sections 8 and 17 in Church Rock, and Crownpoint and Unit 1 in Crownpoint. See Hydro Resources, Inc., LBP-98-09, 47 NRC 261 (1998).

HRI plans to commence its ISL mining operations at Section 8, and it must successfully demonstrate groundwater restoration at that site before it starts mining the other sites. It anticipates that the operation and restoration of Section 8 will last about five and one-half years. See Hydro Resources, Inc., CLI-98-08, 47 NRC 314, 318-19 (1998).

However, HRI has not yet commenced mining operations at Section 8 (or elsewhere), apparently due, at least in part, to profitability concerns. Moreover, HRI must obtain additional regulatory agency permits before it begins mining. See Hydro Resources, Inc., CLI-04-14, 59 NRC 250, 253-54 (2004); Hydro Resources, Inc., CLI-01-04, 53 NRC 31, 42 (2001); Hydro Resources, Inc., LBP-04-03, 59 NRC 84, 109-10 n.154 (2004) (Licensing Board observes that HRI must obtain other regulatory agency permits before it may begin mining and "it is far from certain" that HRI will be successful in obtaining such permits).

HRI thus does not know when it will begin mining at Section 8, and it has no immediate intent to mine the other three sites. See Hydro Resources, Inc., CLI-01-04, 53 NRC 31, 36 (2001); Hydro Resources, Inc., CLI-00-08, 51 NRC 227, 242 (2000).

The Commission has held, however, that HRI's uncertainty as to when it will commence mining operations does not abridge the Intervenors' right to timely litigate their challenges to HRI's license. See Hydro Resources, Inc., CLI-01-04, 53 NRC 31, 38-44 (2001). Given HRI's stated intent to begin its mining operations at Section 8, the then-Presiding Officer – pursuant to HRI's request – bifurcated the litigation, focusing initially in Phase I on the Intervenors' challenges relating to Section 8 and the overall validity of the license, leaving those issues relating specifically to Section 17, Unit 1, and Crownpoint open and subject to later litigation in Phase II.

See id. at 40 ("[i]t is sensible to decide the most time-sensitive issues first, as the Presiding Officer did here when he examined Section 8-related issues initially").

The litigation in this case not only has been lengthy, it has been – in the words of the Commission – "formidable" and "complex, due both to its large number of technical issues and to unprecedented legal questions" (Hydro Resources, Inc., CLI-01-04, 53 NRC 31, 34, 43 (2001); see also id. at 39 ("[t]he case record is voluminous, the legal and technical arguments multifaceted and difficult")).

By 2001, the Commission already had issued several appellate decisions relating to the Section 8 proceeding. See, e.g., Hydro Resources, Inc., CLI-01-04, 53 NRC 31 (2001) (National Environmental Policy Act and environmental justice concerns); Hydro Resources, Inc., CLI-00-12, 52 NRC 1 (2000) (groundwater, radioactive air emissions, and technical qualifications); Hydro Resources, Inc., CLI-00-08, 51 NRC 227 (2000) (financial qualifications).

In 2001, this proceeding was held in abeyance for about two years while the parties attempted to negotiate a settlement. Unfortunately, their efforts were unsuccessful, and active litigation resumed in 2003. See Hydro Resources, Inc., CLI-04-33, 60 NRC 581, 583 (2004).

In February 2004, the then-Presiding Officer completed adjudicating the Phase I issues relating to Section 8, see Hydro Resources, Inc., LBP-04-03, 59 NRC 84 (2004), and the Commission, on appeal, sustained the validity of HRI's license insofar as it involves prospective mining operations at Section 8. See Hydro Resources, Inc., CLI-04-33, 60 NRC 581 (2004) (groundwater and surety issues); see also Hydro Resources, Inc., CLI-04-39, 60 NRC 657 (2004) (denying petition for review of Presiding Officer's denial of Intervenors' motions to supplement final environmental impact statement for Sections 8 and 17).

2. Phase II

The Intervenors' contentions in Phase II of this case challenge the validity of HRI's license insofar as it authorizes mining at the other three sites – Section 17, Crownpoint, and Unit 1. For litigative efficiency, the Intervenors' challenges were grouped into the following four categories: (1) groundwater protection, groundwater restoration, and surety estimates; (2) historic preservation; (3) air emission controls; and (4) adequacy of environmental impact statement.

The instant decision – which is based on full briefing by the parties and a voluminous record – resolves the first category of challenges (i.e., groundwater protection and restoration, and surety estimates) to HRI's license authorizing ISL mining at Section 17, Crownpoint, and Unit 1.

The Intervenors assert that HRI's license authorizing ISL uranium mining at Section 17, Crownpoint, and Unit 1 is invalid because: (1) the licensing condition establishing the secondary groundwater restoration standard for uranium is unlawfully high and must be reduced from 0.44 mg/L to 0.03 mg/L; (2) several licensing conditions that permit HRI to make particular groundwater-related determinations after the completion of this proceeding deprive the Intervenors of their hearing rights; (3) HRI's groundwater restoration plan and its cost estimates in the Restoration Action Plan are inadequate; and (4) HRI fails to establish that drinking water supplies will be protected from unlawful uranium contamination. The Intervenors therefore ask that HRI's license be invalidated or, alternatively, that it be revised to cure the allegedly invalid provisions. See Intervenors' Written Presentation in Opposition to Hydro Resources, Inc.'s Application for a Materials License With Respect To Groundwater Protection, Groundwater Restoration, and Surety Estimates (Mar. 7, 2005) [hereinafter Intervenors' Written Presentation].

HRI and the NRC Staff have submitted written presentations addressing the Intervenors' challenges and arguing that HRI's license need not be invalidated. See HRI's Response in Opposition to Intervenors' Written Presentation (Apr. 21, 2005) [hereinafter HRI's Response]; NRC Staff's Written Presentation on Groundwater Protection, Groundwater Restoration, and Surety Estimates at 6-8 (Apr. 29, 2005) [hereinafter NRC Staff's Written Presentation].

For the reasons discussed below, I conclude that HRI has met its burden of demonstrating by a preponderance of the evidence that its license need not be invalidated. However, I direct that the secondary groundwater restoration standard for uranium in HRI's license be reduced consistent with the Intervenors' request, and I direct that HRI's Restoration Action Plan be revised to include a cost estimate for expenses associated with disposal site unloading, surveying, and decontamination.

III. ANALYSIS

Introduction: The Applicability Of The "Law Of The Case" Doctrine In This Proceeding

The NRC Staff correctly observes that the Intervenors' challenges must be considered against the backdrop of the "law of the case" doctrine. See NRC Staff's Written Presentation at 6-8. The "law of the case" doctrine, which is a common law rule applicable to NRC adjudicative proceedings, establishes that the decision of an appellate tribunal should ordinarily be followed in all subsequent phases of that case, provided that the particular question in issue was "actually decided or decided by necessary implication" (Safety Light Corp. (Bloomsburg Site Decontamination), CLI-92-09, 35 NRC 156, 159-60 & n.5 (1992)). It is a rule of repose, designed to advance judicial efficiency and economy by refusing to re-visit those issues that already have been decided.[3]

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[3] HRI argues that a different rule of repose – collateral estoppel – bars the Intervenors from advancing arguments that were previously rejected. See HRI's Response at 9.

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The law of the case doctrine may be implicated here, because the Commission already has issued several decisions that contain factual determinations and legal conclusions pertaining to groundwater protection, groundwater restoration, and surety estimates as they apply to HRI's prospective mining operations at Section 8 (see supra Part II.B.1). To the extent that the Intervenors are unable to distinguish their current challenges from those that were previously rejected by the Commission, the law of the case doctrine will militate strongly in favor of adhering to those decisions.

It bears emphasizing, however, that the law of the case doctrine merely guides a tribunal's discretion; it does not limit a tribunal's power (Arizona v. California, 460 U.S. 605, 618 (1983)), and it "should not be applied woodenly in a way inconsistent with substantial justice" (United States v. Miller, 822 F.2d 828, 832-33 (9th Cir. 1987)). Thus, an adjudicative body should, in a proper exercise of discretion, refrain from applying law of the case doctrine where "changed circumstances or public interest factors dictate" (Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), CLI-04-27, 61 NRC 145, 154 (2004) (internal quotation marks omitted)). Changed circumstances include a situation where, for example, intervening controlling authority makes reconsideration appropriate, or substantially different evidence is adduced at a subsequent stage of the proceeding. See, e.g., In re Rainbow Magazine, Inc., 77 F.3d 278, 281 (9th Cir. 1996); DeLong Equip. Co. v. Washington Mills Electro Minerals Corp., 990 F.2d 1186, 1196-97 (11th Cir. 1993); United States v. Bell, 988 F.2d 247,

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But collateral estoppel is a rule that applies in situations involving *different* proceedings. Specifically, it bars re-litigation in a subsequent proceeding of issues of law or fact that have been adjudicated in an earlier, *different* proceeding. See Ohio Edison Co. (Perry Nuclear Power Plant, Unit 1), LBP-92-32, 36 NRC 269, 284-85 (1992). Collateral estoppel is not apposite here, because the earlier adjudication of the Intervenors' challenges did not occur in a different proceeding; it occurred in a prior phase of the same proceeding.

251 (1st Cir. 1993); Lyons v. Fisher, 888 F.2d 1071, 1075 (5th Cir. 1989), cert. denied, 495 U.S. 948 (1990).

With the above "law of the case" considerations in mind, I now turn to the Intervenors' challenges.[4]

A. THE INTERVENORS' CHALLENGE TO HRI's SECONDARY GROUNDWATER RESTORATION STANDARD FOR URANIUM NEED NOT BE ADJUDICATED, BECAUSE BOTH HRI AND THE NRC STAFF AGREE THAT THE STANDARD SHOULD BE REDUCED FROM 0.44 MG/L TO 0.03 MG/L

As discussed supra Part II.A, during the ISL uranium mining process, (1) HRI will introduce a lixiviant solution into the groundwater in a targeted mining zone, (2) the lixiviant solution will dissolve uranium oxide in the mining zone, and (3) HRI will pump the pregnant lixiviant solution (the solution containing the dissolved uranium oxide) from the ground and extract the uranium oxide. After HRI completes its mining operations at a site, it must remediate the affected area, which, as relevant here, requires HRI to restore the groundwater to levels consistent with restoration goals established in its license.

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[4] Consistent with a briefing order in this case dated February 3, 2005 (unpublished), the Intervenors filed their brief for this portion of the proceeding on March 7, 2005, and HRI and the Staff filed their responsive briefs on April 21, 2005 and May 2, 2005, respectively. Although the February scheduling order did not provide that the Intervenors could file a reply brief, they filed such a brief on May 9, 2005, responding narrowly and specifically to the preclusion arguments advanced by HRI and the Staff. Neither HRI nor the Staff objected to this filing, and it is appropriate in this case to allow this reply brief to be filed, especially in light of an unpublished scheduling order dated May 25, 2001 that authorized the Intervenors to file reply briefs limited to such preclusion issues. Cf. Alabama Power Co. (Joseph M. Farley Nuclear Plant Units 1 and 2), ALAB-182, 7 AEC 210, 218 (1974) (a party must be accorded a meaningful opportunity to respond to arguments that are in the nature of affirmative defenses).

In their reply brief, the Intervenors – in addition to opposing the preclusion arguments on the merits – assert that these arguments should be stricken, because HRI and the Staff failed to comply with a procedural requirement in the unpublished scheduling order of May 25, 2001 that required them to provide the Intervenors with advance notice if they intended to raise such arguments. See Intervenors' Reply Brief at 5 n.2. Because the Intervenors' reply brief has been accepted for filing, they have suffered no prejudice; their request to strike the preclusion arguments is therefore denied.

Specifically, HRI will establish groundwater restoration goals on a parameter-by-parameter basis, with the primary restoration goal to return each parameter to the average well field concentration that existed prior to the commencement of mining operations, or the baseline. If that goal cannot be achieved, the secondary restoration goal is to return water quality to the maximum concentration limit specified in the United States Environmental Protection Agency (EPA) drinking water regulations or, for certain parameters, to New Mexico or NRC standards. The license condition establishing the primary and secondary groundwater restoration goals states in pertinent part (LC 10.21(A) (emphasis added)):

> Groundwater restoration goals shall be established on a parameter-by-parameter basis, with the primary restoration goal to return all parameters to average pre-lixiviant injection conditions. *If groundwater quality parameters cannot be returned to average pre-lixiviant injection levels, the secondary goal shall be to return groundwater quality to the maximum concentration limits as specified in the U.S. [EPA] secondary and primary drinking water regulations. The secondary restoration goal for barium and fluoride shall be set to the State of New Mexico primary drinking water standard. The secondary restoration goal for uranium shall be 0.44 mg/L . . . .*

When the Staff issued HRI's license in 1998, the EPA did not have a maximum concentration limit (MCL) for uranium. Therefore, in selecting a secondary restoration goal, the Staff chose 0.44 mg/L from the effluent concentration limits of Table 2 of Appendix B of 10 C.F.R. Part 20. See FEIS at 2-20.

After the Staff issued HRI's license, the EPA – pursuant to its authority under the Safe Drinking Water Act (SDWA) – promulgated an MCL for uranium of 0.03 mg/L. See 65 Fed. Reg. 76708 (Dec. 7, 2000) (effective Dec. 8, 2003). The EPA concluded that drinking water that contained more than 0.03 mg/L of uranium would, inter alia, pose an unacceptable threat of kidney damage due to uranium's *chemical* toxicity (id. at 76710-15). The Intervenors assert that the secondary restoration standard for uranium must be reduced from 0.44 mg/L to 0.03 mg/L, else HRI's license will violate the SDWA (Intervenors' Written Presentation at 22, 31, 33).

The Intervenors also argue that the current secondary restoration standard for uranium in HRI's license violates the Atomic Energy Act (AEA), which provides that the Commission "shall not" issue a license that "would be inimical to the . . . health and safety of the public" (42 U.S.C. § 2099). Allowing HRI to exceed the EPA's MCL for uranium would endanger the public health and safety, argue the Intervenors, because the overwhelming weight of recent epidemiological studies establishes that chronic ingestion of even low levels of uranium can – due to its chemical toxicity – cause kidney damage and eventual kidney failure (Intervenors' Written Presentation at 25, 33, 34).

HRI and the NRC Staff disagree with the Intervenors' assertion that the secondary groundwater restoration standard for uranium in HRI's license violates the SDWA and the AEA. HRI and the Staff base their argument on the fact that HRI's license requires that – prior to mining – HRI obtain other administrative authorizations that will ensure its conduct is consistent with the health and safety standards established in the SDWA and the AEA. Specifically, HRI may not commence ISL mining operations at any site until it obtains (1) an aquifer exemption for the portion of the aquifer where HRI will be mining, and (2) an Underground Injection Control (UIC) permit. See LC 9.14 ("[p]rior to injection of lixiviant, the licensee shall obtain all necessary permits and licenses from the appropriate regulatory authorities"). A valid aquifer exemption, once obtained, would exempt HRI from adhering to EPA's prescribed MCLs for underground sources of drinking water, because exempted aquifers, by definition, will not likely be used as a future drinking source after ISL operations are complete. See 40 C.F.R. § 146.4.[5]

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[5] Pursuant to the SDWA, an organization must obtain a UIC permit from the EPA or its authorized designee before engaging in ISL uranium mining. See 42 U.S.C. § 300f; 40 C.F.R. § 144.6. The UIC Program prohibits ISL uranium mining in aquifers that meet the definition of an "underground source of drinking water," absent an aquifer exemption (40 C.F.R. § 144.7). To obtain an aquifer exemption, the applicant must demonstrate that a localized portion of an aquifer (e.g., a discrete area containing a high concentration of uranium which renders

(continued...)

HRI and the Staff thus argue that if HRI's application for an aquifer exemption is denied, it will not be permitted to engage in ISL mining; if its application is approved, the EPA MCL for uranium will not apply. In no event, therefore, will HRI be violating the SDWA or taking action inimical to the public health and safety. Under these circumstances, they argue, the Intervenors' request to reduce the secondary groundwater restoration standard for uranium from 0.44 mg/L to 0.03 mg/L is a matter that need not be decided in this proceeding. See HRI's Response at 15-16; NRC Staff's Written Presentation at 23-24.[6]

I agree with HRI and the Staff that the Intervenors' argument concerning the validity of the secondary groundwater restoration standard for uranium is a matter that need not be adjudicated here. My decision, however, is not grounded on the notion that the requirement of obtaining an aquifer exemption absolves HRI from demonstrating the legitimacy of the standard in this proceeding (supra note 5 and accompanying text). Nor is my decision grounded on the Staff's assertion that it is not bound by the SDWA (supra note 6).

Rather, I decline to decide the legitimacy of the secondary groundwater restoration standard for uranium in HRI's license because HRI and the Staff – despite disagreeing with the

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[5](...continued)
that portion of the aquifer unsuitable as a drinking water source) is not an "underground source of drinking water." The UIC Program and its process for obtaining an aquifer exemption thus ensure aquifer protection consistent with SDWA standards.

The EPA has authorized the State of New Mexico to implement the UIC Program on non-Native American lands in New Mexico; the EPA implements the UIC Program on Native American lands. See 40 C.F.R. § 144.3; FEIS at 1-5. Which entity will administer the UIC Program for HRI's mining sites is beyond the scope of this proceeding. Cf. FEIS at 1-5 ("[c]urrently, there are disputes over the jurisdictional status of some of the [HRI] project area"); HRI, Inc. v. EPA, 198 F.3d 1224, 1249 (10th Cir. 2000) (holding that Section 17 qualifies as Native American land, but a legitimate dispute exists as to whether Section 8 qualifies as Native American land).

[6] The Staff also argues that, although it may look to EPA standards for guidance, it is not bound by the strictures of the SDWA when exercising its regulatory authority in the field of ISL uranium mining. See NRC Staff's Written Presentation at 20.

Intervenors' legal theory underlying their request to reduce that standard – do not object to reducing that standard. To the contrary, they agree that reducing the standard to 0.03 mg/L is appropriate, because such action is consistent with the intent of HRI's license. See NRC Staff's Written Presentation at 24 (NRC Staff "agrees . . . that the appropriate secondary groundwater restoration goal for uranium in HRI's license should be the uranium MCL specified in EPA's year 2000 rulemaking[, because] the intent of LC 10.21(A) was clearly to impose requirements consistent with the EPA's drinking water regulations"); HRI's Response at 16, 17 (HRI "does not contest Intervenors' request to amend the secondary groundwater restoration standard to reflect the 0.03 mg/L SDWA MCL for uranium," because "HRI agrees that now it is proper to set the . . . secondary groundwater restoration standard at 0.03 mg/L").

As explained by HRI's former president, Mark S. Pelizza (who currently is vice president of HRI's parent company, Uranium Resources, Inc.): "At the time of the FEIS the secondary restoration goals were designed to be the lower of EPA MCLs, State of New Mexico standards, or the 10 C.F.R. Part 20 release standard. The EPA uranium MCL was promulgated in December 2003, and with the advent of that standard it is reasonable to now adopt [0.03 mg/L] as a secondary restoration standard" (Pelizza Affidavit at 14; accord FEIS at A-21).

It is well established that, absent compelling reasons, the Commission adheres to the "case" or "controversy" doctrine in its adjudicatory proceedings. See Texas Utilities Elec. Co. (Comanche Peak Steam Elec. Station), CLI-93-10, 37 NRC 192, 200 n.28 (1993). Pursuant to this doctrine, a justiciable controversy must involve adverse parties representing a true clash of interests. The questions raised must be "presented in an adversary context and in a form historically viewed as capable of resolution through the judicial process" (Flast v. Cohen, 392 U.S. 83, 95 (1968)).

When, during the course of a proceeding, the parties no longer disagree about the appropriateness of a requested remedy, the question of whether that remedy should be awarded no longer represents a live controversy involving a true clash of interests. Under such circumstances, a licensing board should ordinarily refrain from adjudicating questions underlying whether that remedy should be granted. Cf. Moore v. Charlotte-Mecklenburg Bd. of Ed., 402 U.S. 47, 48 (1971) (per curiam) (Supreme Court dismissed appeal for lack of live controversy where both litigants desired precisely the same result).

In the instant case, because HRI and the Staff agree with the Intervenors that the appropriate secondary groundwater restoration standard for uranium is 0.03 mg/L, it may fairly be concluded that the controversy regarding that standard is no longer live and, thus, not properly amenable to judicial resolution. To adjudicate the legitimacy of the standard in this non-adversarial context would be tantamount to issuing an advisory opinion, which I decline to do. "[My] reluctance to embark upon the rendition of advisory opinions has its roots in more than simply the husbanding of resources. Beyond that factor is the consideration that [non-justiciable] controversies . . . are very poor vehicles for adjudicatory pronouncements" (Texas Utilities Generating Co. (Comanche Peak Steam Elec. Station), ALAB-714, 17 NRC 86, 94 (1983)).

Instead, consistent with the parties' agreement that the secondary groundwater restoration standard for uranium in HRI's license should be reduced from 0.44 mg/L to 0.03 mg/L, I direct that HRI's license be revised to effect that reduction by striking the final sentence of LC 10.21(A).[7]

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[7] Revising HRI's license in this manner is consistent with the Staff's suggestion (NRC Staff's Written Presentation at 24). Although this revision will reduce the secondary groundwater restoration level for *all* the sites, including Section 8, such action is appropriate because – as HRI and the Staff concede – it implements the intent of the license in light of

(continued...)

B. THE INTERVENORS' HEARING RIGHTS ARE NOT UNLAWFULLY DENIED BY LICENSE CONDITIONS THAT ALLOW HRI TO ESTABLISH BASELINE WATER QUALITY (LC 10.21 AND LC 10.22) AND HYDROLOGICAL PROPERTIES OF THE MINE SITES (LC 10.23 AND LC 10.31) AFTER THE CLOSING OF THIS HEARING

1. The Intervenors' Hearing Rights Are Not Violated By LC 10.21 And LC 10.22, Which Govern The Establishment Of Baseline Water Quality And Upper Control Limits

a. The AEA states that "[i]n any proceeding under this Act, for the granting . . . of any license . . . the Commission shall grant a hearing upon the request of any person whose interest may be affected by the proceeding" (42 U.S.C. § 2239(a)(1)). The Intervenors argue that this statutory provision entitles them to a hearing to challenge any aspect of HRI's license that is material to the public health and safety and may implicate issues of credibility and sufficiency. They contend that the license conditions governing the establishment of groundwater baseline conditions (LC 10.21) and upper control limits (UCLs)[8] for specified groundwater parameters (LC 10.22) deprive them of their hearing rights because HRI is permitted to determine these values *after* this hearing is closed and *without* any regulatory oversight. The

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[7](...continued)
EPA's recent establishment of an MCL for uranium. This change, however, will probably have no practical effect on restoration operations at Section 8. The estimated current average level of uranium at Section 8 is quite high at 1.8 mg/L, which suggests that the baseline, or *primary* restoration standard, for Section 8 will be similarly high. Because "HRI [would] not be required to restore the uranium level at Section 8 to a cleaner, more stringent level than the average level already existing in Section 8[,] . . . it is unlikely that the secondary restoration standard [of 0.44 mg/L, much less of 0.03 mg/L] will ever come into play" (Hydro Resources, Inc., CLI-00-12, 52 NRC 1, 4 (2000)).

[8] During mining operations, HRI will monitor three groundwater parameters (i.e., chloride, bicarbonate, and electrical conductivity) at a ring of monitor wells constructed at prescribed locations outside the mine field to ensure that the parameter concentrations stay below the established UCLs, thus ensuring that the injected lixiviant remains within the cone of depression created by the production wells. UCLs are determined by establishing the groundwater baseline for the ring of monitor wells (with outliers removed) and adding five standard deviations. See LC 10.22, LC 11.3; Consolidated Operations Plan § 8.7. "[Lixiviant] contains concentrations that are so much higher than the UCL . . . that if an excursion [of lixiviant outside the cone of depression] occurred the result would be quickly recognized by a corresponding value that will be well above UCLs" (Pelizza Affidavit at 54 n.56).

Intervenors therefore ask this Licensing Board to keep this hearing open so they can challenge the determinations HRI ultimately makes under these license conditions; alternatively, they ask that HRI's license be invalidated. See Intervenors' Written Presentation at 39-43. I conclude that these license conditions do not abridge the Intervenors' hearing rights and, accordingly, that the relief requested must be denied.[9]

First, the Intervenors' argument ignores that the challenged license conditions – coupled with the procedural protocol mandated in HRI's Consolidated Operations Plan § 8.6[10] – provide a highly detailed, prescriptive methodology for establishing groundwater baselines and UCLs. The Intervenors have had a full opportunity – both here and in the prior Section 8 proceeding – to identify flaws, omissions, or irregularities in these procedures that could erroneously affect the determination of groundwater baselines and UCLs and thereby endanger public health or safety. Moreover, they availed themselves of this opportunity, both here (see Intervenors' Written Presentation at 43) and in the prior Section 8 proceeding (see Hydro Resources, Inc., LBP-

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[9] The Staff argues (NRC Staff's Written Presentation at 27-28) that this argument should be summarily rejected as outside the scope of this proceeding, because at an earlier stage, the Intervenors argued – similarly to what they argue here – that the license improperly deferred the determination of important safety issues, and the then-Presiding Officer ruled that this concern was not germane to this proceeding. See Hydro Resources, Inc., LBP-98-9, 47 NRC 261, 280 (1998). The Staff fails to mention, however, that the Presiding Officer also ruled that this putatively non-germane argument may be a basis for procedural relief, such as keeping the hearing open (ibid.). There is an obvious – and perhaps irreconcilable – tension in ruling on the one hand that an argument is non-germane, and ruling on the other hand that the same argument may be a basis for relief. In any event, I agree with the latter ruling that the Intervenors' argument, if meritorious, would be a basis for relief, and I therefore proceed with an analysis of that argument.

[10] LC 9.3 requires HRI to conduct operations "in accordance with all commitments, representations, and statements made in its license application . . . and in the . . . Consolidated Operations Plan . . . 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."

99-30, 50 NRC 77, 93, 99 (1999)). Under these circumstances, the Intervenors' argument that their hearing rights have been abridged must be rejected as insubstantial.

Nor can the Intervenors salvage their argument by *conjecturing* that, when HRI establishes the groundwater baselines and UCLs, it *might* violate the prescribed procedures, and that a hearing would then be necessary to evaluate the sufficiency and credibility of HRI's data (Intervenors' Written Presentation at 42-43). This argument, if accepted, would effectively transmogrify license proceedings into open-ended enforcement actions: that is, licensing boards would be required to keep license proceedings open for the entire life of the license so intervenors would have a continuing, unrestricted opportunity to raise charges of non-compliance. Neither the AEA nor NRC regulations contemplate, much less compel, such an outcome. See Pacific Gas And Elec. Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-03-02, 57 NRC 19, 29 (2003) (the Commission has "long declined to assume that licensees will refuse to meet their obligations under their licenses or our regulations").[11]

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[11] It is axiomatic that an intervenor should receive a "meaningful hearing opportunity on all substantive issues material to the agency's licensing decision" (Hydro Resources, Inc., CLI-00-08, 51 NRC 227, 240 (2000)). But this principle does not automatically render HRI's *post-hearing* determination of groundwater baselines and UCLs improper. The pertinent inquiry is whether the methodology for making these determinations is sufficiently detailed and prescriptive so that, assuming HRI complies with that methodology, the Commission has "reasonable assurance" that these determinations will not endanger public health and safety (10 C.F.R. § 2.104(c)(3); see Consolidated Edison Co. of New York, Inc. (Indian Point Station), CLI-74-23, 7 AEC 947, 952 (1974). In the instant case, I have no difficulty answering that question in the affirmative (see infra Part III.B.1.b). Holding this hearing open pending HRI's determination of groundwater baselines and UCLs would thus serve no purpose. See Union of Concerned Scientists v. NRC, 735 F.2d 1437, 1449 (D.C. Cir. 1984) ("Congress did not mean to require a hearing [under the AEA] where a hearing serves no purpose"); Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), CLI-03-08, 58 NRC 11, 20 & n.25 (2003) (verification by the NRC Staff that a licensee complies with preapproved design or testing criteria "is a highly technical inquiry not particularly suitable for hearing").

I note, moreover, that the sequential development of ISL well fields, and the correlative establishment of baselines and UCLs *after* the issuance of the mining license, is consistent with industry practice and NRC methodology (Affidavit of Craig S. Bartels at 14-16 (Apr. 21, 2005)

(continued...)

Finally, the Intervenors' notion (Intervenors' Written Presentation at 43 n.16) that HRI may set groundwater baselines and UCLs without NRC oversight or public challenge is patently erroneous. Like all licensees, HRI's license-related activities – including its establishment of baselines and UCLs – will be subject to the NRC Staff's continuing regulatory oversight and enforcement authority. See, e.g., Hydro Resources, Inc., LBP-99-10, 49 NRC 145, 150 (1999) (the Intervenors' assertion that HRI can operate without NRC oversight is "far from the truth"); 10 C.F.R. § 40.62 (Staff's inspection authority); id. § 40.71 (Staff's license-suspension and license-revocation authority); id. § 40.81 (Staff's civil penalty authority); Consolidated Operations Plan § 8.6.2.b (before HRI collects baseline samples, it must contact regulatory authorities so "they can, if desired, collect split samples . . . for comparative purposes"); id. §§ 8.7.3.6, 8.7.3.7, and 8.7.3.8 (data relating to collection, analysis, and evaluation of baseline water quality, UCLs, and groundwater restoration target values "will be maintained on site for inspection"); FEIS at 2-20 ("HRI groundwater baseline conditions and all well field restoration would be subject to NRC inspection"); William H. Ford Affidavit at 25 (Feb. 20, 1998) [hereinafter Ford Affidavit] (same).

Moreover, members of the public, including the Intervenors, may – if future circumstances warrant – file a request to institute an enforcement proceeding. Such requests, however, should be grounded on articulable "facts" (10 C.F.R. § 2.206(a)), not bare suspicion or tubular conjecture.

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[11](...continued)
[hereinafter Bartels Affidavit]; Pelizza Affidavit at 46-48). Indeed, if – consistent with the Intervenors' argument – HRI had constructed well-fields for the purpose of establishing baselines and UCLs prior to the issuance of its license, that would have been a basis for the denial of its license. See 10 C.F.R. § 40.32(e) (beginning construction of process facilities or well fields before the Staff has concluded that the appropriate action is to issue the proposed license is grounds for denial of the application); accord Standard Review Plan for In Situ Leach Uranium Extraction License Applications, NUREG-1569 at xviii [hereinafter NUREG-1569].

b. Having rejected the Intervenors' broad assertion that LC 10.21 and LC 10.22 abridge their hearing rights, I now address their narrower argument that these license conditions suffer from the following two alleged defects: (1) LC 10.21 gives HRI the latitude to set the average groundwater baseline (i.e., the primary groundwater restoration value) by "averaging ore zone groundwater quality with non-ore zone," which the Intervenors contend is "technically unsupportable" (Intervenors' Written Presentation at 43); and (2) for purposes of determining UCLs, LC 10.22 requires HRI to eliminate statistical outliers, but it allegedly does not require HRI to determine data distribution, which – the Intervenors assert – "could skew sampling results" (ibid.). Neither of these arguments provides a basis for granting the Intervenors' request to invalidate HRI's license or, alternatively, to keep this hearing open.

The Intervenors' first argument – that LC 10.21 gives HRI the latitude to establish baselines in a technically unsupportable manner by averaging ore zone with non-ore zone baselines – is barred by the law of the case doctrine. In LBP-99-30, 50 NRC 77, 93, 99 (1999), aff'd, CLI-00-12, 52 NRC 1, 5 (2000), the then-Presiding Officer rejected the same argument, concluding that (1) it was refuted by the protocol mandated in HRI's Consolidated Operations Plan for establishing baselines, which requires HRI to determine the baselines for the ore zones and the non-ore zones separately, and (2) the methodology prescribed in the protocol for establishing baselines was acceptable. As the Presiding Officer explained (50 NRC at 93, 99) (citations omitted):

> Intervenors allege that HRI lumped chemical data from poor quality water in the ore zone with data from high quality water outside the ore zone, thus degrading the baseline for the high quality water. Intervenors are concerned that may also be done when setting restoration goals. . . .
>
> As pointed out by HRI, baselines . . . will be set according to the protocol in [the Consolidated Operations Plan] Rev. 2.0 § 8.6. There is no basis in the record for finding that this protocol is unacceptable. Accordingly, I accept this protocol as adequate . . . .

* * * *

> As described in [Consolidated Operations Plan] Rev. 2.0 § 8.6.3, baseline will be determined after the mine units have been installed for groundwater in the ore zone and non-ore zone separately. HRI agrees that baseline should be determined in both the production area [i.e., well field, or ore zone] and the mine area [i.e., monitor well ring, or non-ore zone] separately.

The Intervenors provide no persuasive reason for re-visiting that decision.

Even if I were to re-visit that decision, however, I would not change it. Contrary to the Intervenors' assertion, the procedures in LC 10.21, as supplemented by the protocol in the Consolidated Operations Plan, prescribes a detailed methodology for establishing baselines that *prevents* HRI from averaging ore-zone baselines with non-ore zone baselines.

LC 10.21 provides the following detailed procedure for establishing baselines:

> The licensee shall establish groundwater restoration goals by analyzing three independently-collected groundwater samples of formation water from: (1) each monitor well in the well field; and (2) a minimum of one production/injection well per acre of well field. Samples shall be collected a minimum of 14 days apart from each other. Groundwater restoration goals shall be established on a parameter-by-parameter basis, with the primary restoration goal to return all parameters to average pre-lixiviant injection conditions. . . .

The Consolidated Operations Plan § 8.6, in turn, provides a highly reticulated protocol for implementing LC 10.21. Most significantly (for present purposes), section 8.6.3 states – in explicit negation of the Intervenors' argument – that the average baseline for the ore zone (i.e., Production Zone Wells) will be determined *separately* from the average baseline for the non-ore zone (i.e., Monitor Well Ring and Overlying Zones):

> Baseline water quality is determined by averaging the data collected for each parameter, from each well, for each zone that is monitored. . . .
>
> Baseline conditions are determined as follows:
>
> a. Production Zone (Production Pattern) Wells – Individual well data for each parameter are averaged. The resulting average is generally referred to as the production area average.
>
> b. Mine Area (Monitor Well Ring) Wells – Individual monitor well data for each parameter are averaged. The resulting average is generally referred to as the mine area average.

> c. Overlying Zones – Individual monitor well data for each parameter are averaged. The resulting average is generally referred to as the non-production area average.

Consolidated Operations Plan § 8.6.3.[12]

Not only does the plain language of the Consolidated Operations Plan negate the Intervenors' assertion that HRI has latitude to determine the primary groundwater restoration value by averaging the ore zone groundwater quality with non-ore zone groundwater quality, but HRI expressly refutes that assertion (Pelizza Affidavit at 53), and it affirmatively attests that it will determine groundwater baselines "in the ore zone and non-ore zone separately" (ibid.). Moreover, the relevant NRC guidance document (NUREG-1569 at 5-39, 6-9) provides for the establishment of restoration goals based on data from the well field (i.e., the production zone or ore zone); it does *not* provide for averaging the ore zone baselines with the non-ore zone baselines. See Affidavit of Stephen J. Cohen at 13 (Apr. 29, 2005) [hereinafter Cohen Affidavit].

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[12] The Production Zone (Production Pattern) Wells are the injection and extraction wells in the ore zone or well field. See FEIS at 4-15 (the "well field" is "where production and injection wells have been completed and solution mining occurs"). The baselines that HRI will establish in the well field constitute the primary restoration goals (ibid.; NUREG-1569 at 5-39).

In contrast, the Mine Area (Monitor Well Ring) Wells and the Overlying Zone Wells are in the non-ore zone. The baselines from the monitor wells – which encircle the well field at a distance of 400 feet and which monitor for horizontal lixiviant excursions – are used to calculate UCLs (supra note 8; FEIS at 4-15 to 4-20; NUREG-1569 at 5-41). The baselines from the Overlying Zone Wells, which are in the aquifers overlying the Westwater Aquifer, are used to monitor vertical excursions of lixiviant (Consolidated Operations Plan § 8.6.2; FEIS at 4-18 to 4-19).

As a matter of common sense, the baseline from the well field or ore zone is not combined with the baseline from the Monitor Well Ring outside the ore zone for purposes of determining UCLs, because such an approach would likely inflate the UCL, making it more difficult to detect lixiviant excursions. Likewise, common sense dictates that the ore zone baselines and non-ore zone baselines should not be combined to determine the primary groundwater restoration goal, because such an approach would generally require the licensee to restore the groundwater in the well field to a cleaner, more stringent level than previously existed, thus exceeding Commission requirements. See Hydro Resources, Inc., CLI-00-12, 52 NRC 1, 4 (2000).

In short, the Intervenors' challenge to the methodology in LC 10.21 for determining baselines lacks merit, because the premise of their challenge – i.e., that HRI has the latitude to average the ore zone baselines with the non-ore zone baselines – is refuted by HRI's Consolidated Operations Plan, NRC's guidance document, and representations made under oath by HRI and the NRC Staff.

Nor is there merit to the Intervenors' assertion that LC 10.22 – which provides the methodology for determining UCLs – could improperly skew the sampling results because it does not require HRI to determine data distribution when it eliminates statistical outliers. In this regard, the Intervenors rely (Intervenors' Written Presentation at 43) on the declaration of their expert, Dr. Abitz, who avers that the "outlier test is meaningless unless the data distribution is known and a statistical test is first performed to determine the data distribution, as recommended in [e.g.] the U.S. Environmental Protection Agency's guidance for groundwater monitoring at RCRA facilities" (Declaration of Dr. Richard J. Abitz at 15-16 (Mar. 3, 2005) [hereinafter Abitz Affidavit]).[13]

Puzzlingly, Dr. Abitz ignores the term of HRI's license that provides "[p]rior to calculating upper control limits, outliers shall be eliminated using methods consistent with those specified in *EPA's 1989, "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Guidance*" (LC 10.22(B) (emphasis added)). Thus, the EPA document that Dr. Abitz opines must be used by HRI to conduct a meaningful outlier test is specifically referenced in HRI's license, and HRI is required to comply with the methods in that document when eliminating outliers. See Cohen Affidavit at 11; Pelizza Affidavit at 52; Bartels Affidavit at 17-18. Dr. Abitz's

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[13] The witnesses in this proceeding accompanied their written testimony with credentials establishing their education, experience, and expertise. I find that these credentials qualify the witnesses as experts for purposes of this proceeding.

opinion – which appears to be based on a startling misreading of LC 10.22 – may therefore be summarily rejected.[14]

2. The Intervenors' Hearing Rights Are Not Violated By LC 10.23 and LC 10.31, Which Govern The Establishment Of Hydrological Properties Of The Mine Sites.

a. The Intervenors argue broadly that LC 10.23 and LC 10.31 deprive them of their hearing rights under the AEA, because these license conditions allow HRI to establish hydrological properties of the mine sites *after* this hearing is closed and *without* NRC oversight.[15] For

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[14] The NRC Staff correctly observes (see Staff's Written Presentation at 30) that the Intervenors' experts include arguments in their affidavits that the Intervenors fail to mention, much less develop, in their written presentation. I decline to consider those dormant, undeveloped arguments. The relevant regulation requires the Intervenors to submit a written presentation that "describe[s] in detail any deficiency or omission in the license application, with . . . a detailed statement of reasons why any particular sections or portion is deficient" (10 C.F.R. § 2.1233(c)). Arguments that the Intervenors failed – in derogation of section 2.1233(c) – to raise or develop in their written presentation will be treated as waived for several reasons. First, the Intervenors' failure to raise an argument in their written presentation deprives HRI of a fair opportunity to discern and attempt to rebut that argument. See Carolina Power & Light Co. (Shearon Harris Nuclear Power Plant), ALAB-843, 24 NRC 200, 204 (1986) (argument on appeal that is not adequately briefed need not be considered). Second, my function as the Presiding Officer of this Licensing Board is to be an impartial arbiter of the challenges raised by the Intervenors, and the integrity of this function would be undermined if I were required to search the record for evidence to construct and develop the Intervenors' arguments. See, e.g., Williams v. Eastside Lumberyard and Supply Co., 190 F. Supp. 2d 1104, 1114 (S.D. Ill. 2001). Finally, judicial economy and efficiency are promoted by a rule that relieves the Licensing Board from the task of searching for the Intervenors' arguments by "dig[ging] through the reams of paper which [they] have deposited . . ., particularly [when the Intervenors] did not consider the [arguments] sufficiently important to raise [them] in [their written presentation]" (Dahlberg v. Avis Rent A Car Sys., Inc., 92 F. Supp. 2d 1091, 1110 (D. Col. 2000)). This rule applies with special force in this case, where the Intervenors are represented by experienced counsel who submitted a 100-page written presentation accompanied by a voluminous administrative record. See United States v. Dunkel, 927 F.2d 955, 956 (7th Cir. 1991) ("[j]udges are not like pigs, hunting for truffles buried in [the record]").

[15] LC 10.23 states: "Prior to injection of lixiviant in a well field, groundwater pump tests shall be performed to determine if overlying aquitards are adequate confining layers . . . ."

LC 10.31 states: "Prior to injection of lixiviant at the Church Rock site, the licensee shall conduct a Westwater Canyon aquifer step-rate injection (fracture) test within the Church Rock site boundaries, but outside future well field areas. One such test at the Unit 1 or Crownpoint site shall also be performed before lixiviant injection begins at either of these sites."

the same three reasons that I rejected this expansive type of attack on LC 10.21 and LC 10.22 (supra Part II.B.1.a), I reject it here. First, these license conditions, as supplemented by the procedural protocol prescribed in HRI's Consolidated Operations Plan §§ 6.5.3, 8.5 to 8.5.3, provide a highly detailed and prescriptive methodology for establishing the hydrological properties of the mine sites. Because the Intervenors have had the opportunity – both here and in the prior Section 8 proceeding – to identify flaws, omissions, or irregularities in these procedures that could erroneously affect HRI's determinations, they cannot properly be heard to complain that they have been denied their right to a hearing (supra pp. 19-20). Second, there is no merit to the argument that an otherwise valid license condition is rendered inadequate based solely on the Intervenors' *conjectural* assertion that HRI *might* fail in the future to comply with that procedure (supra p. 20). Third, there is no merit to the Intervenors' assertion that HRI is permitted to determine interaquifer communication and fracturing at the mine sites without NRC oversight or public challenge (supra pp. 21-22).

b. The Intervenors also launch a narrower attack against LC 10.23. This license condition is invalid, they argue, because it gives HRI excessively "wide latitude to exercise judgment" in determining vertical mine-zone containment (Intervenors' Written Presentation at 45). Specifically, the Intervenors assert that: (1) "the amount of change in water level downward in a monitor well, which signifies interaquifer communication, can take weeks or months to develop and can be difficult to detect" (ibid.); and (2) "pump tests, like those required by LC 10.23 often do not establish the hydraulic properties of confining layers" (ibid.). Neither of these assertions provides a basis for invalidating HRI's license or holding this proceeding open pending HRI's performance of the groundwater pump tests.

Pursuant to LC 10.23, HRI must – before injecting lixiviant into the well field – perform groundwater pump tests to determine if the aquitards overlying and underlying the Westwater

Aquifer provide an adequate containment layer. The Intervenors assert that such pump tests are inadequate to establish that the aquitards will prevent the vertical excursion of lixiviant outside the Westwater Aquifer into the overlying and underlying aquifers. This assertion ignores that the pump tests, by themselves, are not intended to guarantee against interaquifer communication of lixiviant. Rather, these tests are an integral part of a multi-faceted and on-going process designed to provide a "reasonable assurance" that vertical excursions of lixiviant outside the Westwater Aquifer will not occur (see 10 C.F.R. § 2.104(c)(3)).

For example, HRI's data indicates that the Brushy Basin Aquitard – which overlies the Westwater Aquifer and separates it from the Dakota Aquifer – provides a relatively thick confining layer, averaging 67 to 112 feet in thickness at the Crownpoint site (FEIS at 3-15), 153 feet in thickness at Unit 1 (id. at 3-18), and 63 feet at Section 17 (ibid.). Given the projected "thickness and rock type" of the Brushy Basin Aquitard at the three sites, the NRC Staff concluded that "there should be little likelihood" of interaquifer communication during mining operations (id. at 4-42, 4-51, 4-55).

That the Westwater and Dakota Aquifers are not connected is also supported by the fact that leakage between the two aquifers "is not indicated, since there is not a corresponding reaction in Dakota [Aquifer] water levels to water level changes in the Westwater [Aquifer] that would suggest leakage" (FEIS at 4-42). This conclusion is based on data collected from January 1992 through March 1996 (ibid.).

Additionally, HRI already has provided the results of pump tests at each site that support a conclusion that the Brushy Basin Aquitard is a confining layer. At the Crownpoint site, HRI installed one monitor well in the Dakota Aquifer (the aquifer overlying the Brushy Basin Aquitard) and five wells in the Westwater Aquifer, and 72 hours of testing revealed no discernable aquifer interconnection – that is, no drawdown was detected by the Dakota Aquifer monitor well

(FEIS at 3-29). At Unit 1, HRI relied on pump test data collected by Mobil Oil Company, which installed two wells in the Dakota Aquifer and 27 wells in the Westwater Aquifer, and two days of testing revealed no discernable aquifer interconnection (id. at 3-31). And at Section 17, HRI installed one monitor well in the Dakota Aquifer and four wells in the Westwater Aquifer, and the pump testing revealed no discernable aquifer interconnection (id. at 3-35).

HRI's data also indicates that the Recapture Aquitard – which underlies the Westwater Aquifer and separates it from the Cow Springs Aquifer – provides a thick confining layer, averaging about 260 feet in thickness at the Crownpoint site (FEIS at 3-12, 3-25, 4-19), 250 feet in thickness at Unit 1 (id. at 3-18, 4-19), and 180 feet at Section 17 (id. at 3-18, 3-35, 4-19). Given the projected "thickness and rock type" of the Recapture Aquitard at the three sites, the NRC Staff concluded that "there should be little likelihood" of interaquifer communication during mining operations (id. at 4-42, 4-51, 4-55).

Additionally, prior to injecting lixiviant at a mine site, HRI must perform groundwater pump tests to ensure that the aquitards provide adequate containment layers for the Westwater Aquifer (LC 10-23; FEIS at 4-43; Consolidated Operations Plan §§ 8.5 to 8.5.3). Following completion of the groundwater pump tests at a site, HRI must prepare a Mine Unit Hydrologic Test Document (MUHTD) that, in accordance with NRC requirements, will be reviewed by the New Mexico Environmental Department as well as the Safety and Environmental Review Panel (SERP)[16] to ensure that the planned mining activities are consistent with licensing and technical requirements (FEIS at 4-43). The MUHTD must include (1) a map showing all the production

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[16] The SERP consists of a minimum of three individuals employed by HRI, one of whom shall be designated the SERP chairman. One member shall have expertise in management and shall be accountable for decisions implicating managerial and financial issues. One member shall have expertise in operations and/or construction and shall be accountable for decisions implicating operational issues. One member shall be the Environmental Manager and shall be accountable for decisions implicating environmental and radiation issues. LC 9.4(B).

and monitor wells, (2) geologic cross-sections, (3) an isopach map of the overlying containment layer, (4) a discussion of how the hydrologic test was performed, including well completion reports, (5) a discussion of the results of the hydrologic test, including raw data for the pumping tests, drawdown match curves, water level graphs, and drawdown maps, and (6) sufficient information to show that the monitor wells will be in adequate communication with the production wells. Consolidated Operations Plan § 8.5.3. The SERP must prepare a written report that evaluates safety and environmental concerns, and this report and the MUHTD will remain on site and available for regulatory review (ibid.).

Finally, HRI must: (1) maintain well field injection pressures considerably below anticipated conservative fracture pressures for the aquifer that could cause vertical interaquifer communication (Hydro Resources, Inc., LBP-99-30, 50 NRC 77, 94 (1999); LC 10.3; FEIS at 4-44); (2) conduct well integrity tests to ensure that no well casing provides a path for interaquifer communication (Consolidated Operations Plan §§ 6.1, 6.4.1.4); and (3) monitor overlying aquifers for lixiviant excursions during mining operations (id. §§ 8.7.1 to 8.7.1.2).

These requirements, viewed in conjunction with data already submitted by HRI and reviewed by the NRC Staff regarding the Westwater Aquifer's restrictive aquitards, provide the requisite reasonable assurance that vertical excursions of lixiviant outside the Westwater Aquifer will not occur during mining operations.

Moreover, HRI's obligation to take corrective action if an excursion occurs (Consolidated Operations Plan § 8.7.2; LC 10.12 to LC 10.14; see FEIS at 4-21 to 4-22, 4-62) provides the requisite reasonable assurance that a vertical excursion of lixiviant will not pose a danger to public health or safety.

C. THE INTERVENORS' CHALLENGE TO HRI's GROUNDWATER RESTORATION PLAN LACKS MERIT, BUT ONE OF THEIR CHALLENGES TO HRI's REMEDIATION COST ESTIMATES PROVIDES A BASIS FOR REVISING HRI's RESTORATION ACTION PLAN

The Intervenors argue (Intervenors' Written Presentation at 50, 63, 64) that HRI's Restoration Action Plans (RAPs) for Section 17, Crownpoint, and Unit 1 fail to provide an adequate surety, because: (1) HRI has not demonstrated that it can restore the groundwater by flushing with 9 pore volumes; (2) HRI has not shown that natural groundwater attenuation will assist in groundwater restoration; and (3) HRI has failed to provide reasonable cost estimates for several decommissioning activities. The Intervenors assert that HRI's license should be invalidated due to these deficiencies or, alternatively, HRI should be directed to revise the allegedly deficient cost estimates (id. at 1-2). For the reasons discussed below, I conclude that none of these challenges supports invalidating HRI's license; however, I agree with the Intervenors that HRI's RAP improperly fails to include a cost estimate for expenses associated with disposal site unloading, surveying, and decontamination. I therefore direct HRI to revise its RAP to include this cost estimate.

1. The Intervenors' Challenge To HRI's Plan To Restore Groundwater Quality By Flushing With 9 Pore Volumes Is Precluded By Law Of The Case And Lacks Merit In Any Event

a. The Intervenors attack HRI's plan to remediate the groundwater at Section 17, Crownpoint, and Unit 1 by flushing the mine fields with 9 pore volumes, arguing that HRI has failed to demonstrate that 9 pore volumes will restore the groundwater to the standards prescribed in HRI's license. Specifically, the Intervenors claim the 9 pore volume estimate is "completely unsupported" and contradicted by experience at other sites (Intervenors' Written Presentation at 51-55). I conclude that this argument is barred by law of the case and, alternatively, lacks merit.

Preliminarily, it is important to understand the groundwater restoration approach prescribed by HRI's license. Before HRI can start mining operations, it must "submit an NRC-approved surety arrangement to cover the estimated costs of . . . groundwater restoration" (LC 9.5). As discussed supra Part II.A, HRI's license requires HRI to restore the affected groundwater in the mine fields to prescribed restoration levels (LC 10.21). The NRC Staff concluded that the prescribed restoration levels could be achieved by flushing the mine fields with 9 pore volumes (FEIS at 4-40). Accordingly, the license states that "[s]urety for groundwater restoration of the initial well fields shall be based on 9 pore volumes" (LC 9.5), and it directs that surety shall be maintained at this level until the actual number of pore volumes required to restore the groundwater quality is established by conducting a restoration demonstration at Section 8, as described in LC 10.28 (LC 9.5).

This demonstration must be conducted at Section 8 before HRI injects lixiviant at Section 17, Crownpoint, or Unit 1, and the demonstration must be conducted "on a large enough scale, acceptable to the NRC, to determine the number of pore volumes that shall be required to restore a production-scale well field" (LC 10.28). HRI must submit the results of the groundwater restoration demonstration to NRC for approval (ibid.), and these results, in turn, will be used to either adjust or confirm the accuracy of the 9 pore volume estimate before commencing operations at the other three mining sites. If, based on this restoration demonstration, "it is found that well field restoration [for the other sites] requires greater pore-volumes . . ., the value of the surety will be adjusted upwards" (LC 9.5).

The Intervenors' challenge to HRI's plan to use 9 pore volumes for groundwater restoration at Section 17, Crownpoint, and Unit 1 overlooks the critical point that, pursuant to LC 9.5, the 9 pore volume figure is an *initial* estimate that will be revisited after HRI conducts a ground-

water restoration demonstration at Section 8 – an approach that the Commission has declared is "prudent" (Hydro Resources, Inc., CLI-04-33, 60 NRC 581, 593 n.52 (2004)).

More fundamentally, the Intervenors' challenge to HRI's groundwater restoration approach overlooks the fact that the Commission already has considered and sustained that approach, thus precluding the Intervenors' challenge here pursuant to law of the case doctrine. In 1999, the Intervenors claimed that the 9 pore volume estimate for groundwater restoration at Section 8 was "not based upon safety considerations, but rather was based upon what was convenient for [HRI]" (Hydro Resources, Inc., LBP-04-03, 59 NRC 84, 92 (2004)).[17] The then-Presiding Officer rejected that argument, finding that the restoration plan was based upon the NRC Staff's "professional judgment," and observing that the number of pore volumes could be increased in the future if "'at any time' it was determined that well-field restoration requires greater pore volumes" (LBP-99-13, 49 NRC 233, 236-37 (1999)). The Commission affirmed (CLI-00-08, 51 NRC 227, 244-45 (2000)).

On a second occasion in 1999, the Intervenors again attacked the 9 pore volume estimate, claiming that it would not be sufficient for successful groundwater restoration. Again, the then-Presiding Officer rejected the argument. He stated that if 9 pore volumes did not achieve groundwater restoration standards, "HRI will be required to continue to restore; the requirement does not end at 9 pore volumes. In addition, HRI must demonstrate successful restoration at [the Section 8 site] or it will not be permitted to conduct injection mining elsewhere" (Hydro Resources, Inc., LBP-99-30, 50 NRC 77, 106 (1999) (citation omitted); see LC 10.29). Again, the Commission declined to disturb the Presiding Officer's decision, observing that the Inter-

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[17] The Intervenors' 1999 argument is substantially identical to their current argument. In 1999, they argued that the 9 pore volume estimate was based on HRI's convenience rather than public safety; here, they argue similarly that the 9 pore volume estimate was based on HRI's cost considerations (i.e., HRI's financial convenience) rather than public safety. See Intervenors' Written Presentation at 52-53.

venors had not identified any clearly erroneous factual finding or important legal error (CLI-00-12, 52 NRC 1, 3 (2000)).

In short, the Intervenors already have challenged the reasonableness of HRI's groundwater restoration approach, and they lost. As the Commission stated, the reasonableness of HRI's groundwater restoration approach using an "initial 9 pore volume estimate for groundwater restoration at Section 8 was litigated, indeed litigated twice, in separate decisions" (Hydro Resources, Inc., CLI-04-33, 60 NRC 581, 587 (2004)). The Intervenors' attempt to re-litigate this issue is therefore precluded by law of the case.

Significantly, the Intervenors *concede* that the Commission concluded that "9 pore volumes is a sufficient initial pore volume for all the proposed mine sites" (Intervenors' Reply Brief at 16 n.4). They nevertheless argue that this should not preclude revisiting the issue, because they "do not agree that 9 pore volumes is actually sufficient to restore groundwater" (ibid.). Of course, a party's bare disagreement with a decision does not, under law of the case doctrine, justify revisiting that decision (supra pp. 10-12).[18]

b. Even if I were to revisit that decision, however, I would reject the Intervenors' challenges as insubstantial. The Intervenors argue that HRI's belief "that groundwater quality

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[18] That the Intervenors are now precluded from challenging HRI's pore volume estimate does not necessarily mean they will never have an opportunity to participate in proceedings involving the consideration of pore volumes. For example, if HRI determines that it must adjust the pore volume estimate and, accordingly, adjust its surety amount, it will be required to amend its license; because the Intervenors will have notice of the license amendment, they "may have a further opportunity to participate on pore volume considerations" (Hydro Resources, Inc., CLI-04-33, 60 NRC 581, 593 n.52 (2004)). Alternatively, if HRI finds it is unable to return a groundwater quality parameter to the prescribed restoration goal, it may – in lieu of increasing the pore volume and the surety amount – request that the restoration standard specified in the license be relaxed. "The Staff and HRI agree that any such request would have to be in the form of a license amendment, where again the Intervenors would have the opportunity to intervene" (ibid.).

can be restored by circulating 9 pore volumes through the aquifer is completely unsupported" (Intervenors' Written Presentation at 51). The record refutes this argument.

In the FEIS, the NRC Staff explained that, in establishing the 9 pore volume estimate, it examined data from: (1) small-scale rock core restoration tests (FEIS at 4-30 to 4-31); (2) a pilot test conducted in the Westwater Aquifer near the Church Rock site in June 1980 by United Nuclear Corporation and Teton Exploration Company (id. at 4-31); (3) a pilot project conducted by Mobil Oil Company in 1979 and 1980 near the Unit 1 site (id. at 4-37); and (4) a study sponsored by the NRC to investigate the ability of natural geochemical processes to restore water quality after ISL mining activities (id. at 4-39). Notwithstanding the above data, the NRC Staff concluded that "groundwater restoration criteria for specific mining projects should be set taking into account site-specific conditions and spatial variation. Restoration criteria should be based on a statistical analysis of groundwater chemistry data from a large set of wells sampled over a period of time" (ibid.).

Until such site-specific restoration criteria are established, however, the NRC Staff must determine a pore volume estimate for purposes of determining how much surety the licensee must provide. The Staff decided that achieving the desired groundwater restoration standards here "would require significantly more than 4 pore volumes, as proposed by HRI," and it established a 9 pore volume estimate for HRI's groundwater restoration effort (FEIS at 4-40). The Staff explained (ibid.):

> Depending on the parameter and the test chosen, the pore volumes required to achieve the [desired water quality restoration standard] ranged from less than 1 pore volume to greater than 28 pore volumes. However, plots of TDS [total dissolved solid] concentrations and specific conductivity values . . . show little improvement with continued pumping after 8 to 10 pore volumes. The Mobil Section 9 pilot is the largest restoration demonstration conducted in the project area to date. During groundwater restoration activities in the Mobil demonstration, TDS concentrations were close to the secondary restoration goal . . . after 6.9 and 9.7 pore volumes. On the basis of the data submitted by HRI, the Staff concludes that practical production-scale groundwater restoration activities would at most require a 9 pore volume restoration effort. . . . [S]urety should be

> maintained at this level until the number of pore volumes required to restore the groundwater quality of a production-scale well field has been demonstrated by HRI.

I find that – contrary to the Intervenors' assertion – the 9 pore volume figure selected by the NRC Staff is an acceptable initial pore volume estimate that finds adequate support in the record. Accord Hydro Resources, Inc., LBP-99-13, 49 NRC 233, 236-37 (1999), aff'd, CLI-00-08, 51 NRC 227, 244-45 (2000); see also Hydro Resources, Inc., LBP-99-30, 50 NRC 77, 105-06 (1999).[19]

The Intervenors nevertheless complain that the 9 pore volume estimate is contradicted by experience at other ISL sites (Intervenors' Written Presentation at 51). This complaint is fully answered by the fact that before HRI begins mining operations at Section 17, Crownpoint, or Unit 1, it will have the benefit of site-specific data obtained from its restoration efforts both at Section 8 and its groundwater restoration demonstration at Church Rock (LC 9.5 and LC 10.28). Based on that data, HRI must make any necessary adjustment to its pore volume estimate, and "[i]f at any time it is found that well field restoration requires greater pore volumes . . ., the value of the surety will be adjusted upwards" (LC 9.5). Thus, consistent with the Intervenors' wish, the ultimate pore volume estimate for Section 17, Crownpoint, and Unit 1 – and, correlatively, the ultimate surety amount for groundwater restoration at those sites – will be supported by actual experience that provides the best possible data from the most relevant ISL site. See Hydro Resources, Inc., LBP-04-03, 59 NRC 84, 94 n.46 (2004) (the Section 8 well

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[19] The Intervenors assert (Intervenors' Written Presentation at 53) that the NRC Staff improperly elevated cost concerns over public health and safety concerns when it selected the 9 pore volume figure. This assertion finds no support in the record. Some of the salient factors the Staff considered were that (1) water quality improved little after 8 to 10 pore volumes, (2) the Mobil Section 9 pilot restoration effort was the largest restoration demonstration conducted in the project area to date, and (3) the Mobil pilot restoration effort approached the secondary restoration goal after 9.7 pore volumes. See FEIS at 4-40. These types of technically-based analytic factors – *not* cost factors – informed the Staff's judgment.

field demonstration will provide "the best possible, site-specific data" for making any adjustment to the 9 pore volume estimate and, likewise, to the surety).[20]

2. The Intervenors' Contention That Natural Groundwater Attenuation Will Not Assist In Groundwater Restoration Is Precluded By Law Of The Case And Lacks Merit In Any Event

a. The Intervenors also claim that HRI failed to show that natural groundwater attenuation of contaminants will assist in groundwater restoration (Intervenors' Written Presentation at 55). The Intervenors rely on their expert, Dr. Abitz, who asserts that when uranium ore is present in aquifer sediments, the concentration of uranium in groundwater is controlled by the pH, redox state (i.e., oxidation reduction potential), and concentrations of bicarbonate and carbonate ions in the groundwater (Abitz Affidavit at 34). The injection of lixiviant, according to Dr. Abitz, transforms the redox state of an aquifer, removing the reducing material, and creating "a toxic zone of aqueous contaminants in oxidized groundwater" (ibid.). Dr. Abitz claims that "the uranium and other toxic metals will remain in solution as they migrate outside the mining zone in their cocoon of oxidized water" (id. at 35).

Dr. Abitz further claims that the injection of lixiviant creates high concentrations of uranium that could not exist under natural oxidizing conditions, and the removal of uranium from groundwater via natural processes takes much longer when the groundwater contains higher concentrations of uranium (Abitz Affidavit at 35, 39). Dr. Abitz states that the transition of the

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[20] In an argument relegated to a footnote, the Intervenors assert that HRI failed to provide a "technical basis" for its calculation of "flare factors," which are multipliers used in the calculation of the pore volume estimate to account for any lixiviant that may have "flared," or migrated laterally or horizontally outside the boundaries of the calculated ore pore volume (Intervenors' Written Presentation at 52-53 n.17). This assertion lacks merit. As the record shows, the flare factors were "calculated by URI [HRI's parent company] engineers based on operating experience at other restoration demonstrations and commercial operations," and the methods used to calculate them "are consistent with the methods used for the Mobil Section 9 Pilot . . . [which] were the basis for the NRC evaluation in the FEIS" (Pelizza Affidavit at 61-62). See also Hydro Resources, Inc., CLI-04-33, 60 NRC 581, 589-90 (2004) (Commission observes that HRI explained its calculation of flare factors over 5 years ago, in 1999).

Westwater Canyon aquifer to an oxidizing environment in the Church Rock and Crownpoint areas due to the injection of lixiviant "makes the removal of uranyl-carbonate anions from groundwater under natural conditions extremely inefficient, due to the limited number of adsorption sites and the slow kinetics associated with reduction and precipitation of the uranium" (id. at 39). He concludes that "[n]either HRI nor the NRC Staff has published site-specific geochemical data to support their speculation that adsorption and redox conditions downgradient of ore zones will (1) attenuate mining fluids that may escape during production operations and (2) enhance restoration efforts by lowering the concentrations of uranium and other redox sensitive metals (e.g., arsenic and selenium)" (ibid.).

I reject the Intervenors' argument for two alternative reasons. First, I conclude that this argument is precluded by law of the case. In 1999, the then-Presiding Officer squarely rejected Dr. Abitz's opinion that natural attenuation of redox sensitive metals through chemical reduction is likely to fail (Hydro Resources, Inc., LBP-99-30, 50 NRC 77, 104 (1999)). The Presiding Officer explained (id. at 86-87, 102, 104, 105) (citations omitted):

> [I]t is well documented that the Westwater [Aquifer] is rich in humates. Humates are organic compounds that serve as reducing agents, taking oxygen from groundwater, thus precipitating elements, such as uranium, that depend on the oxygen to remain in solution.
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> * * * *
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> Arsenic, molybdenum, radium, and uranium are readily precipitated by redox reactions or adsorption on mineral grains while traveling through the rock so most of these elements will remain close to the mine site and not . . . create problems at a distance.
>
> * * * *
>
> It . . . should be recognized that the Westwater [Aquifer] is huge, . . . [and] toxic elements that migrate out of [the mine field] are affected by both precipitation and dilution. These natural mechanisms help to protect the quality of water in the aquifer as a whole from the toxicity contained in small areas.
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> * * * *

> So far as I am aware, there are no reports of water with elevated uranium levels in wells away from the [old uranium mining site at the] Church Rock site, despite the fact that the mean values of water sampled in the vicinity of the site show values for this element well above any drinking water standards. This is persuasive evidence that uranium does not travel readily through the aquifer, even over time scales of thousands of years.

The Presiding Officer thus concluded that the Westwater Aquifer "act[s] as a significant precipitating agent for uranium and other elements" (id. at 105), and the Commission declined to disturb that decision (CLI-00-12, 52 NRC 1, 3 (2000)). The Intervenors present no viable reason for revisiting that decision. Their argument that HRI has failed to show that natural groundwater attenuation of contaminants will assist in groundwater restoration is therefore precluded by law of the case.

Alternatively, I reject the Intervenors' argument on the merits. HRI – in opposing the Intervenors' argument – relies on the Affidavits of its experts, Mr. Pelizza and Mr. Bartels (HRI's Response at 36-38). Mr. Pelizza points out that the Westwater Aquifer has demonstrated "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 so miles" (Pelizza Affidavit at 30). In contrast to this capacious redox area, the area that HRI proposes to mine is "extremely small" (ibid.). Mr. Pelizza states that "[i]t is logical that the regional reducing capacity of the aquifer will prevail over any small pockets of residual oxidation that may persist" (ibid.). He explains (id. at 30 n.11):

> [B]oth Intervenors and HRI agree that [broad uranium roll front deposition] processes are ongoing today [in the Westwater Aquifer]. Regional roll fronts require broad areas of upgradient meteoric oxidation to keep uranium mobile until that oxidized water which moves downgrade slowly encounters a zone of abundant reductant downdip. It is at this regional redox interface where the oxygenated water is reduced and uranium is deposited. Again, this process is active today. It is unreasonable to conclude that the Westwater Formation maintains capacity to absorb meteoric oxygen from expanses of slow moving ground water on a grand scale yet this same redox interface would be unable to absorb oxygen in similar form at a far smaller scale from slow moving groundwater that may exist after restoration from an ISL mine.

Mr. Bartels provides further support for Mr. Pelizza's statements. Mr. Bartels asserts that Dr. Abitz "provides no specifics" for his arguments, instead utilizing "only a generic discussion of geochemistry available in any good book on the subject and that applies equally well to all ISL sites, past and present" (Bartels Affidavit at 13). Mr. Bartels states that geologists can easily find the location of a "redox front" in an aquifer by examining the color of a drill core: oxidation fronts are tan and reduction fronts are gray (ibid.). He states that he has studied "multiple post-leach cores," and "[i]f the oxidation was as intense and complete as Abitz implies, the color change from reduced to oxidized should be easily seen," but "we saw no color change" (ibid.). In other words, Mr. Bartels' actual experience refutes Dr. Abitz's theoretical, unsupported argument.

Dr. John Bradbury of the NRC Staff agrees with Mr. Bartels' statements (Affidavit of Dr. John W. Bradbury at 5 (Apr. 29, 2005) [hereinafter Bradbury Affidavit]). Additionally, NRC Staff member Mr. Ford states that – contrary to Dr. Abitz's assertion – uranium excursions *will* be retarded by reducing zones in the aquifer (Ford Affidavit at 10 (Mar. 12, 1999)). Finally, research conducted for the NRC by the Pacific Northwest Laboratory (PNL) "showed that after solution mining, the reducing capacity of sediments outside the well field (and even for leached ore zones within the well field) remains very high" (ibid.). PNL concluded that the lixiviant's ability "to mobilize uranium quickly expends itself within the well field, and that when the dissolved uranium encounters reducing conditions in the rock, the uranium is removed from solution" (ibid.).

I am persuaded by the evidence and arguments of HRI and the NRC Staff that, contrary to the Intervenors' claim, natural attenuation will assist in groundwater restoration.

3. One Of The Intervenors' Challenges To HRI's Remediation Cost Estimates – Namely, Their Challenge To The Cost Estimates For Disposal Site Surveys, Decontamination, And Unloading Charges – Provides A Basis For Revising HRI's Restoration Action Plan

a. Groundwater Restoration

The Intervenors allege that HRI failed to provide a reasonable cost estimate for groundwater restoration (Intervenors' Written Presentation at 59). They base this assertion on their claim that neither HRI nor the Staff provided any evidence that the 9 pore volume estimate will be adequate to restore water quality at Section 17, Crownpoint, and Unit 1 to baseline conditions (ibid.). They argue that the license condition that requires HRI to revise its surety upward if it finds the 9 pore volume estimate inadequate is not an adequate remedy, because "[p]ost-licensing revisions to a license are meant to cure minor defects, not compensate for major deficiencies in the original license application" (id. at 60).

Although the Intervenors characterize this argument as a challenge to a component of HRI's cost estimate, it is substantively no different than the Intervenors' earlier attack on HRI's 9 pore volume estimate to restore the quality of the groundwater. For the same reasons that I rejected that argument earlier (supra Part III.C.1), I reject it here. Cf. Hydro Resources, Inc., CLI-04-33, 60 NRC 581, 588 (2004) (the Commission, having sustained the 9 pore volume figure in the Section 8 litigation, rejected the Intervenors' effort to re-challenge that figure in the context of their challenge to HRI's surety estimate for Section 8).

b. Contract Radiological Technicians

The Intervenors argue that HRI's decommissioning cost estimate is inadequate because it fails to include the costs of individuals to conduct radiological surveys (Intervenors' Written Presentation at 61). Relying on their expert, Gary R. Konwinski, they claim that although HRI's RAP includes cost data for "surveys by staff," this does not take into account the possibility that HRI might not be operating the site at the time of closure (ibid.). They assert that because of

this possibility, the RAP must include an estimate of the costs to hire trained individuals to conduct contamination surveys (ibid.) (citing Declaration of Gary R. Konwinski at 11-12 (Mar. 1, 2005) [hereinafter Konwinski Affidavit]).

HRI responds that Mr. Konwinski ignores the salary allocated for the Environmental Manager, which is included in the RAP (HRI's Response at 52). The Environmental Manager "will perform a wide range of duties including having 'responsibility over radiological surveys and technician level responsibilities described for the [Radiation Safety Officer]'" (ibid.). HRI asserts that, by budgeting for the salary of the Environmental Manager in addition to the Radiation Safety Officer, which is in accordance with its plan to share responsibilities among staff, it has fulfilled the cost requirement for conducting radiological surveys (ibid.). The NRC Staff agrees (NRC Staff's Written Presentation at 36-37).

HRI's RAP states that, in calculating the groundwater restoration budget, it assumed that employees in all positions "are required to provide a multitude of services, i.e., every employee will be wearing multiple hats" (Section 17 RAP at 2.6). It appears that Mr. Konwinski disregarded both HRI's assumption that employees would wear "multiple hats" and the fact that HRI budgeted not only for a Radiation Safety Officer, but also for an Environmental Manager. I find – given HRI's "multiple hats" assumption, and bolstered by the fact that it budgeted for the position of a Radiation Safety Officer *and* an Environmental Manager – that the Intervenors' concern regarding the adequacy of the cost estimate for radiological technicians lacks merit.

c. Section 11(e)(2) Byproduct Waste Disposal Costs

i. The Intervenors claim (Intervenors' Written Presentation at 61) that HRI underestimated its disposal costs for section 11(e)(2) byproduct waste, which, as relevant here, is the waste "produced by the extraction or concentration of uranium . . . from any ore processed primarily for its source material content" (42 U.S.C. 2014(e)(2); 10 C.F.R. § 40.4). 10 C.F.R. Part

40, Appendix A, Criterion 2 requires that byproduct material from ISL mining operations be disposed of at existing large mill tailings disposal sites, unless, given the nature of the waste and the costs and environmental impacts of transporting the waste, offsite disposal is impracticable or there are clear advantages to onsite burial. The Intervenors state that their expert, Mr. Konwinski, "contacted several existing large mill tailings sites" to determine the costs of disposal of byproduct waste, and he concluded that Utah's White Mesa Mill is the most likely site for HRI's disposal of its byproduct waste (id. at 62). Mr. Konwinski estimated – based on information received from White Mesa Mill – that the cost of byproduct waste disposal will be $125.00 per cubic yard, which is substantially higher than the $43.61 per cubic yard estimated by HRI in its RAPs (ibid.). Moreover, assuming that HRI disposes of its waste at White Mesa Mill, the Intervenors assert that HRI could easily exceed White Mesa's waste limitations, because White Mesa "is currently limited to receiving 500 cubic yards of waste from each off-site waste generator," and the Intervenors allege that HRI will likely exceed this limit (id. at 62 n.20).

HRI responds that the Intervenors' challenge is flawed for three reasons. First, Mr. Konwinski's conclusion that HRI would likely use White Mesa Mill as a disposal site is based on incomplete information, because he evaluated only three disposal sites, and he failed to consider two other potential disposal locations, both which could be used by HRI for disposal of section 11(e)(2) byproduct material (HRI's Response at 53). Second, Mr. Konwinski's calculation of costs is overstated, because it ignores that one of the disposal sites he failed to consider – Cotter Corporation – quotes a disposal fee of $50 per cubic yard (id. at 54). Third, Mr. Konwinski errs in stating that White Mesa Mill will accept only 500 cubic yards of waste per year from a single source; in fact, it accepts up to 5,000 cubic yards per year (ibid.). In any event, HRI states that it may avail itself of more than one disposal site and, moreover, "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 11(e)(2) byproduct material wastes in excess of existing license conditions" (ibid.).

The NRC Staff agrees with HRI that the Intervenors have not demonstrated any fatal deficiencies in HRI's cost estimates for disposal of section 11(e)(2) waste. The Staff declares that, contrary to the Intervenors' assertion, ISL mining facilities typically generate small quantities of byproduct material (NRC Staff's Written Presentation at 38). Additionally, the Staff states that "[b]ecause HRI does not anticipate generating any waste for some time, the estimates in the RAP are necessarily based on predictions of disposal costs, and quickly become outdated" (id. at 37) (citing Affidavit of Richard A. Weller at 6 (Apr. 29, 2005) [hereinafter Weller Affidavit]). Significantly, the Staff notes that Mr. Konwinski's cost estimates were calculated using an incorrect figure for the cost per unit volume of waste disposal, and they failed to take into account the elapsed time since the cost estimates were submitted; "[o]nce the cost estimates are properly calculated and updated to present value, HRI's cost estimates closely track Mr. Konwinski's estimates" (NRC Staff's Written Presentation at 38) (citing Weller Affidavit at 9). Moreover, prior to lixiviant injection, HRI must obtain a waste disposal agreement and must also provide an updated RAP (NRC Staff's Written Presentation at 38).[21]

Based on the evidence and arguments submitted by HRI and the Staff, I conclude that HRI's section 11(e)(2) waste disposal estimates are reasonable. My confidence in these estimates, and the decommissioning surety that HRI will ultimately provide for waste disposal at Section 17, Crownpoint, and Unit 1, is buttressed by the fact that HRI's estimates will be updated prior to mining operations and annually thereafter (LC 9.5).

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[21] The Affidavit of NRC Staff member Richard A. Weller makes clear that (1) HRI has several options for disposing of byproduct waste, and (2) the Staff has little concern about HRI's ability to obtain an agreement with a waste disposal facility (Weller Affidavit at 4-5). For HRI to have an agreement now would be "premature" because the need for such services "is not anticipated for a number of years" (id. at 6).

ii. The Intervenors also advance a challenge to HRI's estimated waste disposal costs that is specific to Unit 1 and Crownpoint. HRI's cost estimates assume that the concrete floors and other materials of the Unit 1 and Crownpoint buildings will be decontaminated and thus not treated as waste. The Intervenors assert that this is an unlikely scenario, and that HRI's cost estimate should include costs for disposal of this material (Intervenors' Written Presentation at 64-65).

HRI responds that its experience rebuts the Intervenors' argument. Specifically, Mr. Pelizza states that HRI's parent company, URI, was able to decontaminate and decommission all scrap from buildings at its Kingsville Dome process facility, including the "contaminated dryer enclosure [which] is arguably the most contaminated structure at the facility. Even so, all scrap was routinely decontaminated and . . . released for unrestricted use. Similarly, HRI plans that all buildings will be decontaminated at [its mining sites]" (Pelizza Affidavit at 60). HRI states that the Intervenors provide no evidence that decontamination of its concrete floors and equipment is impossible (HRI's Response at 56). Finally, HRI points out that it is required to update its surety to reflect changes in its decontamination plans, and that it is also required to refine financial assurance cost estimates immediately prior to commencement of uranium recovery operations, and also annually (id. at 56-57).

The Staff agrees that HRI need not revise its RAP to include estimated disposal costs of buildings and building-related materials. The Staff observes that HRI has "several options for reducing or eliminating concrete contamination and concrete waste volume including concrete curbing, epoxy application, or concrete surface removal" (NRC Staff's Written Presentation at 39; see Weller Affidavit at 6).

I agree with HRI and the Staff that HRI need not include the cost of disposal for concrete and building-related material in its cost estimates. Based on the Affidavits of Mr. Pelizza

and Mr. Weller, I am satisfied that HRI's efforts at decontaminating this material will likely be successful. Moreover, HRI is required periodically to update its cost estimates, so if the waste removal cost estimates require adjustment based on future conditions not now apparent, they will be revised.

iii. The Intervenors raise a challenge to HRI's section 11(e)(2) waste disposal estimates that is unique to Crownpoint. They argue that HRI failed to account for the cost of sludge removal and removal and disposal of sludge pond liners (Intervenors' Written Presentation at 65).

HRI does not directly address this issue in its written presentation, but the Staff presents the Affidavit of Mr. Weller, which states that – contrary to the Intervenors' assertion – HRI's RAP contains estimates for pond sludge and liner disposal costs (Weller Affidavit at 10). HRI specifically included $217,299 for pond sludge and liner disposal in its budget for surface reclamation (Crownpoint RAP, Attachment E-8-1).

The Intervenors' challenge is thus based on an incorrect premise and may be rejected.[22]

d. On-Site Packaging, Surveying, And Decontamination Costs Relating To Transport

The Intervenors assert that HRI failed to include, or underestimated, costs for the packaging of contaminated waste for transport (Intervenors' Written Presentation at 62). They also assert that HRI failed to include, or underestimated, the costs of contamination surveys of trucks transporting waste before their release from the site, as well as costs of surveys of the containers and any necessary decontamination (ibid.).

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[22] The Intervenors assert that the Affidavit of their expert, Mr. Konwinski, "identifies numerous other wastes for which HRI has not accounted in its Crownpoint RAP which is summarized in Table 3 of his testimony" (Intervenors' Written Presentation at 65). Because the putative licensing deficiencies summarized in Mr. Konwinski's Affidavit are neither described nor developed in the Intervenors' Written Presentation, I decline to consider them (see supra note 14).

HRI refutes the argument that packaging of section 11(e)(2) byproduct materials is necessary for transport (HRI's Response at 55). In his Affidavit, Mr. Pelizza states that he supervised the decommissioning of two commercial ISL plans, and although "many truckloads" of contaminated material were transported off site, containers were not used (Pelizza Affidavit at 59). Rather, the contaminated material was "always shipped in bulk because it is more efficient" (ibid.). If contaminated material is "drummed and stored onsite, it is standard procedure to empty the drums into bulk transports, and flatten the drums and ship them with the bulk material" (ibid.).

The Staff likewise urges this Board to reject the Intervenors' packaging argument, based on HRI's prior experience with shipping waste in bulk (NRC Staff's Written Presentation at 38-39). The Staff also points out that the labor costs for on-site surveys and any necessary decontamination efforts are covered by the salaries of the Radiation Safety Officer and the Environmental Manager, which are already included in the RAP (id. at 38).

I find that HRI's estimates for packaging, surveying, and decontamination relating to the transport of contaminated material from the mining site are adequate. Based on the evidence submitted by HRI and the Staff, I conclude that (1) packaging of contaminated waste for shipment will probably not be necessary, and (2) to the extent HRI's RAPs include the salaries of the Radiation Safety Officer and the Environmental Manager, the costs for on-site surveys and decontamination efforts are covered.[23]

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[23] My conclusion that HRI will likely be able to ship its contaminated waste in bulk is based on HRI's experience and the NRC Staff's approval of that practice. Cf. NUREG-1569 at 6-24 to 6-25 (assumptions used for proposed surety should, to the extent possible, be based on experience). To conclude that waste may be shipped in bulk is not to be equated with concluding that HRI may engage in transportation practices that will threaten the health and safety of the public or the environment. All shipments are subject to U.S. Department of Transportation requirements (10 C.F.R. § 71.5; FEIS at 2-23). Moreover, subject to the NRC Staff's vigilant oversight, HRI's Environmental Manager and Radiation Safety Officer will be

(continued...)

e. Disposal Site Surveys, Decontamination, And Unloading Charges

Finally, with respect to the RAP for Section 17, the Intervenors claim that HRI failed to include estimates for disposal site surveys, a decontamination wash, and unloading charges (Intervenors' Written Presentation at 63). The Intervenors rely on their expert, Mr. Konwinski, who states that an additional $12,000 should be added to the waste disposal costs for the purposes of surveys, decontamination efforts, and unloading (Konwinski Affidavit at 11, 15).

As the Staff observes (NRC Staff's Written Presentation at 39), HRI does not directly respond to this claim by the Intervenors. The Staff notes that although costs for "unloading time" and "additional decontamination costs" were included in the sample byproduct agreement submitted with the RAP, "*it is unclear whether these costs are included in HRI's cost estimate*" (ibid.) (emphasis added). Assuming that the $12,000 is not included in HRI's decommissioning cost estimate, the Staff nevertheless urges this Board to "reject" the Intervenors' request to revise the RAP, because "these costs, if incurred, are relatively insignificant in light of the overall surety estimate" (ibid.). The Staff's argument is misguided.

HRI is required to establish financial surety arrangements "to carry out the decontamination and decommissioning of the . . . site" (10 C.F.R. Part 40, Appendix A, Criterion 9). The record shows that HRI views costs for disposal site "unloading time" and "decontamination" as material to site decommissioning, else it would not have included them in the sample byproduct agreement submitted with the RAP. I believe HRI is quite correct in that view. Accordingly, those costs should be included in HRI's cost estimate.

Significantly, the NRC Staff does not argue that these costs were correctly omitted. Rather, it characterizes this $12,000 omission as "relatively insignificant," and it invites this

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[23](...continued)
responsible for developing, administrating, and enforcing a program that ensures the safe and secure transportation of waste (Consolidated Operations Plan at 131).

Board to disregard HRI's lapse in failing to include it (NRC Staff's Written Presentation at 39). In my judgment, the omission of a material cost estimate of $12,000 does not fall into the category of "relatively insignificant." Moreover, the rule that the Staff asks this Board to apply – i.e., to ignore small but material errors in surety arrangements – is unsupported in law and would be problematic in application. Accordingly, I direct HRI to revise its RAP to include the cost estimate for disposal site unloading, surveys, and decontamination.

D. THE INTERVENORS' ASSERTION THAT HRI FAILED TO DEMONSTRATE THAT DRINKING WATER SUPPLIES WILL BE ADEQUATELY PROTECTED FROM URANIUM CONTAMINATION LACKS MERIT

1. Section 17

a. The Intervenors' Assertion That HRI Failed To Show That The Westwater Aquifer Is Homogenous And Contained By An Underlying Aquitard Is Barred By The Law Of The Case Doctrine

The Intervenors assert that HRI's license to mine Section 17 should be invalidated because HRI has failed to show that drinking water supplies will be protected. First, they argue that the Westwater Aquifer is heterogenous – that is, it is composed of small-scale channels of high permeability – and that the channels will act as conduits for the accelerated lateral transport of contaminants to drinking water sources (Intervenors' Written Presentation at 73-76). Second, they argue that the Recapture Aquitard does not underlie the Westwater Aquifer at Section 17 and, accordingly, contamination from HRI's mining operations will be transported to the Cow Springs Aquifer (a drinking water source) that underlies the Westwater Aquifer (id. at 77-80). These issues, however, have already been considered and rejected in this case with respect to mining operations at Section 8, *which is adjacent to the Section 17 site*. As discussed below, because the Intervenors fail to provide any persuasive reason why the conclusions reached by the then-Presiding Officer and left undisturbed by the Commission with regard

to Section 8 do not also apply to Section 17, they are foreclosed by the law of the case doctrine from re-litigating them.

First, the hydrogeology of the Westwater Aquifer has been extensively litigated. The Intervenors argued earlier in this proceeding (Hydro Resources, Inc., LBP-99-30, 50 NRC 77, 84-86 (1999)) – as they argue now (Intervenors' Written Presentation at 73-74) – that the Westwater Aquifer is heterogeneous, consisting of stacked sand channels of high permeability that will allow the rapid excursion of mining contaminants to adjacent drinking water sources. But the then-Presiding Officer squarely rejected this theory, finding that: (1) "[o]n a broad scale, that of the proposed mining operation, the Westwater may be approximated as homogeneous" (LBP-99-30, 50 NRC at 85); and (2) "the Westwater does not contain channelways" that would allow the accelerated excursion of contaminants outside the mining area (id. at 86). The Presiding Officer explained (id. at 85, 88) (citations and footnotes omitted):

> The considerable literature on the Westwater demonstrates that it consists predominantly of sandstone which contains discontinuous clay horizons formed by fluvial deposition. . . .
>
> * * * *
>
> On a small scale, groundwater flow in the Westwater is complicated, just as water flow through a filter is complicated on a very small scale. But on a larger scale the Westwater may be treated as homogeneous . . . . By homogeneous . . ., what is meant here is that groundwater will flow down gradient at about the same velocity in different parts of the Church Rock area.
>
> 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. Channelways have not been reported elsewhere, . . . nor do the Intervenors provide evidence of them.

The Presiding Officer thus concluded that the Intervenors' characterization of the Westwater Aquifer as a heterogenous environment containing lengthy channels of high permeability was "without basis" (LBP-99-30, 50 NRC at 88), because it was: (1) inconsistent with seismic studies at Church Rock (id. at 85); (2) inconsistent with or unsupported by technical literature

(ibid.); and (3) based on a flow and transport model that included a "totally unreasonable assumption" (ibid.). The Commission declined to disturb that conclusion, finding that the Intervenors' challenges were "unpersuasive" (Hydro Resources, Inc., CLI-00-12, 52 NRC 1, 3 (2000)). The Intervenors fail to provide a convincing reason to revisit that conclusion. Their argument is therefore barred by the law of the case doctrine.[24]

Likewise barred by the law of the case doctrine is the Intervenors' assertion that the Recapture Aquitard does not underlie the Westwater Aquifer at Section 17 and, accordingly, that mining contaminants will be transported to the Cow Springs Aquifer (a drinking water source) that underlies the Westwater Aquifer. This is precisely the same argument they previously made, when they asserted that "the Recapture [Aquitard] is thin or missing in the area of Church Rock . . . [and therefore] the Cow Springs Aquifer 'comes into nearly direct

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[24] The Intervenors cannot avoid the law of the case doctrine by relying here, as before, on technical literature that characterizes the Westwater at Section 17 "on a local scale [as] lithologically heterogeneous" (Intervenors' Written Presentation at 75). The Intervenors ignore that the *same* literature reveals that the Westwater is "a fairly pure sandstone, albeit cross-bedded and scoured, and may . . . be regarded as generally homogenous" (LBP-99-30, 50 NRC at 87). The Intervenors thus fail to show that the technical literature is inconsistent with the former Presiding Officer's finding that "[o]n a broad scale, that of the proposed mining operation, the Westwater may be approximated as homogeneous" (id. at 85). Nor can the Intervenors avoid the law of the case doctrine by relying on manifestly flawed studies to construct arguments that are wholly insubstantial and, thus, not colorable. Cf. Steel Co. v. Citizens For a Better Environment, 523 U.S. 83, 89 (1998) (a federal claim is not colorable if it is so "insubstantial, implausible, foreclosed by prior decisions of [this] Court, or otherwise completely devoid of merit as not to involve a federal controversy") (internal quotation marks omitted). Even if the Intervenors' arguments were colorable, they lack merit (infra Part III.D.1.b).

In their Written Presentation (p. 76 n.21), the Intervenors also assert that the 400 feet spacing between monitor wells that is provided by LC 10.17 "is insufficient to detect contaminants flowing through the small scale sand channels in the Westwater." This argument, too, is barred by the law of the case doctrine, because the Presiding Officer previously found that "[b]ased on these characteristics [of the Westwater Aquifer], there seems little chance that monitor wells spaced 400 feet apart would miss an excursion in this environment" (LBP-99-30, 50 NRC at 87-88), and the Commission found that the Intervenors failed to identify a factual finding or legal conclusion that required correction (CLI-00-12, 52 NRC at 3). In any event, I find that the record supports the conclusion that HRI will install adequate monitor wells. See, e.g., Pelizza Affidavit at 33-34; Cohen Affidavit at 23.

contact with the Westwater'" (LBP-99-30, 50 NRC at 90). The Presiding Officer had no difficulty rejecting this argument (ibid.) (citations and footnotes omitted):

> Many drill holes penetrated the Recapture [Aquitard] to varying degrees, and in every case its characteristics are those of an aquitard. The [Recapture Aquitard] appears to be present throughout Section 8, as reported by the Staff in the FEIS and HRI.
>
> HRI's expert, Lichnovsky . . . offers evidence that the Cow Springs sandstone does not intertongue with the Recapture [Aquitard] at the site. . . .
>
> [The Intervenors' expert] Lucas points out that . . . "the Recapture [Aquitard] is a fluvial deposit in the southern part of the San Juan Basin." Condon and Peterson . . . agree with this, [and] point out that it contains sandstone, claystone, mudstone, and siltstone, in agreement with HRI and Staff. I therefore find that it is an aquitard, separating the Westwater from the Cow Springs Aquifer . . . .

The Commission declined to disturb the Presiding Officer's conclusion that the Recapture Aquitard has the characteristics of an aquitard and separates the Westwater and Cow Springs Aquifers in the area of Church Rock (CLI-00-12, 52 NRC at 3). The Intervenors' failure to explain why the size or characteristics of this regional aquitard would vary between the mining site at Section 8 and the adjacent mining site at Section 17 precludes them from re-visiting that issue.

b. The Intervenors' Assertions That HRI Failed To Show That The Westwater Aquifer Is Homogenous And Contained By An Underlying Aquitard Lacks Merit In Any Event

There is no merit, in any event, to the Intervenors' assertion that the Westwater Aquifer at Section 17 is not homogeneous. They once again argue the existence of channels in the Westwater that "have permeability and porosity characteristics that accelerate groundwater flow" and will allow uncontrolled excursions of pregnant lixiviant outside the mining area (Intervenors' Written Presentation at 76). As stated above, the former Presiding Officer squarely rejected this argument, ruling that the claim that "sand channels in the Westwater function as 'pipelines' is without basis" (LBP-99-30, 50 NRC at 88).

The Intervenors now rely on studies of an outcrop analogue by Dr. Spencer G. Lucas to support their channel theory (Intervenors' Written Presentation at 75-76). An outcrop analogue is a geologic unit – here the Westwater sandstone – that is exposed to the surface and is geographically close to or geologically similar to the rock unit where the mining will occur. The outcrop analogue here is "3-4 miles" from Section 17 (id. at 76), and Dr. Lucas states that his examination of the outcrop supports a conclusion that the Westwater Aquifer is "locally heterogeneous, characterized by 'numerous, interlaced ribbon-like sandstone bodies' . . . [that will] act as easy, rapid conduits for groundwater flow" (ibid.; see Declaration of Dr. Spencer G. Lucas at 27 (Feb. 25, 2005) [hereinafter Lucas Affidavit]).

Notably, NRC Staff expert William von Till does not dispute that "studying outcrops can be very useful . . . [for] describ[ing] the lithology of the rock units in question . . . at the locations" of the particular outcrop (Affidavit of William von Till at 6 (Apr. 29, 2005) [hereinafter von Till Affidavit]). But he vigorously, and persuasively, states that "site specific pump test data and geophysical logs are the best tools for purposes of determining how geologic units will behave under groundwater hydrodynamic flow conditions in an ISL mining operation" (ibid.). Moreover, he points out that Dr. Lucas – in focusing on the outcrop – "fails to address . . . the more important aspect here of how the Westwater . . . behaves from a groundwater and hydrodynamic flow standpoint" (von Till Affidavit at 12). As Mr. von Till explains (id. at 12-13) (citations omitted):

> Dr. Lucas does not address the pump tests results showing that on a larger-scale hydrodynamic groundwater flow perspective, the Westwater . . . behaves in a homogeneous manner. In the ISL mining context here, this hydrodynamic behavior of groundwater flow in the Westwater . . . is the key factor . . . .
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> * * * *
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> Mark Pelizza, on behalf of HRI, addressed these issues in detail when he discussed the Southtrend pump test data . . . generated in January 1992 at Mobil's Section 9 site. This pump test demonstrated radial flow, and the results do not suggest any influence

> by channels, in my opinion. Data from this pump test can be correlated to the conditions at Church Rock for the Westwater . . . .
>
> Dr. Lucas provides no basis for his conclusion that heterogeneity in the Westwater . . . "will accelerate groundwater flow, inhibiting containment of lixiviant." Throughout his affidavit, Dr. Lucas uses only traditional geology arguments without addressing hydrogeologic information generated by pump tests. Such information is the most important tool available to determine hydrodynamic flow within the Westwater . . . .

See also Pelizza Affidavit at 36-37 (interpreting stratigraphic cross sections of Church Rock site and finding no evidence "that would support the claim of a conduit for preferential flow of groundwater"); Lichnovsky Affidavit at 19 (Westwater Aquifer acts hydrologically as a homogeneous unit because it "was deposited as sheet sandstone, with each sheet overlying and scouring into another sheet. These sandstone sheets are coalesced and amalgamated into [a] thick sandstone's body that functions hydrologically as one unit").

HRI expert Dan W. McCarn provides compelling support for the common-sense conclusion that no outcrop study, by itself, can tell a geologist the hydrodynamic behavior of an aquifer that is several miles away and "covered by thousands of feet of rock. Outcrops are useful, but drilling is absolutely essential" (Declaration of Dan W. McCarn at 10 (Apr. 15, 2005) [hereinafter McCarn Affidavit]; accord Lichnovsky Affidavit at 7). As NRC Staff expert Stephen Cohen confirms, regardless of the physical appearance of the outcrop examined by Dr. Lucas, the Westwater Aquifer "responds as a homogeneous aquifer hydraulically. . . . [T]he notion that subsurface channels are influencing groundwater flow is simply incorrect" (Cohen Affidavit at 19-20) (citing several studies).

I therefore reject the Intervenors' invitation to rely on Dr. Lucas' outcrop study for purposes of determining hydrodynamic flow in the Westwater Aquifer, and I find that the record supports the conclusion that, for purposes of mining operations, the Westwater Aquifer at Church Rock (including Section 17) behaves as a homogeneous aquifer.

Similarly, I reject the Intervenors' argument that Dr. Lucas' outcrop study reveals that the Westwater Aquifer at Section 17 is not contained by the underlying Recapture Aquitard and, consequently, contaminants from mining operations will migrate from the Westwater Aquifer to the underlying Cow Springs Aquifer (Intervenors' Written Presentation at 77-78; Lucas Affidavit at 13). Dr. Lucas' conclusion is refuted by convincing record evidence.

As HRI expert, Frank Lichnovsky, states, mine geologists and engineers do not make mine-planning decisions based on outcrops, which provide "weathered and therefore altered information of the sediments present" (Lichnovsky Affidavit at 7). Moreover, such outcrops do not reveal the "lateral extent of the sediments or whether they pinch-out or thicken in the subsurface downdip of the outcrop" (id. at 7-8).

Instead of relying on outcrops, mine geologists and engineers drill numerous exploration holes at each mine site, and each drill hole furnishes data for a geophysical log that "provides information on the types of rocks, their relationship to one another, and allows mapping of their aerial extent and thickness" (Lichnovsky Affidavit at 7). Additionally, "[s]amples of drill cutting are taken during drilling and provide details such as the coarseness of the sand and the type of rock being drilled. The drilling rate also provides information on the lithologies. The drilling rate is slower in mudstone, cemented sandstone, or limestone, while the drilling rate is faster in friable sandstone" (ibid.). The geophysical drill hole logs record the lithology of the subsurface rocks at the actual mine site, and "[b]y correlating the geophysical logs and constructing cross sections, the extent and continuity of the confining layers can be mapped" (id. at 9; see also Pelizza Affidavit at 40-42; von Till Affidavit at 11).

I agree with HRI and the NRC Staff that the data from HRI's drill holes and geophysical logs are more reliable and informative than outcrop studies for determining the existence of confining layers. I further agree with HRI and the NRC Staff that HRI's drill holes and geo-

physical logs demonstrate the presence of the Recapture Aquitard beneath the Westwater Aquifer at the Section 17 mine site (Lichnovsky Affidavit at 13). See also id. at 9-12; Cohen Affidavit at 34 (confirming that HRI drilling and geophysical logs for Section 17 reveal the presence of the Recapture Aquitard beneath the Westwater Aquifer); id. at 36 ("independent analyses of boring and geophysical logs . . . clearly show that the Recapture is present in . . . the Church Rock . . . area[]"); von Till Affidavit at 6 ("NRC Staff stated in the FEIS that 'the Recapture Member is at least 45 [meters] (150 feet) thick in the mine area and overlies the Cow Springs Sandstone'"); LBP-99-30, 50 NRC at 90 ("[m]any drill holes penetrated the Recapture Shale to varying degrees, and in every case its characteristics are those of an aquitard"). I thus conclude that, contrary to the Intervenors' assertion, the likelihood of vertical excursions of lixiviant from the Westwater Aquifer to the Cow Springs Aquifer at Section 17 is remote.

The Intervenors nevertheless persist in their assertion that the Recapture Aquitard will not prevent vertical excursions of lixiviant to the Cow Springs Aquifer, arguing that HRI misinterpreted the geophysical logs for Section 17. They claim that what HRI identifies as the Recapture Aquitard is, in fact, the "sandstone of the upper Cow Springs [Aquifer]" (Intervenors' Written Presentation at 79). I am not persuaded by this argument. The Intervenors' interpretation of the geophysical log focuses on only one of its relevant aspects, and in failing to take into account other relevant aspects of the log – in particular, the Resistivity curve – the Intervenors' interpretation founders (von Till Affidavit at 9). As NRC Staff expert, William von Till, states, "[w]hen comparing the Recapture Member and the Cow Springs [Aquifer] . . . one must also look at the Resistivity curve. The change in Resistivity at the intersection between the Recapture Member and Cow Springs [Aquifer] supports [HRI's] interpretation" that the Recapture

Aquitard is 169 feet thick (id. at 9-10). The Intervenors' contrary interpretation thus lacks merit. See also Lichnovsky Affidavit at 9-11; Pelizza Affidavit at 41; FEIS at 3-18, 3-35, 4-19.[25]

Moreover, that the Westwater Aquifer at Section 17 is vertically confined is to be confirmed by groundwater pump tests that HRI must perform prior to injecting lixiviant at a mine site (supra Part III.B.2.b). Notably, the Intervenors' own expert, Michael G. Wallace, agrees that groundwater pump tests "are the most commonly used assessment tool to determine if there is a hydraulic connection between the mine zone and overlying aquifer" (Declaration of Michael G. Wallace at 25 (Mar. 1, 2005) [hereinafter Wallace Affidavit]). As NRC Staff expert, Mr. von Till, explains (von Till Affidavit at 7-8):

> [C]ollecting site-specific stratigraphic and pump test data – at the location of ISL mining – are the best methods of determining whether a hydraulic connection is present between the Westwater [Aquifer] and the [Dakota and Cow Springs Aquifers], and that the license conditions set forth [in LC 10.23 (requiring groundwater pump tests), LC 10.25 (requiring the placement of monitor wells in the Cow Springs Aquifer to determine if a vertical connection exists with the Westwater Aquifer), and LC 10.32 (requiring the establishment of baseline parameters in the Cow Springs Aquifer prior to mining, and groundwater pump tests at each mining site to confirm it is hydraulically confined from the Westwater Aquifer)] adequately ensure that such data will be collected.

Furthermore, HRI will monitor for vertical lixiviant excursions during mining operations, and evidence of an excursion will require immediate corrective action (supra Part III.B.2.b; Cohen Affidavit at 34).

Finally, the Intervenors make the perfunctory assertion that the outcrop shows that the Dakota Aquifer "sits directly on top of the Westwater [Aquifer]" (Intervenors' Written Presentation at 77), thus intimating that the Brushy Basin Aquitard does not separate the two aquifers. This assertion lacks merit. First, as discussed above, outcrops can provide incomplete and

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[25] The NRC Staff notes that the Intervenors, once again, failed to mention in their Written Presentation additional related opinions expressed by their expert (NRC Staff's Written Presentation at 46 n.15). Although the Staff, in a commendable exercise of its responsibilities, addressed and rebutted such opinions, I decline to consider them given that the Intervenors neither developed nor affirmatively relied upon them (see supra notes 14, 22).

inaccurate information regarding the underground geology. Moreover, HRI expert Mr. Lichnovsky explains why this particular outcrop erroneously suggests that the Dakota Aquifer sits directly atop the Westwater Aquifer; namely, the outcrop "lies with angular unconformity on the Morrison rocks in the Church Rock area," and any absence of the Brushy Basin Aquitard "represents simple erosional planation of the Mesozic strata that was tilted north prior to deposition of the Dakota" (Lichnovsky Affidavit at 15). I find that HRI's data – including its geophysical logs – shows the presence of the Brushy Basin Aquitard above the Westwater Aquifer at the Section 17 mine site (id. at 8, 13-16; see also von Till Affidavit at 10-11; Pelizza Affidavit at 41; FEIS at 3-18).

2. Unit 1

HRI and the NRC Staff have concluded that the Westwater Aquifer at the Unit 1 mine site – like the Westwater Aquifer at Section 17 – is homogenous and vertically confined by the Recapture and Brushy Basin Aquitards. The Intervenors disagree. They argue that (1) HRI's pump tests for Unit 1 show that the Westwater is heterogeneous (Intervenors' Written Presentation at 81), and (2) an outcrop analogue study for Unit 1 shows no vertical confinement (id. at 83-84). I am unpersuaded by the Intervenors' arguments.

First, the Intervenors argue that HRI – in concluding that the Westwater Aquifer at Unit 1 is homogeneous – misinterpreted a contour map that was based on data from a pump test conducted by Mobil. The Intervenors' expert Mr. Wallace claims that an aquifer is "likely" to be heterogeneous if the contour map "is not perfectly circular" (Wallace Affidavit at 16). Because HRI's contour map for Unit 1 is not *perfectly* circular, Mr. Wallace concludes that the Westwater Aquifer there is heterogenous (ibid.)

NRC Staff expert Mr. Cohen disputes that homogenous aquifers usually appear as perfect circles on contour maps. In his experience, a homogeneous aquifer "rarely" appears as

a perfect circle "because of natural heterogeneities in aquifer material" (Cohen Affidavit at 32). As Mr. Cohen explains, "[u]nder most real-world isotropic conditions – in which hydraulic conductivity is assumed to be the same in all directions – [contour maps] are usually sub-circular or slightly eliptical rather than perfectly circular. Cones of depression more elliptical in shape are indicative of anisotropic conditions (hydraulic conductivity is different in different directions). However, anisotropy does not necessarily indicate that channels exist; rather, it indicates heterogeneities in aquifer materials" (id. at 28). Most important, for present purposes, Mr. Cohen states that "a sub-circular [contour map] such as that presented [by HRI is] highly representative of a homogeneous aquifer" (id. at 32). He thus concludes that the aquifer response presented in HRI's contour map "is quite homogeneous for a real-world pumping test" (ibid.). I find Mr. Cohen's interpretation of HRI's contour map, and his conclusion that the Westwater Aquifer at Unit 1 is homogeneous – which is supported by HRI (see Pelizza Affidavit at 36-38) – to be credible and convincing. I therefore reject the Intervenors' contrary argument.[26]

Similarly, I reject the Intervenors' argument (Intervenors' Written Presentation at 83-84) that an outcrop analogue study for Unit 1 shows that the Westwater Aquifer there is not

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[26] Using a groundwater flow and transport model, the Intervenors also calculate that mining contaminants from Unit 1 could reach the municipal wells in Crownpoint within 63 years (Intervenors' Written Presentation at 82-83), rather than the 2,616 years calculated by HRI and the NRC Staff (FEIS at 3-28). I find that the Intervenors' calculation is flawed, because – in addition to being based on the erroneous premise that the Westwater Aquifer at Unit 1 is heterogeneous (Intervenors' Written Presentation at 83) – it is based on data "that is clearly unsubstantiated by literature and HRI's data" (Cohen Affidavit at 29). Even if the Intervenors' figure of 63 years were correct, it would be of little consequence because: (1) if an excursion occurs during mining operations, HRI will take immediate corrective action (LC 9-13); and (2) any toxic elements dissolved in the groundwater would likely re-precipitate close to the mining area (supra Part III.C.2; Pelizza Affidavit at 30). I note, moreover, that this would be a moot point if HRI begins mining operations at Crownpoint prior to or contemporaneously with Unit 1, because prior to commencing mining operations at Crownpoint, HRI must move the Crownpoint municipal wells to a more distant location (LC 10.27).

vertically confined. First, as discussed above (see supra pp. 53-55), an outcrop may be altered due to many years of exposure and, accordingly, does not necessarily provide accurate information regarding underground geology. Second, the particular outcrop on which the Intervenors rely is some fifteen miles away from the mining site (Lucas Affidavit at 11) and, therefore, may not be representative of the actual mining site geology. Third, adequate record evidence supports the conclusion that the Westwater Aquifer is vertically confined at Unit 1. See Pelizza Affidavit at 41-42; FEIS at 3-31. Finally, LC 10.23 requires pump testing before the injection of lixiviant, which will confirm the vertical containment status of the Westwater Aquifer at Unit 1 prior to the commencement of mining operations (von Till Affidavit at 5, 10).

3. Crownpoint

The Intervenors argue that HRI failed to demonstrate that drinking water supplies will be adequately protected from mining contaminants at Crownpoint because (Intervenors' Written Presentation at 85-87): (1) the Westwater Aquifer at Crownpoint is heterogeneous, containing channels that will allow the rapid lateral transport of contaminants outside the mining area; (2) the outcrop analogue study conducted by Dr. Lucas reveals that the Westwater Aquifer at Crownpoint is not vertically contained; and (3) Mr. Wallace produced a groundwater flow and transport model that, assuming the Westwater Aquifer at Crownpoint is heterogeneous, calculated mining contaminants from Crownpoint would reach Crownpoint Municipal wells in about 7 years, rather than the 178 years calculated by HRI and the NRC Staff. Having already addressed these concerns with regard to Section 17 and Unit 1, I find them likewise without merit as to Crownpoint. HRI has demonstrated that drinking water supplies will be adequately

protected from mining contaminants at Crownpoint. See, e.g., Pelizza Affidavit at 31, 34-37, 42; Cohen Affidavit at 30-31; von Till Affidavit at 14; FEIS at 4-15 through 4-26.[27]

Finally, the Intervenors argue that HRI failed to show that the Westwater and Dakota Aquifers are not connected at Crownpoint, because (Intervenors' Written Presentation at 87-89): (1) HRI's pump test was not properly designed and therefore failed to produce reliable results; and (2) HRI's pump test results suggest a connection between the two aquifers. I find these arguments to be insubstantial. First, NRC Staff expert, Stephen Cohen, and HRI expert, Craig Bartels, persuasively rebut the Intervenors' assertion that HRI's pump test failed to produce reliable results (Cohen Affidavit at 30; Bartels Affidavit at 46-47). Additionally, I find – based on the Affidavits of Mr. Cohen and Mr. Bartels – that the pump test reveals that the Westwater and Dakota Aquifers are hydrologically separated (Cohen Affidavit at 30-31; Bartels Affidavit at 46-49; see also Pelizza Affidavit at 42). This conclusion is confirmed by: (1) a 1982 pumping test near the Crownpoint site that "showed no hydraulic connection between the Westwater . . . and Dakota Aquifers (Cohen Affidavit at 31); (2) a technical research paper stating that the Westwater Aquifer is a "continuous aquifer confined between two units of low permeability" (ibid.); and (3) a five-year comparison of water levels between two "twin" wells at Crownpoint – one in the Westwater Aquifer and the other in the Dakota Aquifer – that indicates that the two aquifers are hydrologically isolated (Bartels Affidavit at 51-52).

IV. CONCLUSION

For the foregoing reasons, I find – with the concurrence of Special Assistants Dr. Richard Cole and Dr. Robin Brett – that HRI met its burden of proof to demonstrate that the

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[27] The Intervenors' assertion that mining contaminants from Crownpoint may reach the Crownpoint municipal wells not only is insubstantial (see supra note 26), it is disingenuous, because it fails to acknowledge that LC 10.27 requires HRI, in an abundance of caution, to move the Crownpoint municipal wells to a more distant location prior to commencing mining operations at Crownpoint.

Intervenors' challenges relating to groundwater protection, groundwater restoration, and surety estimates do not provide a basis for invalidating HRI's license to perform ISL uranium mining at Section 17, Crownpoint, and Unit 1. However, in accordance with Part III.A supra, HRI's license shall be revised to reduce the secondary groundwater restoration standard for uranium from 0.44 mg/L to 0.03 mg/L. Additionally, in accordance with Part III.C.3.e supra, HRI's Restoration Action Plan shall be revised to include a cost estimate for expenses associated with disposal site unloading, surveying, and decontamination.

Pursuant to 10 C.F.R. §§ 2.786(b) and 2.1253, a party wishing to challenge this decision before the Commission must file a petition for review within fifteen days after service of this decision. Any other party to this proceeding may, within ten days after service of a petition for review, file an answer supporting or opposing Commission review (id. § 2.786(b)(3)). The filing of a petition for review is mandatory for a party seeking to exhaust its administrative remedies before seeking judicial review (id. §§ 2.786(b)(1) and 2.1253). If no party files a petition for review of this decision, and if the Commission does not sua sponte review it, this decision constitutes the final action of the Commission thirty days after its issuance (id. § 2.1251(a)).

It is so ORDERED.

BY THE PRESIDING OFFICER[28]

/RA/

E. Roy Hawkens
ADMINISTRATIVE JUDGE

Rockville, Maryland
July 20, 2005

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[28] Copies of this Partial Initial Decision were sent this date by internet e-mail or facsimile transmission to all participants or counsel for participants.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
HYDRO RESOURCES, INC.	)	Docket No. 40-8968-ML
	)	
	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing LB PARTIAL INITIAL DECISION (PHASE II CHALLENGES TO IN SITU LEACH MINING MATERIALS LICENSE REGARDING GROUNDWATER PROTECTION, GROUNDWATER RESTORATION, AND SURETY ESTIMATES) (LBP-05-17) have been served upon the following persons by U.S. mail, first class, or through NRC internal distribution.

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[Original signed by Evangeline S. Ngbea]

Office of the Secretary of the Commission

Dated at Rockville, Maryland,
this 20th day of July 2005