

May 8, 2015

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
CROW BUTTE RESOURCES, INC.)	Docket No. 40-8943-OLA
)	
(License Renewal for the In Situ Leach)	ASLBP No. 08-867-02-OLA-BD01
Facility, Crawford, Nebraska))	

NRC STAFF'S INITIAL STATEMENT OF POSITION

The Staff of the U.S. Nuclear Regulatory Commission (NRC Staff) submits its Initial Statement of Position on the Oglala Sioux Tribe's (OST's) Contentions A, C and D; Consolidated Intervenor's (CI's) Contention F; and Contentions 1, 6, 9, 12 and 14, submitted by both the OST and CI (collectively, the Intervenor). In these contentions, the Intervenor challenges the Environmental Assessment (EA) prepared by the NRC Staff for Crow Butte Resources, Inc.'s (CBR's) proposed license renewal. For the reasons below, the Board should dismiss the contentions and affirm that the NRC Staff's review of the CBR License Renewal Application (LRA) complied with applicable law.

I. Background

A. The LRA

CBR holds NRC source materials license SA-1534, which authorizes operation of an in-situ uranium recovery (ISR) facility in Dawes County, Nebraska.¹ On November 27, 2007, CBR submitted an application requesting renewal of NRC source materials license SUA-1534 for a 10-year period.² The environmental information in the LRA was provided to inform the Staff's

¹ Ex. NRC-012

² Ex. CBR-011

independent environmental review of a license application and thereby assist the Staff in meeting the requirements of the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. §§ 4321 *et seq.*

B. The Staff's Safety Review

Following receipt of the LRA, the Staff conducted a safety review of CBR's application. The Staff conducted its review to determine whether CBR met the relevant criteria in 10 C.F.R. Parts 20 and 40. After evaluating CBR's application, as supplemented by its responses to Staff Requests for Additional Information (RAIs), the Staff found that CBR met these criteria. The Staff documented its findings in a Safety Evaluation Report (SER) for the CBR license renewal. The Staff issued its SER in December 2012.³ The SER was subsequently revised and reissued in August 2014 to modify several license conditions and the discussion of them in the SER.⁴

C. The Staff's NEPA Review

In accordance with the National Environmental Policy Act (NEPA) and the NRC's NEPA implementing regulations in 10 C.F.R. Part 51, the Staff has prepared an environmental assessment (EA) in connection with Crow Butte's application. The Staff issued the EA and Finding of No Significant Impact (FONSI) for the CBR License Renewal in October 2014.⁵ The EA describes the proposed action and the affected environment, and assesses the impact of the proposed action on 12 resource areas. The EA also includes an analysis of cumulative impacts from past, present, or reasonably foreseeable future actions.

³ Safety Evaluation Report for the License Renewal of the Crow Butte Resources ISR Facility, Dawes County, Nebraska, Materials License No. SUA-1534 (December 2012) (ADAMS Accession No. ML103470470).

⁴ Ex. NRC-009.

⁵ Final Environmental Assessment for the License Renewal of U.S. Nuclear Regulatory Commission License No. SUA-1534 (October 2014) (Ex. NRC-010); License Renewal of Crow Butte ISR, Uranium In-Situ Recovery Project, 79 Fed. Reg. 64,629 (October 30, 2014) (Ex. NRC-011).

D. The Staff's NHPA Review

As required under the National Historic Preservation Act (NHPA), the Staff evaluated how properties eligible for inclusion on the National Register of Historic Places (NRHP) may be affected by the CBR license renewal. As part of this effort, the Staff consulted with interested Tribes to provide them a reasonable opportunity to identify their concerns about historic properties that may be affected by the CBR license renewal. From January 2011 through October 2012, the Staff communicated with Tribal representatives through letters, phone calls, and face-to-face meetings. In October 2012, the Staff sent letters to all consulting Tribes with an invitation to participate in a Traditional Cultural Properties (TCP) survey of the CBR facility and proposed North Trend, Marsland, and Three Crow expansion areas. Two Tribes accepted the invitation and participated in the survey, which was conducted in November and December 2012. Following the survey, the Staff shared the participating Tribes' TCP survey report with all consulting Tribes and solicited comments.

In addition to receiving Tribal input, the Staff reviewed the baseline cultural resources data developed as a result of Class III field inventories in 1982 and 1987, conducted a literature review to identify potential cultural or historic resources that may not have been considered during previous reviews, and conducted site visits through its contracted cultural resources expert. As a result of its review, the Staff concluded that no sites were eligible for listing in the NRHP. The Nebraska State Historic Preservation Office (SHPO) reviewed and concurred with the Staff's finding on July 15, 2013.

II. The Staff's Expert Witnesses

A. David Back

Mr. Back is a consultant with Sanford Cohen and Associates (SC&A) and a subject matter expert for the CBR license renewal EA. As stated in his resume (Ex. NRC-002), he holds a Master of Science degree in Geology (hydrogeology concentration) from the Oklahoma State University and a Bachelor of Science degree in geology from the College of William and

Mary. Mr. Back has over 30 years of professional experience conducting field and modeling investigations to predict the migration of radionuclides and other chemicals through hydrogeologic systems. His expertise includes predicting the fate and transport of radionuclides under a wide range of hydrogeologic conditions such as porous and fractured media, saturated and unsaturated, various geochemical environments; reviewing and evaluating hazardous and nuclear waste disposal methods; supporting hydrogeologic assessments of environmental impact statements; and developing and reviewing performance assessments. Mr. Back served as the subject matter expert for matters related to geology and hydrology for the CBR license renewal EA.

B. Tianqing Cao

Dr. Cao is a Senior Seismologist in the NRC's Office of Nuclear Material Safety and Safeguards (NMSS). As stated in his resume (Ex. NRC-003), he has a B.S. in Theoretical Nuclear Physics from the Chinese University of Science and Technology in Beijing, and a Ph.D in Geophysics from MIT. Prior to joining the NRC, he worked as a seismologist for 20 years with the California Geological Survey with their Strong Motion Instrumentation Program and Seismological Hazard Mapping Programs. Since joining the NRC in 2007, Dr. Cao has worked on the safety review for the U.S. Department of Energy's Yucca Mountain high-level waste repository, performing confirmatory calculations and writing the seismic and drift degradation sections of NUREG-1949, Volumes 2 and 3. He also worked on the NRC's seismic response project following the Fukushima earthquake, reevaluating seismic hazards at U.S. nuclear power plants and served as a reviewer for NUREG-2115, "Central-Eastern United States Seismic Source Characterization for Nuclear Facilities," and Regulatory Information Letter 09-001, which addressed the seismic hazard at the Diablo Canyon nuclear power plant from the newly discovered Shoreline Fault. Dr. Cao has published over a dozen papers on seismic hazard assessment and similar issues.

C. Nathan Goodman

Mr. Goodman is the lead Environmental Project Manager for the Staff's review of Crow Butte's license renewal application. As stated in his resume (Ex. NRC-004), he holds a Master of Science in Environmental Science from the Johns Hopkins University and a Bachelor of Science in Environmental Science from Muhlenberg College. He has ten years of professional experience reviewing and preparing EAs and environmental impact statements (EISs), and has worked in the Environmental Review Branch in the NRC's Office of Nuclear Material Safety and Safeguards since 2010. He is also the lead Environmental Project Manager for the Crow Butte North Trend Expansion Area project. For the CBR License Renewal project, he has led the development of the EA and the technical review for all resource areas in the EA with the exception of Water Resources, where he assisted in the technical review. He has also led all efforts and consultation under Section 106 of the NHPA. Mr. Goodman assisted a team of NRC Staff in a Tribal Training Pilot Program, leading the instruction on NEPA and the NHPA, including Section 106 consultations. Mr. Goodman's expertise includes NRC NEPA documents, NEPA requirements and regulations, ecology technical review, and consultation under Section 106 of the NHPA. Prior to joining the Environmental Review Branch, Mr. Goodman was a project manager for the Prairie Island Nuclear Generating Plant License Renewal EIS and led the efforts to sign a MOU with the Prairie Island Indian Community for that project. He has also work as an ecologist in the technical review branch within the division of License Renewal at the NRC.

D. Thomas Lancaster

Mr. Lancaster is a Hydrogeologist with the Uranium Recovery Licensing Branch in the NRC's Office of Nuclear Material Safety and Safeguards. As stated in his resume (Ex. NRC-005), he holds a Master of Business Administration degree from George Mason University and a Bachelor of Science degree in Geophysical Sciences from Juniata College. He is a Certified Professional Geologist in Virginia and completed graduate studies in geophysical and

hydrogeology sciences at Old Dominion University. Mr. Lancaster has more than 25 years of experience as a hydrogeologist and project manager and has extensive knowledge of uranium recovery licensing. He has five years of experience as a project manager and hydrogeologist for uranium recovery licensing reviews at the NRC. He is the alternate Safety Project Manager for the CBR license renewal and served as a hydrogeology technical reviewer in the CBR license renewal safety review.

E. Paul Nickens

Dr. Paul Nickens is a Senior Cultural Resources Specialist with SC&A and a subject matter expert in cultural resources for the Crow Butte EA. As stated in his resume (Ex. NRC-006), he holds a Ph.D. in Anthropology, a Master of Arts in Anthropology/Geography, and a Bachelor of Arts in Anthropology/Geology, each from the University of Colorado. Dr. Nickens has over 40 years of professional experience providing cultural resources services to Federal agencies and national laboratories. In the past 35 years, Dr. Nickens has participated in over 40 EIS and EA efforts in support of compliance with NEPA and evaluations under Section 106 of the NHPA. This work included primary data-gathering activities involving cultural resources field inventories, resource evaluation, and conduct of mitigation activities to reduce the effects of project activities on cultural resources. Dr. Nickens' EIS and EA work has included preparation of sections on cultural resources, affected environments, and environmental consequences, in addition to consultations with numerous Native American Tribes for traditional cultural properties and environmental justice issues. For the CBR license renewal EA, Dr. Nickens served as the subject matter expert for matters related to cultural resources, and he wrote the draft affected environment, impacts, and cumulative impacts sections on cultural resources. Dr. Nickens also supported the Staff during consultations with the affected Native American Tribes.

F. Mirabelle Shoemaker

Ms. Shoemaker worked in the Environmental Review Branch in the NRC's Office of Nuclear Material Safety and Safeguards from 2013-2015. As stated in her resume (Ex. NRC-

007), she has eight years of professional experience reviewing and preparing EAs and EISs. In 2013, she became the lead Environmental Project Manager for the review of CBR's license amendment application for the proposed Marsland Expansion Area (MEA). To inform her review of the MEA license amendment application, Ms. Shoemaker served as co-Environmental Project Manager for the CBR License Renewal, providing support during review of the license renewal application, development of the EA, and consultation under Section 106 of the NHPA. She also balanced NEPA and NHPA responsibilities with contracting duties as back-up Contracting Officer's Representative (COR) for SC&A, leading technical staff toward successful completion of environmental review for this project. Ms. Shoemaker's expertise includes NRC environmental regulations, NEPA requirements, and consultation under Section 106 of the NHPA. She has provided technical support in the areas of cultural and historic resources and cumulative impacts assessment to other license reviews, including the Prairie Island Independent Spent Fuel Storage Installation and the Smith Ranch-Highland Uranium Recovery Project.

G. Elise Striz

Dr. Elise Striz is a Hydrogeologist in the NRC's Office of Nuclear Materials Safety and Safeguards, Uranium Recovery Licensing Branch (URLB). As stated in her resume (Ex. NRC-008), Dr. Striz has a Ph.D. in Petroleum Engineering from the University of Oklahoma, a Master of Science in Civil Engineering from the University of Oklahoma, and a Bachelor of Science in Interdisciplinary Engineering (environmental) from Purdue University. Dr. Striz has more than seventeen years of experience in both the private and public sectors. Prior to joining the NRC, Dr. Striz was a contractor to EPA, where she managed the Center for Subsurface Modeling Support, a group which provided GIS, database and groundwater flow and transport modeling expertise to the R.S. Kerr EPA National Risk Management Research Laboratory in Ada, Oklahoma. She then joined EPA at that facility as a hydrologist, where she conducted field investigations and ground water flow and transport modeling of groundwater contamination at

EPA research sites. In 2007, Dr. Striz joined NRC where she has been a technical reviewer for numerous uranium recovery licensing actions. Dr. Striz acted as one of the hydrogeology technical reviewers for the safety and environmental review of the Crow Butte Resources license renewal application. She was also the principal hydrogeology safety reviewer for the Moore Ranch ISR and Uranerz Hank Nichols ISR new license applications, and the Willow Creek ISR license renewal application. She assisted with the development of the environmental review documents for these projects as well. Dr. Striz is also involved in the oversight of ISR operating facilities, including review of required monitoring reports and conducting numerous onsite routine, unannounced and pre-operational inspections.

In addition to her technical review and oversight role, Dr. Striz also serves as a technical expert in hydrogeology at ISRs for NRC. She was recently the lead on the collection and web post of standardized spreadsheets of all publicly available historical wellfield baseline, operating, restoration and excursion groundwater quality data from NRC licensed sites at the request of the Commission. She has made several presentations on ISR hydrogeology issues at the annual National Mining Association workshops and to EPA. She has and continues to be the hydrogeology technical contact for EPA to assist with the recent 40 CFR Part 192 rulemaking addressing groundwater protection at ISR facilities. She is also a member of the International Atomic Energy Association (IAEA) Consultancy, a team of eight international uranium mining and milling experts, which is currently drafting a technical report entitled "Potential Environmental Impacts of Uranium Mining and Milling," to be published by IAEA in 2017.

III. Procedural History of Admitted Contentions

In response to the NRC Staff's *Federal Register* notice of the opportunity to request a hearing or petition to intervene in the CBR license renewal proceeding, CI and OST filed timely

hearing requests⁶ and were admitted as parties to this proceeding.⁷ After the Commission's decision on the parties' appeals of contention admissibility,⁸ four contentions remained: CI Technical Contention F and OST Environmental Contentions A, C, and D.⁹

Following the Staff's issuance of the EA and FONSI, CI and the OST separately filed new contentions based on the EA on January 5, 2015.¹⁰ CI filed 14 new contentions. The OST filed the same 14 contentions, stating that it "joins, adopts and restates . . . in large part" the contentions submitted by CI, along with an additional new contention that CI had not submitted.¹¹ The NRC Staff and CBR filed answers on January 30, 2015,¹² and CI and the OST replied on February 6, 2015.¹³ The Board held oral argument by telephone on February 17, 2015.¹⁴ On March 16, 2015, the Board admitted several of the new contentions in whole or in

⁶ Request for Hearing and/or Petition to Intervene (July 28, 2008) (OST 2008 Petition); Consolidated Request for Hearing and Petition for Leave to Intervene (July 28, 2008) (CI 2008 Petition).

⁷ *Crow Butte Resources, Inc.* (In Situ Leach Facility, Crawford, Nebraska), LBP-08-24, 68 NRC 691, 760 (2008) (LBP-08-24).

⁸ *Crow Butte Resources, Inc.* (In Situ Leach Facility, Crawford, Nebraska), CLI-09-9, 69 NRC 331, 351-54, 357-58 (2009).

⁹ Order (Canceling Oral Argument, Ruling on Summary Disposition of Consolidated Petitioners' Miscellaneous Contention G, Requiring Filing of Affidavits) at 3 (May 27, 2009) (unpublished) (ADAMS Accession No. ML091470499).

¹⁰ "Consolidated Intervenor's New Contentions Based on the Final Environmental Assessment (October 2014)" (Jan. 5, 2015) (CI New Contentions); "The Oglala Sioux Tribe's Renewed and New Contentions Based on the Final Environmental Assessment (October 2014)" (Jan. 5, 2015) (OST New Contentions).

¹¹ OST included some additional arguments in their versions of Contentions 1, 2, and 3, but essentially restated verbatim CI's Contentions 4-14. OST New Contentions at 1; *compare* OST New Contentions at 48-116 *with* CI New Contentions at 32-104.

¹² NRC Staff's Combined Answer to New Contentions Filed by Consolidated Intervenor's and the Oglala Sioux Tribe (Jan. 30, 2015) (Staff Answer to New Contentions); Crow Butte Resources' Response to Proposed New Contentions Based on Final Environmental Assessment (Jan. 30, 2015).

¹³ Consolidated Intervenor's Combined Reply to NRC Staff and Applicant's Responses to Newly Filed EA Contentions (Feb. 6, 2015) (CI Reply); Oglala Sioux Tribe's Combined Reply to NRC Staff's and Crow Butte Resources' Responses to Tribe's Renewed and New Contentions Based on the Final Environmental Assessment (Feb. 6, 2015).

¹⁴ Tr. at 590-881.

part, held that previously-admitted Contentions A, C, D, and F migrated from the LRA to the EA, and merged certain newly-admitted contentions with those previously admitted.¹⁵

On March 16, 2015, CI moved to admit 11 new contentions¹⁶ based on a proposed rule published by the Environmental Protection Agency (EPA).¹⁷ The NRC Staff and CBR filed answers on March 27, 2015,¹⁸ and CI filed its reply on April 1, 2015.¹⁹ On April 28, 2015, the Board denied CI's motion to admit the new contentions based on the EPA proposed rule.²⁰

As a result of the Board's rulings, the scope of this hearing is limited to those issues that have been pled with particularity in Contentions A, C, D, F, 1, 6, 9, 12, and 14. The admitted contentions, as framed by the Board, are as follows:²¹

Contention A: There is no evidence based science for [the NRC Staff's] conclusion that ISL mining has "no non radiological health impacts," or that non radiological impacts for possible excursions or spills are "small."

Contention C: [The NRC Staff's] characterization that the impact of surface waters from an accident is "minimal since there are no nearby surface water features," does not accurately address the potential for environmental harm to the White River.

¹⁵ *Crow Butte Resources, Inc.* (License Renewal for the In-Situ Leach Facility, Crawford, Nebraska), LBP-15-1, 81 NRC ____ (slip op.) (March 16, 2015) (LBP-15-11).

¹⁶ Consolidated Intervenor's Motion for Additional Contentions Based on EPA Proposed Rules (March 16, 2015).

¹⁷ Human and Environmental Protection Standards for Uranium and Thorium Mill Tailings, 80 Fed. Reg. 4156 (January 26, 2015).

¹⁸ NRC Staff's Answer to Consolidated Intervenor's New Contentions Based on Proposed EPA Rule (March 27, 2015); Crow Butte Resources' Response to Motion for Additional Contentions Based on EPA Proposed Rules (March 27, 2015)

¹⁹ Consolidated Intervenor's Combined Reply to NRC Staff's and Applicant's Answers (April 1, 2015).

²⁰ *Crow Butte Resources, Inc.* (License Renewal for the In-Situ Leach Facility, Crawford, Nebraska), LBP-15-5, 81 NRC ____ (slip op.) (April 28, 2015).

²¹ The following list appears in Appendix A of the Board's March 16, 2015 decision. LBP-15-11 at 61 (all brackets and quotations in original).

Contention D: [The NRC Staff] incorrectly states there is no communication among the aquifers, when in fact, the Basal Chadron aquifer, where mining occurs, and the aquifer, which provides drinking water to the Pine Ridge Indian Reservation, communicate with each other, resulting in the possibility of contamination of the potable water. Based on this potential communication between the aquifers, the EA's environmental justice analysis, including analysis of cumulative effects, should be expanded to consider potential impacts on the aquifer which provides drinking water to the Pine Ridge Indian Reservation.

Contention F: Failure to include recent research.

Contention 1: Whether the cultural surveys performed and incorporated into the EA formed a sufficient basis on which to renew Crow Butte's permit.

Contention 6: The Final EA violates the National Environmental Policy Act in concluding that the short-term impacts from consumptive ground water use during aquifer restoration are MODERATE.

Contention 9: The Final EA violates 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act and implementing regulations by failing to include the required discussion of ground water restoration mitigation measures.

Contention 12: The Final EA omits a discussion of the impact of tornadoes on the license renewal area, and inadequately discusses the potential impacts from land application of ISL mining wastewater.

Contention 14: The Final EA violates the National Environmental Policy Act in its failure to provide an analysis of the impacts on the project from earthquakes; especially as it concerns secondary porosity and adequate confinement. These failings violate 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations.

IV. Applicable Legal Standards

The following general legal standards apply to the Board's review of the merits of the Intervenor's NEPA-related claims. The Staff, in Section V below, addresses each contention.

A. Legal Standards under NEPA

When preparing an EIS or an EA pursuant to NEPA, the Staff must take a hard look at the environmental impacts of the proposed action.²² This standard is, however, subject to a “rule of reason.” Under NEPA’s rule of reason, the Staff need not address every environmental effect that could potentially result from the proposed action.²³ Rather, the Staff need only provide “[a] reasonably thorough discussion of the significant aspects of the probable environmental consequences[.]”²⁴

NRC case law follows Circuit Court precedent in defining the scope of the Staff’s NEPA review. “NEPA does not call for certainty or precision, but an *estimate* of anticipated (not unduly speculative) impacts.”²⁵ The proper inquiry is not whether an effect is “theoretically possible,” but whether it is “reasonably probable that the situation will obtain.”²⁶ The Staff “need not address every impact that could possibly result, but rather only those that are reasonably foreseeable or have some likelihood of occurring.”²⁷ As the Commission has emphasized, “[a]n environmental impact statement is not intended to be ‘a research document.’”²⁸ NEPA does not require the Staff to analyze every conceivable aspect of proposed project.²⁹ NEPA also does

²² *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989).

²³ *Ground Zero Ctr. for Non-Violent Action v. U.S. Dept. of the Navy*, 383 F.3d 1082, 1089-90 (9th Cir. 2004) (citing *NoGWEN Alliance of Lane County, Inc. v. Aldridge*, 855 F.2d 1380, 1385 (9th Cir. 1988)).

²⁴ *Trout Unlimited v. Morton*, 509 F.2d 1276, 1283 (9th Cir. 1974); *Warm Springs Dam Task Force v. Gribble*, 621 F.2d 1017, 1026–27 (9th Cir. 1980).

²⁵ *Louisiana Energy Services, L.P.* (National Enrichment Facility), CLI-05-20, 62 NRC 523, 536 (2005) (emphasis in original).

²⁶ *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 and 2), ALAB-455, 7 NRC 41, 49 (1978).

²⁷ *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-09-07, 69 NRC 613, 631 (2009).

²⁸ *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-10-22, 72 NRC 202, 208 (2010) (citing *Town of Winthrop v. FAA*, 533 F.3d 1, 13 (1st Cir. 2008)).

²⁹ *Private Fuel Storage*, CLI-02-25, 56 NRC at 349.

not require that the Staff commit virtually infinite study and resources to a proposed project.³⁰

Although the Staff can always gather more data in a particular area, it “must have some discretion to draw the line and move forward with decisionmaking.”³¹

Additional considerations apply where an EA, rather than an EIS, is prepared. Unlike an EIS, which is subject to a number of specified regulatory requirements,³² there is no “universal formula for what an EA must contain and consider.”³³ The NRC’s NEPA regulations state that an EA must “identify the proposed action” and include a “brief discussion” of the need for the proposed action, alternatives, the environmental impacts of the proposed action and alternatives, as appropriate, and a list of agencies and persons consulted and identification of sources used.³⁴ The Council on Environmental Quality (CEQ) NEPA regulations define an EA as follows:³⁵

An EA is a “concise public document” which serves to:

- (1) Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.
- (2) Aid an agency's compliance with the Act when no environmental impact statement is necessary.
- (3) Facilitate preparation of a statement when one is necessary.

³⁰ *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 NRC 287, 315 (2010) (footnote omitted).

³¹ *Id.* at 315.

³² See, e.g., 10 CFR §§ 51.70 and 51.71 (draft EIS), 10 C.F.R. §§ 51.90 and 51.91 (final EIS), 40 C.F.R. §§ 1502.15 and 1502.16 (all EISs).

³³ *Friends of Congaree Swamp v. Fed. Highway Admin.*, 786 F.Supp.2d 1054, 1062 (D.S.C.2011).

³⁴ 10 C.F.R. 51.30(a); see also 40 C.F.R. § 1508.9(b).

³⁵ 40 C.F.R. § 1508.9(a).

NRC regulations also require that after completing an EA, the Staff will determine whether to prepare an EIS or a FONSI on the proposed action.³⁶

Whether issuing an EA or an EIS, the agency's "hard look" must encompass "a thorough investigation into the environmental impacts of [the] agency's action and a candid acknowledgment of the risks that those impacts entail."³⁷ Because of the variety of possible factual variations in NEPA cases, an agency's obligations under NEPA are case-specific. The level of detail required "depends upon the nature and scope of the proposed action."³⁸ An EA requires less depth of consideration and less detail than an EIS.³⁹

Finally, when reviewing an EIS or an EA for compliance with NEPA, a court must "take a holistic view of what the agency has done to assess environmental impact[s]," and must not "flyspeck" the agency's environmental analysis."⁴⁰ In the context of NRC proceedings, the Commission has specifically stated that NRC hearings are not intended to fine-tune, add details or nuances, or edit Staff NEPA documents to meet an intervenor's preferred language or emphasis.⁴¹

³⁶ 10 C.F.R. 51.31(a).

³⁷ *Nat'l Audubon Soc'y v. Dep't of Navy*, 422 F.3d 174, 185 (4th Cir.2005).

³⁸ *California v. Block*, 690 F.2d 753, 761 (9th Cir.1982)

³⁹ See *Pa'ina Hawaii, L.L.C.*, CLI-10-18, 72 NRC 56, 75 (2010).

⁴⁰ See, e.g., *Fuel Safe Washington v. FERC*, 389 F.3d 1313, 1323 (10th Cir.2004) (describing the inquiry as "deciding whether claimed deficiencies in a FEIS are merely flyspecks, or are significant enough to defeat the goals of informed decision making and informed public comment") (quotation marks omitted); *Half Moon Bay Fishermans' Mktg. Ass'n v. Carlucci*, 857 F.2d 505, 508 (9th Cir.1988) ("The reviewing court may not 'flyspeck' an EIS.").

⁴¹ *Exelon Generation Co., LLC* (Early Site Permit for Clinton ESP Site), CLI-05-29, 62 NRC 801, 811 (2005) (boards "do not sit to 'flyspeck' environmental documents or to add details or nuances."); see also *System Energy Resources, Inc.* (Early Site Permit for Grand Gulf ESP Site), CLI-05-4, 61 NRC 10, 19 (2005) (internal citations omitted) (editing Staff NEPA documents to meet an intervenor's preferred language or emphasis "is not a function of [the NRC] hearing process", and "boards do not sit to parse and fine-tune" the staff's NEPA documents).

B. Legal Standards under the NHPA

Under Section 106 of the NHPA, an agency must consider the effects that a proposed action will have on any property that is listed in, or eligible to be listed in, the National Register of Historic Places. The Advisory Council on Historic Preservation (ACHP) is the agency charged with implementing the NHPA. Under the ACHP's regulations,⁴² before entering into an "undertaking" a federal agency must make a reasonable and good faith effort to identify historic properties that may be affected by the undertaking.⁴³ The agency's "identification efforts may . . . include background research, consultation, oral history interviews, sample field investigation, and field survey."⁴⁴

The ACHP has published guidance further defining the "reasonable and good faith" standard.⁴⁵ Under this guidance, "a reasonable and good faith effort to identify historic properties [must] include some level of effort—at a minimum, a review of existing information on historic properties that are located or may be located within the [area of potential effects] (APE) (36 C.F.R. § 800.4(a)(2))."⁴⁶ The ACHP explains that a reasonable and good faith effort "may consist of one or more methodologies and should be designed so that the federal agency can ensure that it produces enough information, in enough detail, to determine what the undertaking's effects will likely be on historic properties."⁴⁷ In its guidance, the ACHP also explains:

[A] reasonable and good faith identification effort does *not* require:

⁴² 36 C.F.R. Part 800.

⁴³ 36 C.F.R. § 800.4(b)(1).

⁴⁴ *Id.*

⁴⁵ *Meeting the "Reasonable and Good Faith" Identification Standard in Section 106 Review (ACHP)* (available at http://www.achp.gov/docs/reasonable_good_faith_identification.pdf) (last retrieved January 29, 2015).

⁴⁶ *Id.* at 2.

⁴⁷ *Id.*

- The ‘approval’ of a [State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO),] or other consulting party. The ACHP, SHPO/THPO and other consulting parties advise and assist the federal agency official in developing its identification efforts, but do not dictate its scope or intensity.
- Identification of every historic property within the APE. One of the reasons the ACHP’s regulations contain a post-review discovery provision (36 C.F.R. § 800.13) is that a reasonable and good faith effort to identify historic properties may well not be exhaustive and, therefore, some properties might be identified as the project is implemented.
- Investigations outside of, or below, a properly documented APE. The Section 106 process does not require that the agency search for all historic properties in a given area. Because the APE defines the geographic limits of federal agency responsibility for purposes of Section 106 review, identification efforts are carried out within its boundaries.
- Ground verification of the entire APE. In many cases, areas can be considered to have a certain probability of containing historic properties based on current knowledge. This or similar characterizations can be used to justify where within the APE most identification efforts will or should be targeted. Predictive models that have been tested and found to be reasonably efficient can also assist federal agencies to meet the ‘reasonable and good faith’ identification standard.⁴⁸

With respect to consultation, the ACHP’s regulations make clear that an agency provides tribes with a reasonable opportunity to identify their concerns when it takes the following steps.

First, the agency must make a “reasonable and good-faith effort” to identify tribes that may potentially be affected by an undertaking.⁴⁹ Second, the agency must provide a tribe:

a reasonable opportunity to identify its concerns about historic properties, advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance, articulate its views on the undertaking’s effects on such properties, and participate in the resolution of adverse effects.⁵⁰

⁴⁸ *Id.* at 3 (emphasis in original).

⁴⁹ 36 C.F.R. § 800.2(c)(2)(ii)(A).

⁵⁰ *Id.*

Further, the consulting agency may choose to coordinate its NHPA review with any NEPA review the agency is conducting. Under guidance published jointly by the ACHP and CEQ, this approach is permissible as long as the agency finalizes its NHPA review before issuing its Record of Decision for the proposed action.⁵¹

C. Staff Guidance

The Staff conducted its safety review of CBR's license renewal request in accordance with applicable standards in 10 C.F.R. Part 40, Appendix A, and consistent with NUREG-1569.⁵² The Staff uses NUREG-1569 "to determine whether the proposed activities will be protective of public health and safety and the environment and to fulfill NRC responsibilities under the National Environmental Policy Act (NEPA)."⁵³ The Staff developed NUREG-1569 as an alternative to issuing safety regulations specifically addressing uranium recovery facilities.⁵⁴ Although NUREG-1569 is a Staff guidance document, rather than an NRC rule, it is guidance that the Commission unanimously approved for publication in May 2003.⁵⁵ When the Commission voted to approve publication of NUREG-1569, it understood that the Staff intended to use NUREG-1569 to determine whether an applicant has met the safety requirements for receiving a license and whether the Staff has fulfilled its responsibilities under NEPA.⁵⁶

⁵¹ Ex. NRC-048 at 35.

⁵² NUREG-1569, Standard Review Plan for In Situ Leach Uranium Extraction License Applications (June 2003) (Ex. NRC-013).

⁵³ Ex. NRC-013 at 3.

⁵⁴ *Id.* at 5–6.

⁵⁵ VR-SECY-02-0204, Update of Uranium Recovery Guidance Documents (ADAMS Accession No. ML031270594) (May 7, 2003).

⁵⁶ *Id.* at 14.

The Staff conducted its environmental review in accordance with the applicable standards in 10 C.F.R. Part 51 and NUREG-1748.⁵⁷ NUREG-1748 provides general procedures for the environmental review of licensing actions regulated by NMSS. Because certain areas of the environmental review, such as hydrology and hydrogeology, overlap with the safety review, the Staff incorporated information and findings from the safety review and SER into its environmental review as appropriate.

Although Staff guidance is not binding on a licensing board, it is entitled to special weight in a hearing.⁵⁸ Furthermore, because NUREG-1569 was explicitly endorsed by the Commission's vote in SECY-02-0204, it should be given weight commensurate with its status as Commission-approved guidance.

D. Scope of License Renewal Review

The scope of the Staff's review of a license renewal application differs from that of an initial license application. NUREG-1569 states that all applicants are required to provide detailed information on the facilities, equipment, and procedures to be used, and an environmental report that discusses the effects of proposed operations on the health and safety of the public and on the environment.⁵⁹ For license renewal applications, however, the licensee need only submit information containing changes from the current accepted license. The licensee need not resubmit a complete application covering all aspects of facility operation.⁶⁰

⁵⁷ NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs" (August 2003) (Ex. NRC-014).

⁵⁸ See *Yankee Atomic Elec. Co.* (Yankee Nuclear Power Station), CLI-05-15, 61 NRC 365, 375 n.26 (2005) ("We recognize, of course, that guidance documents do not have the force and effect of law. Nonetheless, guidance is at least implicitly endorsed by the Commission and therefore is entitled to correspondingly special weight."). See also *Nextera Energy Seabrook, LLC* (Seabrook Station, Unit 1), CLI-12-05, 75 NRC 301, 314 n.78 (2012) (explaining that a Staff-issued NUREG is entitled to special weight); *Private Fuel Storage LLC* (Independent Spent Fuel Storage Installation), CLI-01-22, 54 NRC 255, 264 (2001) (same).

⁵⁹ Ex. NRC-013 at xv.

⁶⁰ Ex. NRC-013 at xvii.

NUREG-1569 directs the Staff, in its review of a request for license renewal, to analyze the inspection history and operation of the site and review changes to operations from those currently found acceptable. If these changes are found to be acceptable, then the license is acceptable for renewal.⁶¹ In accordance with this approach, the acceptance criteria for a license renewal application consist of “a summary of proposed changes, a record of amendments since the last license issuance, and documentation of inspection results.”⁶²

Appendix A to NUREG-1569 provides specific guidance regarding the Staff’s review of the licensee’s historical record of site operations and compliance in conjunction with a request for a license renewal. The areas of review include amendments and changes to operating practices and procedures; excursions and cleanup histories; and exceedances of any non-radiological contaminant exposure or release limits.⁶³ If, after reviewing the historical aspects of site operations, the Staff concludes “that the site has been operated so as to protect health and safety and the environment and that no unreviewed safety-related concerns have been identified,” then the Staff is only to review the changes proposed by the license renewal application using the appropriate sections of NUREG-1569.⁶⁴

⁶¹ Ex. NRC-013 at xvii.

⁶² Ex. NRC-013 at 1-2.

⁶³ Ex. NRC-013 at A-1.

⁶⁴ Ex. NRC-013 at A-1 (stating that “[a]spects of the facility and its operations that have not changed since the last license renewal or amendment should not be reexamined.”)

V. The Staff's Position on Individual Contentions

The Staff addresses each of the Intervenor's contentions below and in its attached testimony (Ex. NRC-001). As the Staff explains, it prepared the EA for the CBR license renewal consistent with the requirements of applicable law and guidance. The Intervenor's claims of deficiencies in the EA lack support, and the Board should therefore dismiss the contentions.

A. Contention A: The Intervenor's Fail to Show that the EA Contains an Inadequate Assessment of Non-Radiological Impacts

In Contention A, the OST alleges the following:

There is no evidence based science for [the NRC Staff's] conclusion that ISL mining has "no non radiological health impacts," or that non radiological impacts for possible excursions or spills are "small."⁶⁵

Contention A was first proffered by the OST as a challenge to CBR's LRA and raised a wide variety of arguments grouped loosely around the theme of health impacts on the Pine Ridge Indian Reservation that may result from excursions at the Crow Butte site.⁶⁶ As support for Contention A, the OST referred to opinions provided by Dr. Richard Abitz and Dr. Hannan LaGarry in support of their intervention petition and cited a 1989 letter to the NRC regarding the potential communication of aquifers in the area and studies relating to the effects of depleted uranium on mice and cancer prevalence in Native American populations.⁶⁷

⁶⁵ LBP-15-11 at 61.

⁶⁶ See OST 2008 Petition at 6-9. Specifically, the OST raised arguments relating to the likelihood of communication between the mined aquifer and the drinking water source for the Pine Ridge Indian Reservation; the adequacy of the spill contingency plans described in CBR's LRA; the location and monitoring frequency of the wells used to monitor for excursions at the Crow Butte site; the exclusion of uranium and "other heavy metals known to be toxic and linked to the development of cancer" from the parameters used to monitor for excursions; the accuracy and potential for bias in the testing of monitoring wells; the ecological impacts of the Crow Butte project on various listed ecosystems, animals, and humans; the absence in the LRA of a literature review regarding non-radiological impact of ISR mining on the public generally and the OST specifically; and the absence in the LRA of an outline of "the possible health hazards of ingesting drinking water that is contaminated with uranium." *Id.*

⁶⁷ See *id.* at 5-12.

The Board admitted Contention A in its November 21, 2008 memorandum and order ruling on the intervenors' hearing requests.⁶⁸ The Staff and CBR appealed the Board's decision admitting Contention A, among other contentions, and the Commission responded to their appeal in its order of May 18, 2009.⁶⁹ In considering the Board's ruling on Contention A, the Commission recognized that the OST "made many assertions in its proposed contention," but found that "the Board limited the admitted contention to the following claim:"⁷⁰

The Tribe has raised a genuine dispute with the License Renewal Application by raising sufficient questions whether Crow Butte's spill contingency plan adequately addresses non-radiological contaminants. Specifically in this regard, the Tribe challenges the monitoring frequency for contaminants, and the Tribe's expert, Dr. Abitz, opines that certain portions of the License Renewal Application are deficient.⁷¹

The Commission also referred to the OST's citation of Dr. Abitz's report and his opinion that there is "no valid scientific reason" to exclude uranium as an excursion indicator and the OST's argument that a biweekly testing plan was too infrequent to detect possible excursions.⁷² Finally, the Commission noted that in admitting Contention A, the Board "relied primarily on the expert opinion of Dr. Abitz, rather than on the testimony of Dr. LaGarry."⁷³

In their submission dated January 5, 2015, the OST filed several new contentions in response to the issuance of the Staff's EA for the Crow Butte project.⁷⁴ They did not seek to amend, or otherwise address, Contention A with this filing. In its memorandum and order ruling on the intervenors' proposed new contentions related to the EA, the Board migrated Contention

⁶⁸ LBP-08-24 at 718.

⁶⁹ CLI-09-9 at 331.

⁷⁰ *Id.* at 346.

⁷¹ *Id.* at 347.

⁷² *Id.*

⁷³ *Id.*

⁷⁴ See *generally* OST New Contentions.

A from a challenge to CBR's LRA to a challenge to the Staff's EA.⁷⁵ Therefore, the Staff responds here and in its testimony to the portions of Contention A as previously admitted and limited by the Board and the Commission, and as subsequently migrated in identical form to the Staff's EA.

Contention A, as admitted, purports to challenge the adequacy of CBR's spill contingency plans identified in the LRA.⁷⁶ The OST claims that these plans do not recognize that leaks could occur and go undetected if the biweekly schedule for testing of monitoring wells does not coincide with a leak.⁷⁷ In support of this claim, the OST refers to Section 5.8.1.3 of the LRA.⁷⁸ This section of the LRA describes the operating procedures that CBR has in place to handle potential surface and subsurface releases of radioactive materials through spills and leaks, including surface leaks, transportation accidents, and subsurface releases.⁷⁹ The OST also claims that CBR's groundwater monitoring plan – alluded to in Section 5.8.1.3 but more fully described in Section 5.8.8.2 of the LRA – does not indicate that monitoring wells are tested for uranium and that “[t]here is no scientific basis for excluding uranium from the monitor well testing.”⁸⁰

Section 4.6.2 of the EA describes the potential environmental impacts to groundwater that may result from spills, leaks and excursions at Crow Butte. As the Staff explains in its testimony, the EA describes the potential environmental impacts to groundwater from the various phases of the Crow Butte project, including – most relevant to the claims raised in

⁷⁵ LBP-15-11 at 10.

⁷⁶ CLI-09-9 at 346.

⁷⁷ OST 2008 Petition at 7.

⁷⁸ OST 2008 Petition at 7. While the location, screening and sampling frequency of CBR's monitoring well network is briefly described in Section 5.8.1.3 of the LRA, it is more fully discussed in Section 5.8.8.2. See Ex. CBR-011 at 5-103.

⁷⁹ Ex. NRC-001 at A.A.2.

⁸⁰ OST 2008 Petition at 7.

Contention A – the operational phase.⁸¹ Specifically, the EA describes the potential environmental impacts to groundwater from spills and leaks during operations, including the requirements relating to the management of spills and leaks at the Crow Butte facility, in Section 4.6.2.2.2 of the EA.⁸² The EA describes the potential impacts to groundwater from excursions during operations in Section 4.6.2.2.4.⁸³ The EA also describes the potential environmental impacts that could occur to groundwater outside of the Crow Butte facility as a result of excursions in Section 4.6.2.2.6.⁸⁴ The EA concludes that the potential long-term environmental impacts to groundwater from spills, leaks and excursions during facility operations would be SMALL.⁸⁵

As an initial matter, the Staff explains that it did not make a determination regarding the adequacy of CBR's operating procedures covering spills and leaks in the course of its review of CBR's license renewal application.⁸⁶ This is because the NRC has previously concluded that Crow Butte's spill contingency plans were acceptable, and because the Staff did not find anything during its current licensing review to invalidate its previous findings, the adequacy of these procedures were not reevaluated in the SER for this license renewal action.⁸⁷ This is consistent with NUREG-1569, the Commission-approved guidance governing the Staff's review of an ISR license application. NUREG-1569 does not require the Staff to reconsider the adequacy of CBR's spill contingency plans unless the inspection history of the site, or

⁸¹ Ex. NRC-001 at A.A.4.

⁸² Ex. NRC-010 at 75-77.

⁸³ Ex. NRC-010 at 78-80.

⁸⁴ Ex. NRC-010 at 81.

⁸⁵ Ex. NRC-010 at 76, 79, 81.

⁸⁶ Ex. NRC-001 at A.A.3.

⁸⁷ Ex. NRC-001 at A.A.3; Ex. NRC-009 at 65.

operational changes made to the site, warrants such consideration.⁸⁸ Notably, the OST has not challenged the Staff's determination in this regard.

Moreover, it is not apparent that the spill contingency plans themselves, or the EA's discussion of spills and leaks generally, fall within the scope of the contention as admitted and limited by the Board and Commission. The only specific claims raised by the OST in Contention A as *admitted* concern the omission of uranium as an excursion indicator and the frequency that monitoring wells are sampled in order to detect excursions. These admitted claims do not appear to relate to CBR's operating procedures for spills and leaks generally, but rather to specific elements of CBR's excursion monitoring program.⁸⁹ Therefore, the Staff respectfully maintains that the Commission, in its interpretation of the Board's order admitting Contention A, clarified that the scope of Contention A is limited to these two specific challenges to the adequacy of CBR's excursion monitoring program, and all other claims fall outside the scope of the admitted contention.⁹⁰

Turning to the specific issues admitted for hearing in Contention A, the Staff responds in its testimony to the OST's claims of deficiencies regarding monitoring well sampling frequency and the use of uranium as an excursion indicator. First, the Staff explains that the source of the biweekly sampling standard is Condition 11.5 of CBR's license, which requires CBR to sample and test all perimeter and aquifer monitoring wells no more than 14 days apart.⁹¹ The biweekly sampling requirement has been in place since CBR's initial license was granted in 1989 and was described in the EA for that licensing action, as well as in the NRC's EA for CBR's 1998

⁸⁸ Ex. NRC-001 at A.A.3; *see* Ex. NRC-013 at A-1.

⁸⁹ *See* Ex. NRC-001 at A.A.2.

⁹⁰ *See* CLI-09-9 at 346.

⁹¹ *Id.* at A.A.6; *see also* Ex. NRC-012 at 12.

license renewal.⁹² Moreover, the biweekly standard is consistent with NUREG-1569, which states that “an acceptable excursion monitoring program should indicate that all monitor wells will be sampled for excursion indicators at least every 2 weeks during *in situ* leach operations.”⁹³ The Staff also explains that the adequacy of the biweekly sampling standard has been borne out by historical experience at the site; in the EA, the Staff describes the excursion events that have occurred and been detected at the site and states that there has been no measurable impact to groundwater beyond the licensed area from Crow Butte operations.⁹⁴

Second, the Staff addresses the OST’s claim that the LRA, and subsequently the EA, are deficient because uranium is not sampled by CBR as excursion indicator parameter. In A.A.7 through A.A.9 of their testimony, the Staff addresses the specific claims raised by Dr. Abitz, on behalf of the OST, that uranium is an excellent excursion indicator because uranium is highly mobile as a carbonate complex in lixiviant and because its concentration in baseline wells is generally two or three orders of magnitude lower than the lixiviant. The Staff explains that, notwithstanding Dr. Abitz’s assertions, uranium is not as mobile as the parameters currently used to detect excursions at the Crow Butte site, and is therefore not a good indicator parameter for the early detection of excursions.⁹⁵

Further, as the Staff explains in A.A.7 of its testimony, the indicator parameters that CBR must sample for its excursion monitoring program are established in Condition 11.4 of CBR’s license, and have consisted of the same three indicator parameters – chloride, conductivity, and

⁹² *Id.* at A.A.6.

⁹³ *Id.* at A.A.6; *see also* Ex. NRC-013 at 5-43.

⁹⁴ *Id.* at A.A.6; *see also* Ex. NRC-010 at 81.

⁹⁵ *Id.* at A.A.7–A.A.9. The Staff also explains that CBR was recently required to sample for natural uranium in two mine units. However, the purpose of this requirement is not for the usual purpose of detecting the existence of an excursion; rather, it is for the specific purpose of detecting the source of an excursion already identified, where previous efforts to do so have not proved successful. Ex. NRC-001 at A.A.10.

total alkalinity – since 2003.⁹⁶ The use of these three parameters has historically been effective at identifying excursions in the past and provides a sufficient basis for the expectation that the use of these three parameters will still be an effective practice in the future.⁹⁷ The OST has not challenged this license condition, nor have they provided any information to indicate that the exclusion of uranium as an excursion parameter has detrimentally affected the ability of CBR to detect excursions at the Crow Butte site. The mere assertion that uranium is a “better” excursion indicator for the reasons suggested by Dr. Abitz is not sufficient to establish that the exclusion of uranium as an excursion indicator parameter violates NEPA or other applicable law, particularly in light of CBR’s long operating experience to the contrary.

Furthermore, as the Staff explains, the exclusion of uranium from the suite of required excursion indicator parameters is consistent with and supported by NRC guidance.⁹⁸ NRC documents prepared for or issued by the Staff consistently discourage the use of uranium as an early-time excursion parameter. For example, as the Staff notes in A.A.8 of its testimony,⁹⁹ NUREG/CR-3709 states that some indicators such as uranium are not conservative because they do not travel as rapidly as water,¹⁰⁰ and NUREG-1569 likewise states that uranium is not a good excursion indicator.¹⁰¹ Recently, the Licensing Board in *Strata Energy, Inc.* dismissed a similar contention by finding that, “as compared to other possible indicators such as chloride, alkalinity, sulfate, and electrical conductivity, uranium is not as effective a tool for providing a

⁹⁶ *Id.* at A.A.7; *see also* Ex. NRC-012 at 11; Ex. NRC-010 at 78.

⁹⁷ *See id.* at A.A.7–A.A.8.

⁹⁸ *Id.* at A.A.8.

⁹⁹ *Id.* at A.A.8.

¹⁰⁰ Ex. NRC-018 at 5.

¹⁰¹ Ex. NRC-013 at 5-41.

timely alert regarding a lixiviant excursion from an ISR facility.”¹⁰² While the Board in that case noted that a different conclusion might be reached “in the face of convincing evidence that, for any particular facility, the aquifer geochemistry would make uranium equal (or better) as a well monitoring testing indicator,”¹⁰³ the OST has not provided any site-specific information to suggest that that may be the case here.¹⁰⁴

In sum, the OST has not shown that the Staff has violated NEPA or other governing law in its assessment in the EA of the potential environmental effects of spills, leaks, or excursions at the Crow Butte facility that could result from renewal of CBR’s source and byproduct materials license. With respect to the issues admitted for hearing – the omission of uranium as an excursion indicator and the biweekly sampling requirement for monitoring wells – the OST has not challenged the license conditions imposing the biweekly monitoring requirement and the suite of required excursion indicator parameters, from which uranium is excluded. Furthermore, both requirements are consistent with NRC guidance. While Staff guidance does not carry the legal force of a regulation, it is entitled to special weight in a hearing.¹⁰⁵ Therefore, in light of the Staff’s compliance with Commission-approved guidance in the conduct of its review, and the absence of any specific claim or evidence put forward by the OST to challenge the Staff’s determinations in the SER or its description of spills, leaks and excursions in the EA and

¹⁰² *Strata Energy, Inc.* (Ross In Situ Recovery Uranium Project), LBP-15-3, 81 NRC ____ (slip op. 107) (Jan. 23, 2015).

¹⁰³ *Id.*

¹⁰⁴ *See id.* slip op. 107-08 (“[W]e conclude that the case for using uranium as an excursion indicator for the Ross Project is not compelling, particularly given Joint Intervenors’ failure to present any convincing site-specific evidence to counter the staff and SEI showings that chloride and the other indicators . . . would be effective excursion indicators at Ross.”)

¹⁰⁵ *Nextera Energy Seabrook, LLC* (Seabrook Station, Unit 1), CLI-12-05, 75 NRC 301, 314 n.78 (2012); *Yankee Atomic Elec. Co.* (Yankee Nuclear Power Station), CLI- 05-15, 61 NRC 365, 375 n.26 (2005); *Private Fuel Storage LLC* (Independent Spent Fuel Storage Installation), CLI-01-22, 54 NRC 255, 264 (2001).

conclusion that such impacts would be SMALL, the OST has not established that the Staff has failed to comply with NEPA, the NRC's NEPA-implementing regulations, or other governing law.

B. Contention C: The Staff Thoroughly Considered Potential Impacts to Surface Waters, Including the White River

In Contention C, which was migrated to the EA, the OST argues that the Staff fails to address the White River as a potential pathway for contamination. The OST asserts, through their expert, Dr. LaGarry, that the White River alluvium can receive contaminants through surface spills, migration of contaminants through the Basal Chadron Sandstone aquifer (referred to by the intervenors as the Chamberlain Pass Formation), and through faults. By implication, the OST asserts that the NRC Staff failed to take a hard look at these impacts in its EA. To support these claims, the OST relies on the 2008 opinions of Dr. Hannan LaGarry and JR Engineering (Paul Ivancie and W. Austin Creswell).

When the OST filed its new contentions on the EA in January 2015, the Tribe did not seek to amend, or otherwise address, Contention C in that filing. In LBP-15-11, the Board migrated Contention C from a challenge to CBR's LRA to a challenge to the Staff's EA.¹⁰⁶ Therefore, the Staff responds here and in its testimony to Contention C as previously admitted by the Board and affirmed by the Commission,¹⁰⁷ and as subsequently migrated in identical form to the Staff's EA.

The primary basis for the OST's contention is Dr. LaGarry's statement that the White River alluvium can receive contaminants from surface spills at the CBR facility, from waters transmitted through the mined aquifer (the Basal Chadron Sandstone, referred to by Dr. LaGarry as the Chamberlain Pass Formation) where it is exposed at the land surface, and through faults.¹⁰⁸ In its testimony, the Staff addresses each of the OST's specific claims

¹⁰⁶ LBP-15-11 at 10.

¹⁰⁷ CLI-09-9, 69 NRC at 352.

¹⁰⁸ OST Petition at 16; Ex. INT-003 at 3.

regarding potential pathways for contaminants to reach the White River, and the reasons why such pathways are implausible or unlikely to lead to adverse impacts.¹⁰⁹ As the Staff explains, it specifically considered these pathways in analyzing environmental impacts on surface waters. The Staff summarizes its position below, with specific references to portions of its testimony where the Staff's experts address these issues at length.

1. The Staff thoroughly considered the impact of spills and leaks on surface waters

In its testimony, the Staff explains that there are two pathways for spills and leaks to potentially reach the White River alluvium: transport through surface waters (English and Squaw Creeks), or migration over a distance of 2 miles through the shallow Brule aquifer.¹¹⁰ The Staff also notes that spills and leaks may arise from a number of sources, and identifies the sections of the EA that address each source.¹¹¹ In Section 4.6.1.2, the EA discusses the extensive controls and procedures that CBR has implemented to respond to surface spills and leaks and minimize their impacts.¹¹² In Section 4.6.2.2.2 the EA describes the mechanical integrity testing that is required by license condition to minimize spills and leaks associated with well failures, and notes the oversight of well integrity under the NDEQ Class III injection permit.¹¹³ Section 4.6.2.2.3 of the EA explains how leaks and spills from evaporation ponds are prevented through design features and regular inspections, as well as a license condition imposing a freeboard requirement to prevent overflow.¹¹⁴ The Staff explains in its testimony that despite the fact that spills and leaks have occurred, there is no evidence from over 20 years of surface water and

¹⁰⁹ Ex. NRC-001 at A.C.4, A.C.5, and A.C.6.

¹¹⁰ Ex. NRC-001 at A.C.4.

¹¹¹ Ex. NRC-001 at A.C.4.

¹¹² Ex. NRC-010 at 69-72.

¹¹³ Ex. NRC-010 at 75-77.

¹¹⁴ Ex. NRC-010 at 77-78.

sediment sampling on English and Squaw Creeks that contaminants have been transported downstream of the wellfields and outside of the CBR license area.¹¹⁵ Similarly, all vertical excursions into the overlying Brule aquifer that have occurred between 1995 and 2010 were corrected without long term impacts occurring.¹¹⁶ Finally, Section 4.6.2.2.6 of the EA, which specifically addresses impacts outside of the facility, discusses monitoring data from private wells in the overlying Brule aquifer that indicate the water quality has remained consistent with radiological background levels.¹¹⁷

2. The Staff thoroughly considered whether contaminants could migrate through the Basal Chadron Sandstone from the CBR facility to the White River alluvium

In Section 4.6.2.2.4, the EA discusses CBR's ability to contain process fluids and prevent and control horizontal excursions.¹¹⁸ As explained in the EA and in the Staff's testimony, CBR is required by License Condition 10.7 to maintain an inward hydraulic gradient in the wellfields, and this gradient creates a cone of depression that draws ground water toward the interior of the License Area, thus preventing fluid movement offsite.¹¹⁹ CBR is also required by License Condition 11.5 to monitor a ring of perimeter wells screened in the Basal Chadron Sandstone aquifer to detect excursions, and if excursions are detected, CBR adjusts the extraction and injection rates in the wellfield to draw fluids back in.¹²⁰ This process has been used successfully to correct excursions during the period that the CBR facility has operated.¹²¹

¹¹⁵ Ex. NRC-001 at A.C.4.

¹¹⁶ Ex. NRC-001 at A.C.4.

¹¹⁷ Ex. NRC-001 at A.C.4.

¹¹⁸ Ex. NRC-010 at 78-80.

¹¹⁹ Ex. NRC-010 at 75, Ex. NRC-001 at A.C.5, Ex. NRC-012 at 8.

¹²⁰ Ex. NRC-012 at 7, 12.

¹²¹ Ex. NRC-001 at A.C.5

The Staff also explains in its testimony that the only outcrops of the Basal Chadron Sandstone it is aware of are located approximately 12 miles northwest of Crawford and far north of the White River alluvium.¹²² Therefore, the particular pathway outlined by Dr. LaGarry, which would involve the White River receiving contaminants where the Basal Chadron Sandstone (referred to by Dr. LaGarry as the Chamberlain Pass Formation) is exposed at the land surface, is not plausible.

3. The Staff thoroughly considered whether faults or fractures could provide connections between the Basal Chadron Sandstone and overlying aquifers

As the Staff explains in its testimony, the Staff is unaware of any evidence of faults or fractures at the CBR site which could act as permeable pathways between the Basal Chadron Sandstone aquifer and the overlying Brule aquifer or alluvium.¹²³ To the contrary, as discussed in the EA, there are several bases for concluding that CBR has demonstrated vertical confinement between the Basal Chadron Sandstone and the overlying Brule aquifer and alluvium. These include the results of four aquifer pumping tests that showed no hydrological connection between the Basal Chadron Sandstone aquifer and the overlying Brule aquifer (discussed in Section 3.5.2.3.1 of the EA); thick clay and mudstone layers that isolate the Basal Chadron Sandstone aquifer from the overlying Brule aquifer (discussed in Section 3.5.2.3.2 of the EA); substantial and continued differences in potentiometric head between the Basal Chadron Sandstone and overlying Brule aquifers, along with continued artesian pressure in the Basal Chadron Sandstone aquifer (discussed in Section 4.6.2.2.1 of the EA); and differences in water quality between wells screened in the Basal Chadron Sandstone and Brule aquifers.¹²⁴ These lines of evidence show that there is no connection between the two aquifers due to faults

¹²² Ex. NRC-001 at A.C.5.

¹²³ Ex. NRC-001 at A.C.6.

¹²⁴ Ex. NRC-010 at 37-38, 75, 81.

or fractures. Likewise, operational ground water monitoring over the period of operations has not indicated any contamination of the surrounding or overlying aquifers that would be expected if faults and fractures were present to provide pathways for water to flow between the two aquifers.¹²⁵

Dr. LaGarry also claimed that artesian flow could transmit contaminated water to the land surface and into the White River alluvium. As explained in the Staff's testimony, for this to occur there would have to be a pathway from the Basal Chadron Sandstone aquifer to the surface.¹²⁶ For example, the Staff noted that vertical excursions are unlikely because CBR has plugged and abandoned all exploratory drill holes, because wells are subject to MIT, and because of the thick confining layer that consists of low permeability clays.¹²⁷ And as discussed above, the Staff has seen no evidence of faults that would provide pathways for artesian flow.¹²⁸

4. The Staff appropriately determined that impacts to surface waters, including the White River would be small

The Staff's environmental review considered the potential pathways that Dr. LaGarry identified and concluded that impacts to surface waters would be small.¹²⁹ The Staff documented this review in Section 4.6.1.2 and other sections of the EA, as discussed in Sections B.1-B.3 above. As explained in the Staff's testimony, further evidence that the White River has been unaffected by over 20 years of CBR operations comes from the South Dakota Department of Environment and Natural Resources (SD DENR), which has been monitoring water quality specifically for uranium and other constituents associated with ISR activities at a

¹²⁵ Ex. NRC-001 at A.C.6 (citing Ex. NRC-010 at 81).

¹²⁶ Ex. NRC-001 at A.C.8.

¹²⁷ Ex. NRC-001 at A.C.4.

¹²⁸ Ex. NRC-001 at A.C.6.

¹²⁹ Ex. NRC-010 at 72.

site on the White River near Oglala, South Dakota.¹³⁰ SD DENR's monitoring has found no evidence of impacts from ISR operations,¹³¹ refuting Dr. LaGarry's claim that contaminants are reaching the White River alluvium and being pushed downstream to the Pine Ridge Reservation.

In summary, the OST has not shown that the Staff has violated NEPA or other governing law in its assessment in the EA of the potential environmental effects of CBR's operations on surface waters, including the White River. The Staff evaluated the reasonably foreseeable effects of renewal of the CBR license on impacts to surface water, and thus complied with the "hard look" requirement of NEPA. Therefore, the Board should rule in favor of the Staff on OST Contention C.

C. Contention D: The Staff Properly Concluded There is No Communication Among Aquifers and Appropriately Limited its Environmental Justice Review

As originally admitted, OST Contention D raised a concern about adequate confinement, claiming that the Basal Chadron Sandstone aquifer (the mined aquifer at the CBR facility) communicates with the aquifer that provides drinking water to the Pine Ridge Reservation.¹³² The OST claims that faults – and the White River Fault, in particular – could transmit contaminants from Crawford to Pine Ridge, South Dakota.¹³³ To support this claim, the OST relies on the 2008 Opinion of Dr. LaGarry and the April 2007 NDEQ letter.

In LBP-15-11, the Board merged portions of the intervenors' EA contentions 3, 5 and 10 into OST Contention D. Specifically, the Board admitted the intervenors' claim in EA Contention 5 questioning the accuracy of the Staff's modeling of the White River feature, specifically the

¹³⁰ Ex. NRC-001 at A.C.9 (citing Ex. NRC-022 at 143).

¹³¹ Ex. NRC-022 at 143.

¹³² OST 2008 Petition at 18.

¹³³ OST 2008 Petition at 20. Although the Staff uses the term "White River Fault" here based on the language used by OST in its 2008 Petition, the Staff concluded during its review that the "White River Fault" is a fold, not a fault. See Ex. NRC-001 at A.D.17. Therefore, the Staff subsequently refers to this feature as the "White River structural feature."

use of data from the North Trend Expansion Area, as well as the accuracy of the Staff's determination that the White River feature is a fold.¹³⁴ The Board also found the intervenors' EA Contention 3 on environmental justice (EJ) admissible on the issue of whether the Staff's analysis of EJ, including its analysis of cumulative effects, should be expanded to consider potential impacts on the aquifer that provides drinking water to the Pine Ridge Reservation.¹³⁵

1. Communication Among Aquifers

Communication among aquifers was considered in detail in both the Staff's environmental and safety reviews. The Staff considered both vertical confinement and containment of horizontal migration of contaminants in analyzing environmental impacts on surface waters. The Staff also considered whether there was evidence of faults at or near the CBR facility, and gave specific consideration to the role of the White River structural feature in potential communication among aquifers and thus potential environmental impacts. The Staff summarizes its position below, with specific references to portions of its testimony where the Staff's experts address these issues in depth.

a. The Staff thoroughly evaluated the hydraulic confinement between the mined aquifer and the surface aquifer

As explained in the Staff's testimony, aquifer confinement was considered in both the Staff's safety and environmental reviews. In those reviews, the Staff considered information in the LRA, operational monitoring reports, relevant portions of CBR's applications for an NRC license amendment and NDEQ permits associated with the NTEA, and geological literature.¹³⁶ As the Staff explains, there are several site-specific lines of evidence that support its conclusion

¹³⁴ LBP-15-11 at 25-26.

¹³⁵ LBP-15-11 at 19. The Board found EA Contention 10 on cumulative impacts partially admissible, stating that because the Pine Ridge Reservation lies within 50 miles of all of the proposed CBR expansion areas, "[a]dditional analysis on the cumulative impacts with respect to EJ may be necessary." *Id.* at 39-40, 61.

¹³⁶ Ex. NRC-001 at A.D.3.

that the Basal Chadron Sandstone aquifer is hydraulically isolated (confined) from the Brule aquifer. First, as described in Sections 3.4.1 and 3.5.2.3.2 of the EA, the upper confining units are at least 200 feet thick over the wellfields, contain significant amounts of clay, and have extremely low hydraulic conductivities.¹³⁷ Site-specific cross sections also indicate that the upper confinement is also continuous across the site.¹³⁸ Second, as discussed in Section 3.5.2.3.1 of the EA, CBR has performed four aquifer pumping tests, covering the entire License Area, that demonstrate the integrity of the upper confining layers and the hydraulic isolation of the Basal Chadron Sandstone from the overlying Brule aquifer.¹³⁹ Third, since ISR operations began, the potentiometric surface Basal Chadron Sandstone aquifer has decreased by 14 meters (47 feet) with very little change over the same time period in the potentiometric surface of the Brule aquifer.¹⁴⁰ Fourth, as noted in Section 4.13.6.2 of the EA, there are distinct geochemical differences in the water in the Basal Chadron Sandstone and Brule aquifers that have remained during ISR operations.¹⁴¹ And finally, vertical excursions detected in the Brule aquifer have not been linked to issues with integrity of confining layers.¹⁴²

b. The OST has failed to demonstrate that communication between the mined aquifer and the drinking water aquifer is possible

Although the OST generally asserts that there is communication between the mined aquifer and the drinking water aquifer at the Pine Ridge Reservation, the OST does not describe a specific pathway by which such communication could occur. Dr. LaGarry provides only

¹³⁷ Ex. NRC-001 at A.D.3.

¹³⁸ Ex. NRC-001 at A.D.3.

¹³⁹ Ex. NRC-001 at A.D.3.

¹⁴⁰ Ex. NRC-001 at A.D.3.

¹⁴¹ Ex. NRC-001 at A.D.3.

¹⁴² Ex. NRC-001 at A.D.3.

general assertions that contaminants can be transmitted through spills, migration in the mined aquifer, and through faults.

The Staff addressed transmission of contaminants through spills in A.C.4 in its testimony on Contention C (discussed in Section B.1 above). The Staff addressed vertical confinement of the mined aquifer, which prevents transmission of contaminants from the Basal Chadron Sandstone aquifer to overlying aquifers, in A.D.3 (discussed in Section C.1 above). In Sections 3.5.2.3, 4.6.1.2, and 4.6.2.2 of the EA, and in its testimony, the Staff discusses the bases for concluding that there is no vertical communication between the Basal Chadron Sandstone aquifer and the overlying Brule aquifer at the CBR site. Finally, the Staff explains in A.D.4 why contaminants cannot migrate through the Basal Chadron Sandstone aquifer from the CBR License Area to the Pine Ridge Reservation.¹⁴³ First, as described in Section 4.6.2.2.1 of the EA, ISR operations at the CBR facility create an inward hydraulic gradient, and monitoring of perimeter wells in the mined aquifer provides early detection and opportunity to correct excursions.¹⁴⁴ Second, the Basal Chadron Sandstone pinches out to the east-northeast of the CBR facility.¹⁴⁵ The remainder of the Chadron Formation between the pinch out and the Pine Ridge Reservation consists of low permeability siltstones and mudstones that form a barrier to flow at least 25 miles long.¹⁴⁶ This low-permeability barrier separates the Basal Chadron Sandstone aquifer in the CBR License Area from the aquifers that supply water to the Pine Ridge Reservation.¹⁴⁷ Finally, the Staff also explains that the primary drinking water aquifers on

¹⁴³ Ex. NRC-001 at A.D.4

¹⁴⁴ Ex. NRC-010 at 75.

¹⁴⁵ Ex. NRC-001 at A.D.4 (citing Ex. CBR-011 at 2-111; Ex. NRC-023 at Plate 1).

¹⁴⁶ Ex. NRC-001 at A.D.4 (citing Ex. NRC-030 at 279).

¹⁴⁷ Ex. NRC-001 at A.D.4.

the Reservation are the Arikaree and Ogalalla aquifers, while the White River Group, which includes the Chadron Formation, is not an aquifer at the Reservation.¹⁴⁸

Dr. LaGarry also asserts that the ISR process itself can create faults through the dissolution of uranium. However, as the Staff explains, any increase in permeability associated with that process would be limited to the mined aquifer, and would not change the overlying confinement.¹⁴⁹ In addition, in the Staff's view, dissolution of uranium associated with a reduction in potentiometric head (the situation that exists in the Basal Chadron Sandstone aquifer at the CBR facility) would not cause a fault to move.¹⁵⁰

- c. The Staff thoroughly evaluated the White River structural feature and its possible effects on confinement and containment of fluids at the CBR facility

The OST and Dr. LaGarry assert that faults, particularly the White River structural feature, are potential pathways for contaminants to reach the White River and the Pine Ridge Reservation. Although the Staff agrees that, in general, faults and joints exist in northwestern Nebraska, the Staff has not seen any site-specific data indicating that significant fractures or joints connect the confining layers in the vicinity of the CBR facility.¹⁵¹ In contrast, there is ample evidence of vertical confinement at the site, indicating the absence of faults or other connections between aquifers.¹⁵² As the Staff explains in its testimony, the only field-documented structural feature near the CBR facility is the White River structural feature, which is two miles from the northwest boundary of the License Area.¹⁵³

¹⁴⁸ Ex. NRC-001 at A.D.4 (citing Ex. NRC-025 at 2, Ex. NRC-026 at 2).

¹⁴⁹ Ex. NRC-001 at A.D.14

¹⁵⁰ Ex. NRC-001 at A.D.15.

¹⁵¹ Ex. NRC-001 at A.D.5

¹⁵² Ex. NRC-001 at A.D.3.

¹⁵³ Ex. NRC-001 at A.D.7

In order for contaminants to be transmitted through the White River structural feature, they would have to migrate at least two miles from the CBR License Area to the feature. As the Staff explains, even if such migration were possible, both the Staff and the NDEQ have concluded that the White River feature does not affect the hydraulic confinement of the Basal Chadron Sandstone aquifer.¹⁵⁴ In its testimony, the Staff identifies several reasons supporting its conclusion that the White River feature does not affect hydraulic confinement, including three-dimensional geological modeling based on geophysical logs, differences in vertical gradient and potentiometric surfaces near the feature, an aquifer pumping test in the area of the feature, and geochemical variations between the Basal Chadron Sandstone and Brule aquifers.¹⁵⁵ The Staff also describes in its testimony the reasons that NDEQ reached a similar conclusion, including the 3D modeling, drill hole data showing no evidence of faults or contamination pathways, flowing artesian conditions in the proposed NTEA, CBR's 2006 pumping test for the NTEA, and review by independent experts concluding CBR's interpretation was plausible.¹⁵⁶

As discussed in Section 3.5.2.3.3 of the EA, the Staff also performed ground-water modeling and maximum likelihood analysis to further validate its conclusions about the White River feature. The model input included geological layers developed using borehole data from CBR's NTEA license amendment application because the White River feature is located along the southern boundary of the proposed NTEA.¹⁵⁷ Additional inputs to the model, including well boring log data, hydraulic properties of the geologic units, well water level data, and boundary conditions were all based on field data obtained from the NTEA license amendment

¹⁵⁴ Ex. NRC-001 at A.D.9, A.D.17

¹⁵⁵ Ex. NRC-001 at A.D.17.

¹⁵⁶ Ex. NRC-001 at A.D.9.

¹⁵⁷ Ex. NRC-001 at A.D.20.

application.¹⁵⁸ Data for the main CBR facility were not used in the model because they did not cover the area of the White River feature, which is 2 miles from the northern boundary of the main facility.¹⁵⁹ As the Staff explains in its testimony, the modeling was performed to provide support for the Staff's conclusion that there is no hydraulic connection between the Basal Chadron Sandstone aquifer and the Brule aquifer even outside of the License Area.¹⁶⁰ As explained in the EA, the Staff's modeling results do support this conclusion. However, given the other lines of evidence supporting hydraulic isolation, the modeling is not essential to the Staff's conclusions about the White River feature or its conclusions regarding environmental impacts.¹⁶¹

2. Environmental Justice

In EA Contention 3, the intervenors asserted that the Staff's environmental justice (EJ) analysis was inadequate because the Staff limited its review area to a radius of 4 miles around the CBR facility, did not identify any minority or low-income populations, and found no need to perform a more detailed analysis.¹⁶² The intervenors supported their claim by citing Dr. LaGarry's claims that contaminants from CBR's operations have the potential to impact water at the Pine Ridge Reservation.¹⁶³ In partially admitting this contention and merging it with OST Contention D, the Board identified the issue as follows: "whether the Staff's analysis of EJ, including its analysis of cumulative effects, should be expanded to consider potential impacts on the aquifer that provides drinking water to the Pine Ridge Reservation."¹⁶⁴

¹⁵⁸ Ex. NRC-001 at A.D.20 (citing NRC-009 at 25).

¹⁵⁹ Ex. NRC-001 at A.D.20, Ex. NRC-010 at 38.

¹⁶⁰ Ex. NRC-001 at A.D.21.

¹⁶¹ Ex. NRC-001 at A.D.3, A.D.21.

¹⁶² OST New Contentions at 47.

¹⁶³ OST New Contentions at 45-46.

¹⁶⁴ LBP-15-11. at 61.

a. The Staff Appropriately Chose the Area of Review for Environmental Justice

When considering EJ as part of its NEPA process, the NRC “makes an effort to become aware of the demographic and economic circumstances of local communities where nuclear facilities are to be sited, and take care to mitigate or avoid special impacts attributable to the special character of the community.”¹⁶⁵ In NRC practice, “[t]he essence of an [EJ] claim . . . is disparate environmental harm.”¹⁶⁶ Moreover, the NRC considers EJ implications “only when disparate environmental effects are ‘high and adverse.’”¹⁶⁷

As stated in Section 4.9 of the EA, the Staff followed the guidance in NUREG-1748, Appendix C, in choosing a 4-mile area of review. As noted in the Staff’s testimony, the guidance in NUREG-1748 was explicitly endorsed by the Commission in its 2004 policy statement on environmental justice.¹⁶⁸ As such, while not binding on a licensing board, it should be accorded special weight commensurate with its status as Commission-endorsed guidance.¹⁶⁹ The Staff explains in its testimony that the first step in an EJ analysis is to select an area review. The guidance in NUREG-1748, Appendix C, states that for materials facilities located in rural areas, a radius of 4 miles should be used. In the 2004 policy statement, the Commission specifically endorsed the procedures for materials facilities as articulated in office guidance (i.e.,

¹⁶⁵ *Private Fuel Storage, LLC* (Independent Spent Fuel Storage Installation), CLI-02-20, 54 NRC 147, 156 (2002)

¹⁶⁶ *Id.* at 156.

¹⁶⁷ *Id.* at 154; see also *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Station, Units 2 and 3), CLI-15-6, 81 NRC ____ (slip op. at 51) (March 9, 2015) (agencies are to examine “disproportionately high and adverse” impacts to EJ populations).

¹⁶⁸ Ex. NRC-001 at A.D.27.

¹⁶⁹ *Nextera Energy Seabrook, LLC* (Seabrook Station, Unit 1), CLI-12-05, 75 NRC 301, 314 n.78 (2012); *Yankee Atomic Elec. Co.* (Yankee Nuclear Power Station), CLI-05-15, 61 NRC 365, 375 n.26 (2005); *Private Fuel Storage LLC* (Independent Spent Fuel Storage Installation), CLI-01-22, 54 NRC 255, 264 (2001). In its recent decision in the Indian Point license renewal proceeding, the Commission reiterated that Staff guidance documents do not have the force of law, but they are entitled to special weight and should not lightly be set aside in favor of a board’s own determination without sufficient justification. *Indian Point*, CLI-15-6, 81 NRC ____ (slip op. at 21-22 & n.85).

NUREG-1748, Appendix C) and stated that this guidance should be sufficient in most cases to include all areas with actual or potential impacts.¹⁷⁰

As explained in its testimony, the Staff had no basis to deviate from the 4-mile guideline for this license renewal action. The Staff explains that its decision was informed, in part by the 24-year operating history of the CBR facility without evidence of environmental impacts, which the Staff is aware of through its regulatory oversight activities such as inspections and report reviews.¹⁷¹ With respect to potential surface or groundwater impacts in particular, the Staff cited the semiannual effluent and environmental monitoring reports it receives from CBR that provide data on surface and groundwater quality.¹⁷² The Staff also noted that it did not identify any information during the environmental review process that suggested a reason to use a larger review area.¹⁷³

The Staff also explains that the guidance in NUREG-1748 acknowledges that the Staff might become aware of minority or low-income populations by means other than demographic data, and if the Staff believes such a population would be adversely affected, it can proceed with an EJ review.¹⁷⁴ In this case, the Staff was aware of the OST at the Pine Ridge Reservation, but determined based on the distance from the facility to the reservation that the residents would not be adversely affected.¹⁷⁵

¹⁷⁰ Ex. NRC-001 at A.D.27.

¹⁷¹ Ex. NRC-001 at A.D.27.

¹⁷² Ex. NRC-001 at A.D.27.

¹⁷³ Ex. NRC-001 at A.D.27.

¹⁷⁴ Ex. NRC-001 at A.D.27.

¹⁷⁵ Ex. NRC-001 at A.D.27.

- b. Even if Staff had expanded the area of review, the Staff appropriately determined that impacts would be insignificant and there would therefore be no EJ impacts

As explained in the Staff's testimony, even if a minority or low-income population is identified within an area of review, EJ analysis would only proceed if impacts are determined to be significant.¹⁷⁶ Thus, any further EJ analysis respect to potential impacts on drinking water at the Pine Ridge reservation would have required the Staff to determine that there would be significant impacts to surface or ground water quality from the relicensing of the CBR facility. As discussed in the Staff's testimony, these potential impacts were addressed in Section 4.6.2.2 of the EA,¹⁷⁷ and are also discussed at length in the Staff's testimony on Contention C and the hydrogeology testimony in Contention D.¹⁷⁸ In particular, the Staff considered Dr. LaGarry's concerns regarding various potential contamination pathways during its review.¹⁷⁹ As stated in NUREG-1748, if impacts are not significant, there can be no disproportionately high and adverse impacts on an EJ population.¹⁸⁰ Because the Staff concluded based on its analysis that impacts would be small, and hence not significant, there was no basis to expand the EJ review area based on potential impacts to surface or groundwater at the Pine Ridge Reservation.

- c. The Staff appropriately assessed cumulative effects for EJ

In Section 4.13.9, the Staff explained its approach to cumulative impacts related to EJ. The Staff explained that, applying the same 4-mile review area, demographic analyses for the three proposed CBR expansion areas would yield similar results as the demographic analysis

¹⁷⁶ Ex. NRC-001 at A.D.28.

¹⁷⁷ Ex. NRC-010 at 74-81.

¹⁷⁸ Ex. NRC-001 at

¹⁷⁹ Ex. NRC-001 at A.D.3 to A.D.15.

¹⁸⁰ See *Indian Point*, CLI-15-6, 81 NRC at ____ (slip op. at 51) (explaining the "disproportionately high and adverse" standard in the context of significance).

for the license renewal, and no further EJ analysis would be needed. In its testimony, the Staff notes that the environmental reviews for two license amendments for proposed expansion areas have not yet been completed, and the NRC does not have an application under review for the third. Although the Staff has not yet determined whether those license amendments would result in significant impacts, for the purposes of estimating cumulative effects for the license renewal, the Staff considered two factors. First, the license amendments would not be approved unless the regulatory requirements of 10 CFR Part 40, and the acceptance criteria in NUREG-1569, including those related to geology and hydrology, are satisfied. Second, the Staff has considerable knowledge of operating experience at the CBR facility and other ISR facilities. This was a reasonable basis for the Staff to conclude, for the purposes of cumulative impact analysis, that a 4-mile radius for the review area was appropriate and that there would be no disproportionately high and adverse impacts to the residents of the Pine Ridge Reservation.

3. Conclusion

In summary, the Staff's analysis of environmental impacts on water quality included a detailed assessment of vertical confinement and horizontal containment of the Basal Chadron Sandstone aquifer at the CBR site. In analyzing environmental impacts, the Staff addressed the various pathways that Dr. LaGarry proposed for contaminants to escape the CBR License Area and reach the Pine Ridge Indian Reservation. The Staff considered whether faults at or near the CBR facility could contribute to impacts, and gave specific consideration to the role of the White River structural feature as a potential pathway among aquifers. Based on a thorough review, the Staff concluded that there would be no significant impacts to water quality and provided sufficient discussion of its reasons in the EA to satisfy NEPA requirements.

With regard to EJ, the Staff appropriately selected the EJ review area consistent with Commission-endorsed guidance, and had no basis to deviate from the recommended 4-mile review area in their EJ analysis for the CBR license renewal or for the cumulative impacts

analysis. The Intervenor has not shown that there will be significant environmental impacts on water quality from continued operations of CBR's ISR facility, and, as stated above, the Staff concluded that there would be no significant impacts to water quality. Accordingly, there can be no "disproportionately high and adverse" impacts to address in the context of EJ. For these reasons, the Board should find in favor of the Staff on Contention D.

D. Contention F: The Staff Properly Considered Recent Geological Research in its Environmental Review

In Technical Contention F, which has been migrated to the EA, CI argue that the Staff failed to include recent research in its analysis of environmental impacts. In support of this contention, CI provided a 2008 expert opinion from Dr. Hannan LaGarry, an updated 2015 opinion from Dr. LaGarry, and an April 2007 letter from the Nebraska Department of Environmental Quality (NDEQ) to CBR, which contained preliminary technical review comments on an aquifer exemption petition filed by CBR for the North Trend Expansion Area (NTEA). In his 2008 and 2015 opinions, Dr. LaGarry provides two specific bases for this contention: first, that the Staff improperly applied the "layer cake concept" which overestimates thickness and areal extent of stratigraphic units, and second, that the Staff ignored recent interpretations of the stratigraphic formations at and near the CBR facility and continued to use "outdated nomenclature" in referring to the stratigraphic units.¹⁸¹ Similarly, in referring to the April 2007 NDEQ letter, CI claim that the failure to use recent research is the same criticism NDEQ made in its 2007 letter: "[CBR] continues to use obsolete nomenclature and old information" to support its views that there is adequate confinement between the mined aquifer and other aquifers.¹⁸²

¹⁸¹ Ex. INT-003 at 3, Ex. INT-013 at 4.

¹⁸² Petitioners' Consolidated Reply to Applicant and NRC Staff Answers to Consolidated Petition to Intervene (Sept. 3, 2008) at 56.

Sections 3.4.1 and 3.5.2 of the EA discuss regional and local geology and hydrogeology.¹⁸³ In its testimony, the Staff recognizes that the subsurface stratigraphy at the CBR site consists of many layers, some of which are discontinuous.¹⁸⁴ The Staff goes on to explain that analysis of ground water flow systems involves grouping of stratigraphic units with similar hydrogeological properties into hydrostratigraphic units (i.e., aquifers and aquitards) which are used to characterize ground water flow behavior.¹⁸⁵ To assess the thickness and areal extent of hydrostratigraphic units at the CBR site, the Staff examined site-specific cross sections obtained from geophysical logs that cover the entire license area.¹⁸⁶ In its testimony, the Staff summarizes the hydrostratigraphic units revealed through examination of cross section data and states that those data support a hydrostratigraphic “layer cake model” of the subsurface at the CBR site.¹⁸⁷ Therefore, while Dr. LaGarry generally asserts generally that the “layer cake model” does not apply, the evidence provided by site-specific cross sections, cited in the Staff’s testimony, contradict his claim.

With regard to nomenclature, as explained in the testimony, the Staff reviewed regional and site geology as part of its safety review for the CBR license renewal, and discussed its findings in Sections 2.3.3.1 and 2.3.3.2 of the SER.¹⁸⁸ During that review, the Staff was aware of Dr. LaGarry’s proposed lithostratigraphic revisions, as well as the nomenclature issues raised in the April 2007 NDEQ letter, and specifically considered the issue.¹⁸⁹ As explained in the testimony, the Staff’s review revealed that the United States Geological Survey (USGS) does

¹⁸³ Ex. NRC-001 at A.F.2.

¹⁸⁴ Ex. NRC-001 at A.F.5

¹⁸⁵ Ex. NRC-001 at A.F.5.

¹⁸⁶ Ex. NRC-001 at A.F.5

¹⁸⁷ Ex. NRC-001 at A.F.5

¹⁸⁸ Ex. NRC-001 at A.F.2.

¹⁸⁹ Ex. NRC-001 at A.F.6.

not use the revised nomenclature identified by Dr. LaGarry (in particular, the Chamberlain Pass Formation) in the state of Nebraska.¹⁹⁰ Therefore, because the USGS is the federal authority on geological nomenclature, the Staff chose to retain the currently used and accepted USGS nomenclature in the SER, and later in the EA.¹⁹¹ In addition, as the Staff notes in its testimony, although NDEQ raised several questions about nomenclature in its April 2007 letter, NDEQ ultimately granted the aquifer exemption for the NTEA, and in doing so, retained the original “Basal Chadron” nomenclature.¹⁹² As the Staff explains, NDEQ’s concerns were addressed by correlating the historical nomenclature with the more recent interpretations proposed by Dr. LaGarry and others, and NDEQ decided that continued use of “Basal Chadron sandstone” to refer to the mined aquifer would be consistent with historical permitting and would prevent confusion.¹⁹³

Finally, although not a basis put forth by CI in their pleadings, in admitting this contention the Board cited another example of what it considered to be a failure to use recent research.¹⁹⁴ This example is a statement by Dr. Paul Robinson of the Southwest Research and Information Center that criticized the LRA for referring to two outdated Environmental Protection Agency documents.¹⁹⁵ Mr. Robinson’s statement did not identify the section of the LRA containing these references, nor did it provide any further discussion of the relevance or purpose of those

¹⁹⁰ Ex. NRC-001 at A.F.6.

¹⁹¹ Ex. NRC-001 at A.F.6.

¹⁹² Ex. NRC-001 at A.F.6.

¹⁹³ Ex. NRC-001 at A.F.6.

¹⁹⁴ LBP-08-24 at 739. Mr. Robinson’s review was attached to the CI Petition but was not cited in support of Technical Contention F, either in the original petition or the reply. In affirming the Board’s decision to admit this contention, the Commission noted that the Board’s “brief reference” to Dr. Robinson’s report, attached to the petition but not specifically referenced in the contention, was of “minimal significance” in admitting the contention. CLI-09-9 at 358. The Commission described the contention as a “claim that the application’s description of geology and seismology of the area does not include up-to-date research on the subject.” *Id.* at 357.

¹⁹⁵ Ex. INT-005.

documents. As discussed in the Staff's testimony, a search of the LRA revealed that these documents are mentioned only once, in a list of references to Section 2.9 of the LRA.¹⁹⁶ As the Staff further explains, Section 2.9 presents historical data on the original 1987 baseline water quality monitoring performed by CBR (then Ferret Exploration Co.) in conjunction with their original license application, and the two EPA documents are not actually cited in the text of Section 2.9.¹⁹⁷ Therefore, it appears that the LRA is referring to documents in use at the time of the original baseline measurements were taken, and that the documents were referenced in the LRA for historical context.¹⁹⁸

In summary, CI has not demonstrated that the Staff failed to include recent research in the EA. On the contrary, as explained above, the Staff relied on site-specific information that supported a "layer-cake model" of hydrostratigraphic units at the CBR site. Furthermore, the Staff specifically considered the nomenclature revisions proposed by Dr. LaGarry and had a sound basis for deciding not to adopt them. And, as the Staff explained in its testimony, "[t]he choice of nomenclature has no effect whatsoever on the evaluation of hydrogeology and environmental impacts on surface and ground water."¹⁹⁹ Finally, CI did not put forth the statement by Mr. Robinson in support of Contention F, and, in any event, neither CI nor Mr. Robinson provided any specific explanation as to the relevance or importance of the fact that the cited EPA documents were outdated. As the Staff suggests in its testimony, it appears the documents were cited only for historical context. For these reasons, the Board should find in favor of the Staff with regard to CI Technical Contention F.

¹⁹⁶ Ex. NRC-001 at A.F.9.

¹⁹⁷ Ex. NRC-001 at A.F.9.

¹⁹⁸ Ex. NRC-001 at A.F.9.

¹⁹⁹ Ex. NRC-001 at A.F.7.

E. Contention 1: The Staff Satisfied Its Obligations to Meaningfully Consult with OST, and the Cultural Resource Surveys Relied on in the EA Form a Sufficient Basis for the EA's Conclusions

1. The Staff Meaningfully Consulted with OST as Required by the NHPA

The Intervenor argues that the Staff failed to meaningfully consult with OST. In admitting this portion of the contention, the Board stated that whether the Staff meaningfully consulted with OST is an issue of law “without factual dispute.”²⁰⁰ To inform the Board's disposition of this argument, the Staff's consultation efforts are detailed in the testimony of Nathan Goodman, Paul Nickens, and Mirabelle Shoemaker, and associated exhibits.²⁰¹

Ultimately, the Staff complied with its obligation to make a reasonable and good-faith effort to consult with OST, as defined by ACHP regulations. The Staff both (1) made a reasonable and good-faith effort to identify Tribes that may be affected by the CBR license renewal and (2) offered OST a reasonable opportunity to “identify its concerns about historic properties, advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance, articulate its views on the undertaking's effects on such properties, and participate in the resolution of adverse effects.”²⁰²

The Staff consulted several sources to identify potentially-affected Tribes. First, the Staff reviewed ongoing consultation efforts for nearby ISR projects to determine which Tribes had expressed interest in participating as a consulting party in similar nearby efforts. The Staff also consulted contracted and in-house cultural resources and Tribal specialists for input on which additional Tribes would likely be interested in the CBR license renewal. Finally, the Staff consulted all Tribes who had agreed to participate as a consulting party for input on whether they knew of any additional Tribes interested in the CBR facility. At no point did the Staff refuse

²⁰⁰ LBP-15-11 at 16.

²⁰¹ Ex. NRC-001 at A.1.1-A.1.12; *see also* Ex. NRC-038.

²⁰² 36 C.F.R. § 800.2(c)(2)(ii)(A).

a Tribal request to participate in consultation, and the Staff kept the process open to new Tribes throughout Section 106 consultation.²⁰³ As a whole, these efforts constitute a reasonable and good-faith effort to identify potentially-affected Tribes.

The Staff also offered OST a reasonable opportunity to identify its concerns, provide advice, and articulate its views regarding the CBR license renewal's potential impact to cultural resources. The Staff communicated with OST on a regular basis and dozens of occasions throughout the Section 106 consultation process through multiple avenues, including letters, phone calls, teleconferences, and face-to-face meetings.²⁰⁴ The Staff solicited comments from Tribes at face-to-face meetings and also accepted comments on documents or project developments in writing, electronically, or via phone call.²⁰⁵ And the Staff incorporated comments and suggestions from the Tribes into its Section 106 consultation. For example, the Staff granted Tribal requests for face-to-face meetings (including one at the Pine Ridge Reservation), a Traditional Cultural Properties (TCP) survey, and additional site visits to the CBR facility.²⁰⁶ Typically, however, while the Staff provided OST and other Tribes the opportunity to identify concerns and provide input, OST "almost never responded to a formal consultation letter where comments were solicited."²⁰⁷ In fact, OST did not engage in plans to develop a process for identifying cultural properties, nor did the Tribe submit comments on the result of the 2012 TCP survey of the CBR facility and proposed expansion areas—two critical pieces of the Staff's Section 106 consultation.

²⁰³ Ex. NRC-001 at A.1.2.

²⁰⁴ Ex. NRC-038.

²⁰⁵ Ex. NRC-001 at A.1.7.

²⁰⁶ *Id.*

²⁰⁷ Ex. NRC-001 at A.1.9.

As part of its complaint, the Intervenor argues that the NRC failed to consult with OST on a government-to-government basis. Under the ACHP regulations, an agency's consultation with a Tribe "must recognize the government-to-government relationship between the Federal Government and Indian tribes," and the agency "shall consult with representatives designated or identified by the tribal government" ²⁰⁸ NUREG-2173, the NRC Tribal Protocol Manual (TPM), contains further guidance on respecting the government-to-government relationship between the federal government and Tribal governments. ²⁰⁹ In fact, the TPM warns that "Tribal governments and leadership may take a more restrictive view of government-to-government consultation than the NRC." ²¹⁰ However, the TPM also makes clear that "[w]hen representatives of the Federal government and Tribal governments interact on issues within the scope of their authority, the interaction may be considered 'government-to-government,' and that "information-sharing meetings, presentations, preliminary discussions, introductory briefings, information-gathering sessions, teleconferences, written correspondence, and telephone conversations between staff-level employees" can all constitute government-to-government consultation. ²¹¹

The Staff consistently satisfied its obligation to consult on a government-to-government basis. For example, communications typically took the form of a certified letter sent to the Tribal President and copied to the THPO, with additional copy to the THPO via e-mail. ²¹² With respect to face-to-face meetings, the Staff emphasized to the Tribes that it would hold government-to-

²⁰⁸ 36 C.F.R. § 800.2(c)(2)(ii)(C).

²⁰⁹ Ex. NRC-047 at 9 (current revision of the TPM); *see also* Ex. NRC-046 at 5 (TPM version in effect at the time of the Staff's consultation efforts).

²¹⁰ Ex. NRC-047 at 14.

²¹¹ *Id.*

²¹² *See generally* Ex. NRC-038.

government face-to-face meetings in February 2012 and May 2013.²¹³ At the February 2012 meeting, both the OST President and the OST THPO were present, as well as two attorneys representing OST.²¹⁴ Though the OST President had informed the Staff that OST would be represented at the May 2013 meeting,²¹⁵ OST did not attend that meeting and did not respond to the Staff's attempts to follow up via phone.²¹⁶

2. The Surveys and Other Sources Relied on to Support the EA's Findings Regarding Impacts to Cultural Resources Satisfy NEPA's "Hard Look" Standard

As admitted by the Board, the sole factual dispute presented in Contention 1 is "whether the cultural surveys performed and incorporated into the EA formed a sufficient basis" for the EA's conclusions.²¹⁷ As demonstrated in the Staff's testimony and exhibits, the Staff conducted the "hard look" at impacts to cultural resources required by NEPA.

The Staff conducted several levels of review to identify potential cultural resources at the CBR facility and determine likely impacts to those resources. As a starting point, the Staff reviewed the Class III field inventories of the CBR license area conducted in 1982 and 1987,²¹⁸ in order to verify the extent and intensity of those inventories. This review determined that these inventories "covered the entire CBR development area in a professional and thorough manner."²¹⁹ While the Intervenor's argue that the age of these surveys is problematic, the Staff analyzed the potential for changing land surface conditions at the CBR facility and found that the conditions have remained stable, with the exception of ongoing mining operations that

²¹³ Ex. NRC-001 at A.1.11.

²¹⁴ Ex. NRC-042.

²¹⁵ Ex. NRC-044.

²¹⁶ Ex. NRC-001 at A.1.11.

²¹⁷ LBP-15-11 at 16.

²¹⁸ Ex. CBR-027; Ex. CBR-028.

²¹⁹ Ex. NRC-001 at A.1.15.

practice avoidance of known cultural site locations in accordance with CBR's license.²²⁰ One exception is archeological site 25DW198.²²¹ However, this site did receive additional subsurface testing in 2003.²²² Therefore, there is ample reason to conclude that the information reported in the 1982 and 1987 Class III inventories remains valuable today.

The Staff also conducted a literature review, which included the identification of documents relevant to the CBR project area as well as visits and interviews with government offices, museums, and other knowledgeable organizations or persons.²²³ And throughout the consultation process, the Staff solicited special knowledge of the potential for cultural resources at the CBR facility from interested Tribes. For instance, at the June 2011 face-to-face consultation meeting with interested Tribes, OST members identified several potential places of significance that they believed might be impacted by the CBR license renewal.²²⁴

In October 2012, to address Tribal concerns regarding supplementation of the original Class III inventories, the Staff and CBR invited all consulting Tribes to participate in a Traditional Cultural Properties (TCP) survey of the CBR facility and proposed expansion areas. OST did not accept the invitation, but two other consulting Tribes (the Crow Nation of Montana and the Santee Sioux Nation of Nebraska) did elect to participate. Representatives from each Tribe, accompanied by a CBR representative and a representative for the NRC Staff, conducted field inventories of the CBR facility and proposed expansion areas between November 14 and December 1, 2012. Participating Tribes retained decision-making authority regarding which areas should receive pedestrian inventory coverage, determining that because of the level of

²²⁰ Ex. NRC-012 at 6.

²²¹ Ex. NRC-001 at A.1.17.

²²² Ex. CBR-032; Ex. NRC-001 at A1.17.

²²³ Ex. NRC-001 at A.1.14; Ex. NRC-050; Ex. NRC-051A – NRC-051C.

²²⁴ Ex. NRC-050 at 10-24; Ex. NRC-001 at A1.13.

disturbance at the CBR facility, there was no need to conduct a pedestrian inventory of the current license area. The Tribal representatives conducted intensive Class III walkthroughs of the Marsland Expansion Area and undisturbed portions of the Three Crow Expansion Area. Weather conditions during the survey were favorable, with little to no snow cover. On days where snow cover impeded the survey, the participants waited until conditions improved before beginning again.²²⁵

The Santee Sioux Nation prepared a report of summarizing the results of the TCP survey, which the Staff distributed to all consulting Tribes with a request for comment. The Staff also posted to the NRC website a redacted version of the TCP report and NRC field survey, draft sections of the EA discussing cultural resources, and communications between the Staff and the Nebraska SHPO, so that the public (including consulting Tribes) had an opportunity to comment on how the Staff used the TCP survey results in its findings regarding cultural resources impacts.

The Staff considered all sources consulted, including the original inventories, the literature review, discussions with interested Tribes, and the Tribal TCP survey. Based on its identification of potential cultural resource locations and CBR's continued practice of avoidance under the terms of its license, the Staff determined that overall impacts to historic and cultural resources during the renewal period would not be significant.

The Staff conducted a comparison of its review of the impacts to cultural resources from this project to Staff reviews of similar ISR projects, including the Dewey Burdock, Ross, Nichols Ranch, Lost Creek, and Moore Ranch projects. Even though each of those projects involved EIS-level reviews, the Staff's review of this project met or exceeded the scope of review at similar ISR projects in all respects.²²⁶ The totality of the Staff's efforts to identify cultural

²²⁵ NRC-001 at A.1.19; NRC-053 at 1-2.

²²⁶ NRC-001 at A.1.25.

resources at the Crow Butte facility and assess likely impacts to those resources from renewal of CBR's license constitutes both the required reasonable and good faith effort to identify historic properties under the NHPA and the "hard look" mandated by NEPA.

F. Contention 6: The Staff Properly Concluded that Short-Term Impact to Groundwater Quantity From Aquifer Restoration are MODERATE

The Intervenor argues that the Staff violated NEPA by not concluding that the short-term environmental impact to groundwater quantity from CBR's restoration activities will be greater than MODERATE.²²⁷ In admitting this contention, the Board found that the Intervenor pled alleged facts that restoration of mine units is consuming more water than originally thought necessary, and in fact more than that described in the EA.²²⁸

The Staff's analysis of expected impacts to groundwater quantity from restoration activities constitutes the "hard look" mandated by NEPA, and the conclusion that such impacts will not be greater than MODERATE in the short term is appropriate and factually supported. A MODERATE impact, as defined in NUREG-1738, is "sufficient to alter noticeably, but not to destabilize important attributes of the resource."²²⁹ LARGE impacts are "clearly noticeable and are sufficient to destabilize important attributes of the resource."²³⁰ Because the Staff's analysis demonstrates that consumptive use from restoration is not expected to destabilize the groundwater quantity resource, its conclusion that such impacts will not be greater than MODERATE is appropriate.

The Staff began its analysis by considering the generic discussion of groundwater impacts in the GEIS, which states that impacts to groundwater associated with consumptive use during restoration are expected to be SMALL to MODERATE, depending on site-specific

²²⁷ CI New Contentions at 70; OST New Contentions at 84.

²²⁸ LBP-15-11 at 30-31.

²²⁹ Ex. NRC-048 at 4-14.

²³⁰ *Id.*

conditions.²³¹ Using this framework as a starting point, the Staff then analyzed conditions specific to the CBR facility, including factors such as the expected increase in consumptive use rates for restoration of the remaining mine units. To determine consumptive water use rates during mine unit restoration, the Staff performed a water balance analysis of the CBR facility, as described in the EA²³² and SER.²³³ This analysis found a historical average of consumptive use rates of approximately 105 gallons per minute (gpm). This rate is expected to increase as CBR restores remaining mine units—while CBR extracted nine pore volumes to restore Mine Unit 1, it may need to extract more than 11 pore volumes for the restoration of each remaining mine unit.

The Staff then compared the potentiometric surface of the Basal Chadron Sandstone aquifer prior to operations with the potentiometric surface in 2009 to determine drawdown levels.²³⁴ This analysis determined that the original potentiometric surface was approximately 300 to 500 feet above the ore zone. After several years of production, drawdown within the Basal Chadron Sandstone aquifer was approximately 47 feet, representing approximately 10% of the available height of water above the top of the aquifer. In a confined aquifer like the Basal Chadron Sandstone, drawdown and pumping rates are expected to have a linear relationship. Therefore, consumptive use rates would need to reach approximately 900 gpm for the potentiometric surface to decrease 400 feet to the top of the Basal Chadron Sandstone. Even given the expected increase in required pore volumes for restoration, consumptive use rates of 900 gpm—approximately nine times the historical average—are not realistic.²³⁵ Therefore, the Basal will likely remain saturated.

²³¹ Ex. NRC-045 at xlv-xlv.

²³² Ex. NRC-010 at 83.

²³³ Ex. NRC-009 at 41.

²³⁴ Ex. NRC-001 at A.6.9.

²³⁵ *Id.*

The Intervenor's argue that the short term impacts to ground water quantity from restoration are greater than MODERATE. But they provide no evidence challenging the Staff's analysis or suggesting that the Staff failed to take into account expected increases in consumptive use during restoration of remaining mine units. Most importantly, they provide no reasons to conclude that drawdowns will be sufficient to desaturate the aquifer and thus destabilize the resource—and thus no reason to find a short-term LARGE impact to ground water quantity from restoration. Consequently, the Board should resolve Contention 6 in favor of the Staff.

G. Contention 9: The EA Appropriately Discusses Mitigation Measures Where the Staff's Finding of No Significant Impact to Groundwater Quality or Quantity from Aquifer Restoration Activities Relies on Such Measures

In the portion of this contention as admitted by the Board, the intervenors argue that the EA's discussion of ground water restoration mitigation measures is inadequate. Mitigation measures are measures that are actively implemented to avoid, reduce, or redress adverse environmental effects.²³⁶ When an agency prepares an EA and FONSI that relies on mitigation measures, at least one NRC Board has found that "there must be some assurance that the mitigation measures constitute an adequate buffer against the negative impacts from the authorized activity to render such impacts so minor as to not warrant an EIS."²³⁷ Recent guidance from the CEQ agrees with this finding "where an agency chooses to base the use of

²³⁶ 40 C.F.R § 1508.20, defining "mitigation" as:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments.

²³⁷ *Detroit Edison Co.* (Fermi Nuclear Power Plant, Unit 3), LBP-12-23, 76 NRC 445, 467 (2012) (internal citations omitted).

less extensive NEPA analysis on mitigation.”²³⁸ Therefore, to the extent that the Staff’s conclusion that restoration impacts to groundwater quality and quantity will not be significant relies on mitigation measures, the EA must discuss the effectiveness of those measures. The Staff met this obligation here.

The Staff concluded that impacts to groundwater quantity from restoration activities will be no greater than MODERATE in the short-term and that such impacts will be SMALL overall. This conclusion is not based on the implementation of any mitigation measures.²³⁹ Rather, the short-term finding is justified by determining expected drawdown of the Basal Chadron Sandstone aquifer compared to the available water levels in the aquifer,²⁴⁰ and the long-term finding is justified by the Staff’s determination that those water levels will eventually naturally recover following restoration.²⁴¹ Because a natural process such as aquifer water-level recovery is not an active measure implemented to avoid, reduce, or redress impacts, it is not a “mitigation measure,” and the EA is not required to discuss it to the same degree as mitigation. However, the Staff did consider whether and over what time water levels in the aquifer will likely recover, given expected increases in drawdown during restoration of remaining mine units.²⁴²

Consequently, the Intervenor’s argument, as framed by the Board, that the EA fails to include a substantive analysis “of mitigating the effect of increased pore volumes” does not raise a deficiency in the EA. The Staff’s finding that impacts to groundwater quantity will not be significant does not assume mitigation of increased consumptive use rates. Therefore, the fact

²³⁸ Final Guidance for Federal Departments and Agencies on the Appropriate Use and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact, 76 Fed. Reg. 3,843, 3,844 (January 21, 2011).

²³⁹ Ex. NRC-001 at A.9.3; Ex. NRC-010 at 83.

²⁴⁰ See *supra* Section VI.F.

²⁴¹ Ex. NRC-001 at A.9.4.

²⁴² *Id.*

that the EA does not discuss mitigation of increased pore volumes does not constitute a deficiency in the EA.

The purpose of restoration activities, of course, is to positively impact groundwater quality in the restored aquifer. The Staff found that potential adverse impacts during restoration will likely be negligible. While this conclusion does rely on the implementation of certain mitigation measures, the Staff met its obligation to discuss the effectiveness of those measures in the EA. As discussed in Sections 4.6.2.2 and 4.6.2.3 of the EA, such measures include groundwater monitoring of excursion monitoring wells, pond leak detection systems, spill and leak detection programs including corrective actions, and liquid waste disposal monitoring.²⁴³ An NPDES permit, which governs surface water and discharge to soil limits at CBR, does not form the basis of a mitigation strategy with respect to groundwater quality.²⁴⁴ And the Intervenor's argument that restoration of Mine Unit 1 "proceeded beyond the point where significant improvement was possible with continuing treatment" does not raise a deficiency in the EA's discussion of mitigation measures.²⁴⁵ The scenario described by the Intervenor is precisely that governed by 10 C.F.R. Part 40, Appendix A, Criterion 5B(6)'s allowance for Alternative Concentration Limits (ACLs). To the extent that the Intervenor challenge restoration to ACLs because those limits are higher than baseline, their argument constitutes an impermissible general challenge to the NRC's regulations.²⁴⁶

Similarly, the Intervenor's argument that Nebraska permits restoration to uranium levels 54 times greater than baseline is misplaced.²⁴⁷ As the Staff has explained,²⁴⁸ the NRC no

²⁴³ Ex. NRC-010 at 74-83; Ex. NRC-001 at A.9.6.

²⁴⁴ Ex. NRC-001 at A.9.8.

²⁴⁵ CI Reply at 16-17.

²⁴⁶ 10 C.F.R. § 2.335(a).

²⁴⁷ CI Reply at 15.

longer applies “class of use,” a state water quality designation, as a secondary goal for ISR restoration. In 2009, the NRC issued Regulatory Issue Summary 2009-05, which informed licensees and applicants that they must commit to the restoration standards in 10 C.F.R. Part 40, Appendix A, Criterion 5B(5).²⁴⁹ Therefore, even if Nebraska state standards were relevant to the EA’s discussion of mitigation measures, they are inapplicable to CBR’s restoration of remaining mine units. Because the EA discusses those mitigation measures that are actually relied on to support the Staff’s findings regarding groundwater quality impacts, the Board should resolve Contention 9 in favor of the Staff.

H. Contention 12: The Staff Properly Determined that NEPA Does Not Require Specific Assessment of Impacts from Tornadoes or Selenium in Water Disposed of By Land Application

Contention 12 alleges that:

The Final EA omits a discussion of the impact of tornadoes on the license renewal area, and inadequately discusses the potential impacts from land application of ISL mining wastewater.²⁵⁰

Contention 12 was proffered in identical form by both the CI and the OST as a challenge to the adequacy of the Staff’s EA.²⁵¹ The Board found Contention 12 admissible in part.²⁵² With respect to the arguments deemed admissible by the Board in its admission in part of Contention 12, the intervenors first argue that the EA fails to analyze the foreseeable impact of . . . tornadoes . . . on the facility.”²⁵³ The intervenors also argue that the EA fails to “properly

²⁴⁸ Tr. at 806, 834.

²⁴⁹ Ex. NRC-061.

²⁵⁰ LBP-15-11 at 61.

²⁵¹ CI New Contentions at 94-97; OST New Contentions at 107-109.

²⁵² LBP-15-11 at 44.

²⁵³ CI New Contentions at 96; OST New Contentions at 108.

account” for the environmental impacts, in particular those to wildlife, from the “land application of ISL wastes” such as irrigation from a center pivot.²⁵⁴

Neither the CI nor the OST provided alleged facts or expert opinion in support of their claim regarding tornadoes; in admitting this aspect of Contention 12 as an argument of omission, the Board found that alleged facts or expert opinion to support this claim was not required.²⁵⁵ The Board also found that the intervenors pled an admissible contention of inadequacy and omission concerning land application of ISR wastewater and selenium contamination, and accordingly found that the intervenors provided alleged facts sufficient to admit this portion of Contention 12.²⁵⁶ This support, filed by the CI as exhibits with their submission on the EA, consisted of a letter and report by the U.S. Fish and Wildlife Service (FWS) on the topic of selenium contamination related to the land application of ISR mining wastewater.²⁵⁷

Due of the incongruent nature of the two different claims admitted under the umbrella of Contention 12, the Staff addresses each of these claims in turn.

1. Impacts Related to Tornadoes

In admitting Contention 12 in part, the Board found that “[i]n light of the fact that the agency has found wind events worthy of discussion in the EA (as they have a potential for adverse impacts), we would expect that any associated discussion would only be ‘reasonably complete . . . [were it to] properly evaluate the severity of the adverse effects.’”²⁵⁸ The Board

²⁵⁴ LBP-15-11 at 42 (quoting CI New Contentions at 67, 96; OST New Contentions at 81, 108).

²⁵⁵ See LBP-15-11 at 45.

²⁵⁶ LBP-15-11 at 46, 50.

²⁵⁷ See Exs. INT-018 and INT-019.

²⁵⁸ LBP-15-11 at 45 (quoting *Methow Valley Citizens Council*, 490 U.S. at 352) (internal references omitted). The Board specifically cited EA sections 3.3.4 (discussing wind monitoring on the site), 4.3.2 (noting that “[s]oil erosion due to wind at the CBR facility has the potential for adverse impacts”), and 4.4 (discussing air quality impacts from wind erosion).

specifically cited to EA sections 3.3.4 (discussing wind monitoring on the site), 4.3.2 (noting that “[s]oil erosion due to wind at the CBR facility has the potential for adverse impacts”), and 4.4 (discussing air quality impacts from wind erosion).²⁵⁹

First, the Staff acknowledges in its testimony that the EA does not contain a specific discussion of the potential environmental impacts related to a tornado strike at the Crow Butte facility.²⁶⁰ The Staff also acknowledges that the EA contains a discussion of the potential environmental effects of wind at the Crow Butte site, citing those sections identified by the Board in its memorandum and order admitting Contention 12 in part, and describes the EA’s assessment of the potential effects and mitigation measures employed related to wind effects.²⁶¹ However, as the Staff explains in A.12.2 of its testimony, while these sections of the EA discuss the site characteristics and potential environmental effects related to wind, they do not include a discussion of wind effects related to tornadoes.²⁶² The Staff explains that this is because (1) wind is a more pervasive meteorological feature at the Crow Butte site, and is commensurately more likely to present an identifiable environmental impact at the site than wind associated with a tornado, and (2) wind and tornadoes are different in nature.²⁶³ The difference is such that CBR engages in mitigative practices, such as the application of water to unpaved roads, to address the impacts of wind at the site; there are no such mitigative practices used to address the potential environmental impacts of tornadoes.²⁶⁴ There are no such mitigative practices used to address the potential environmental impacts of tornadoes.²⁶⁵ Indeed, as the Staff notes,

²⁵⁹ *Id.* (quoting Ex. NRC-010 at 23, 65-66, 66-68).

²⁶⁰ Ex. NRC-001 at A.12.3.

²⁶¹ Ex. NRC-001 at A.12.2.

²⁶² Ex. NRC-001 at A.12.2.

²⁶³ Ex. NRC-001 at A.12.2.

²⁶⁴ Ex. NRC-001 at A.12.2 (citing Ex. NRC-010 at 10-11, 66).

²⁶⁵ Ex. NRC-001 at A.12.2.

the NRC has generically considered the potential consequences of tornadoes at ISR facilities and determined that no changes to an ISR facility or operations would be required to mitigate these consequences.²⁶⁶ Consequently, it does not follow that because the EA assesses the potential environmental impacts of wind events at the Crow Butte facility, it must necessarily assess the impacts of wind events related to tornadoes as well in order to satisfy NEPA's "hard look" standard.

Indeed, the "hard look" standard invoked by the intervenors does not mandate that, in order to satisfy the requirements of NEPA, an agency must engage in a "hard look" at every conceivable event that may occur with respect to the proposed action. Rather, NEPA requires federal agencies to take a "hard look" at the environmental impacts of a proposed action, as well as reasonable alternatives to that action, as a whole.²⁶⁷ The purpose of this "hard look" is to "foster both informed agency decision-making and informed public participation" so as to ensure that the agency does not act upon "incomplete information, only to regret its decision after it is too late to correct."²⁶⁸ This "hard look" is, however, subject to a "rule of reason" in that an agency need not address "all theoretical possibilities" related to the environmental impacts of a proposed project, but rather only those that have some "reasonable possibility" of occurring.²⁶⁹

As the Staff explains in its testimony, it did not believe that the possibility of a tornado in the area of the Crow Butte facility necessitated a specific discussion of the potential environmental impact of tornadoes in the EA.²⁷⁰ The Staff's determination that the EA adequately assesses the potential environmental effects of the proposed action, notwithstanding

²⁶⁶ Ex. NRC-001 at A.12.2 (citing Ex. NRC-017 at 4-55 – 4-66).

²⁶⁷ See *La. Energy Servs., L.P.* (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 87S88 (1998).

²⁶⁸ *Id.* at 88 (quoting *Marsh v. Or. Natural Res. Council*, 490 U.S. 360, 371 (1989)).

²⁶⁹ *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-156, 6 AEC 831, 836 (1973).

²⁷⁰ Ex. NRC-001 at A.12.3.

the omission of a specific discussion of tornadoes, is supported by NRC guidance.²⁷¹ The Staff explains that NUREG-1748, which guides the Staff's environmental assessment of the renewal application, states that it may not be necessary for the evaluation of potential environmental impacts to require a discussion of severe weather phenomena such as tornadoes.²⁷²

Furthermore, the ISR GEIS assessed the meteorological conditions and potential environmental impacts for the area encompassing the Crow Butte site and, having considered public comments regarding tornadoes when the draft GEIS was issued for comment, chose not include a discussion of the impacts of tornadoes in the final GEIS.²⁷³ The GEIS notes, however, that a discussion of tornadoes may be warranted on a site-specific basis.²⁷⁴ While the EA does not explicitly tier from the GEIS in its discussion of wind impacts, the GEIS is still a source of information for the Staff's site-specific environmental review of an ISR project.²⁷⁵

In accordance with NUREG-1748 and the ISR GEIS, the Staff has identified no site-specific reason to include a specific discussion of the potential environmental impacts from a tornado at the Crow Butte site.²⁷⁶ As the Staff explains in A.12.4 of its testimony, the information that the Staff examined regarding tornadoes in the area of the Crow Butte facility indicated that tornadoes are a very low probability event. Specifically, the SER notes that CBR identified the probability of a tornado in the region near the Crow Butte facility is approximately 4.8×10^{-4} per year,²⁷⁷ and the LRA states that tornadoes are rare in the licensed area.²⁷⁸ This

²⁷¹ See Ex. NRC-001 at A.12.4.

²⁷² Ex. NRC-001 at A.12.4 (citing Ex. NRC-014 at 6-12).

²⁷³ Ex. NRC-001 at A.12.4 (citing Ex. NRC-045 at G-215).

²⁷⁴ Ex. NRC-001 at A.12.4 (citing Ex. NRC-045 at G-215).

²⁷⁵ Ex. NRC-045 at 1-28.

²⁷⁶ Ex. NRC-001 at A.12.4.

²⁷⁷ Ex. NRC-009 at 158.

²⁷⁸ Ex. CBR-011 at 2-72.

information did not indicate to the Staff that a site-specific assessment of tornadoes was warranted in this EA.²⁷⁹ As the intervenors have not provided any information to indicate otherwise, they have not established that the Staff has failed to comply with NEPA, the NRC's NEPA-implementing regulations, or other governing law.

2. Impacts Related to Land Application of Treated Process Wastewater

Contention 12, as admitted, also alleges that the EA inadequately discusses the potential impacts from land application of ISR mining wastewater. Specifically, the intervenors argue that the EA does not include any discussion of the potential environmental effects of selenium contamination, particularly on wildlife, from land application of ISR wastewater.²⁸⁰ As previously noted, in support of this claim, the intervenors refer to a letter from the FWS to the NRC, dated September 5, 2007, on the topic of selenium contamination associated with ISR mining.²⁸¹ The letter conveys comments on the draft ISR GEIS that was in development by the NRC at the time.²⁸² The letter relies upon a study of the effects of land application of ISR wastewater at an ISR facility in Wyoming which was also attached as an exhibit to the CI's submission.²⁸³

In admitting Contention 12 in part, the Board stated, referring to Sections 2.4 and 4.6.1.3 of the EA, that the Staff claimed that "a discussion of land application of ISL wastewater is not warranted, because Crow Butte is not pursuing the approach."²⁸⁴ In A.12.6 of its testimony, the Staff clarifies that it did in fact discuss the land application of treated ISR process wastewater.²⁸⁵

²⁷⁹ Ex. NRC-001 at A.12.4.

²⁸⁰ CI New Contentions at 68; OST New Contentions at 82.

²⁸¹ Ex. INT-018.

²⁸² *Id.* at 1.

²⁸³ See Ex. INT-018 at 1-2 (citing Ex. INT-019).

²⁸⁴ LBP-15-11 at 51 & n.275.

²⁸⁵ Ex. NRC-001 at A.12.4.

The Staff explains that land application is described in Sections 2.2.2 and 2.4.1 of the EA as an option available to CBR for disposal of treated process wastewater. The EA also describes the limitations applicable to CBR's current National Pollutant Discharge Elimination System (NPDES) permit from the NDEQ, notes that CBR will be required to apply for additional permits from the State of Nebraska for any land application activity that is not included in its existing permit, and relates that CBR has stated that it has no current plans for treating and discharging evaporation pond water under an NPDES permit.²⁸⁶

Furthermore, the Staff explains the EA describes the potential environmental impacts of the land application of wastewater.²⁸⁷ Section 4.6.1.3 of the EA describes the licensee's process for disposing of ISR process wastewater, which begins with treating the wastewater using a reverse osmosis unit to reduce the total dissolved solids and other constituents in the groundwater, which produces water with reduced constituents and brine. It then explains that CBR currently disposes of the treated wastewater and brine by injection of the wastes into the two waste disposal ponds and then into two NDEQ-permitted non-hazardous on-site deep disposal wells. The EA next explains that, in accordance with a license amendment issued by the NRC in 1993 and its NPDES permit, CBR is also permitted to use land application to dispose of the treated wastewater. The EA states that the licensee has not used the option and has not indicated that it will in the future.²⁸⁸ The EA concludes that the potential impacts to surface water resources during the restoration phase of the Crow Butte project, as well as the potential impacts to wildlife from relicensing of the Crow Butte project, would be SMALL.²⁸⁹ Consequently, as the EA describes the land application as an option for treated wastewater

²⁸⁶ Ex. NRC-001 at A.12.6 (citing Ex. NRC-010 at 12-13).

²⁸⁷ Ex. NRC-001 at A.12.6.

²⁸⁸ Ex. NRC-001 at A.12.6 (citing Ex. NRC-010 at 72-73).

²⁸⁹ Ex. NRC-001 at A.12.6 (citing Ex. NRC-010 at 73, 94-98).

disposal and assesses the potential environmental impact associated with it, the EA provides the information required under NEPA.

The intervenors claim that a specific discussion of the impacts of selenium present in wastewater that may be disposed of by land application is necessary to take a “hard look” at the impacts of the Crow Butte project. However, they have not shown why this is the case. As the Staff explains, the EA describes the potential environmental impacts from restoration activities at the Crow Butte site, including land application of treated process wastewater.²⁹⁰ The EA’s assessment of the potential environmental impacts of restoration, including land application of treated process wastewater, is therefore bounding for all constituents that may be present in the treated wastewater, including selenium. In other words, by describing the impacts associated with the disposal of treated process wastewater, the EA necessarily accounts for the impacts associated with each constituent present in that water.²⁹¹ To require the Staff to separately assess each constituent present in the treated process wastewater, where all of these constituents are already assessed collectively, would amount to no more than “flyspecking” the EA for deficiencies that are insignificant to the goal of informed decisionmaking.²⁹²

Furthermore, the intervenors have not provided information to indicate that a specific assessment of selenium in the EA would cause the Staff to alter its conclusion that the potential environmental impacts from restoration would be SMALL.²⁹³ As the Staff explains in A.12.7 of its testimony, pursuant to Condition 10.17 of CBR’s license, the concentration of selenium in the

²⁹⁰ Ex. NRC-001 at A.12.6.

²⁹¹ Ex. NRC-001 at A.12.7.

²⁹² Courts may not “flyspeck” an agency’s environmental analysis, looking for any deficiency, no matter how minor. See, e.g., *Fuel Safe Washington v. FERC*, 389 F.3d 1313, 1323 (10th Cir. 2004) (describing the court’s inquiry as “deciding whether claimed deficiencies in a FEIS are merely flyspecks, or are significant enough to defeat the goals of informed decision making and informed public comment”) (quotation marks omitted); *Half Moon Bay Fishermans’ Mktg. Ass’n v. Carlucci*, 857 F.2d 505, 508 (9th Cir. 1988) (“The reviewing court may not ‘flyspeck’ an EIS.”).

²⁹³ See Ex. NRC-010 at 73, 94-98.

process wastewater that Crow Butte is permitted to dispose of by land application cannot exceed a level equivalent to the EPA's maximum contaminant levels (MCLs) for selenium in drinking water.²⁹⁴ As the Staff explains, the EPA has set an MCL for selenium at 0.05 mg/L, which is based on the best available science to prevent potential health problems.²⁹⁵ Notably, the EPA's enforceable MCL for selenium is also equal to the EPA's health goal for selenium in drinking water, which is based solely on possible health risks and exposure over a lifetime with an adequate margin of safety.²⁹⁶ Moreover, as noted in the EA, CBR possesses an NPDES permit for land application issued and enforced by the NDEQ.²⁹⁷ It is appropriate for the Staff to give substantial weight to NDEQ's decision that issuing the permit would be environmentally acceptable.²⁹⁸

Nor do the FWS letter and study submitted by the provide support for the claim that NEPA mandates a separate assessment of selenium in treated process wastewater. The FWS study cited by the intervenors was conducted at the Highland ISR site in Converse County, Wyoming.²⁹⁹ First, while the study observed bioaccumulation of selenium in birds at the Highland site, the authors were unable to determine the effects of the selenium on the wildlife studied.³⁰⁰ Second, as the Staff explains in A.12.9 of its testimony, the environmental conditions reported in this limited study of the Highland site do not support a conclusion that there would

²⁹⁴ Ex. NRC-001 at A.12.7–A.12.8; see also Ex. NRC-012 at 9-10.

²⁹⁵ Ex. NRC-001 at A.12.8 (citing Ex. NRC-064 at 3).

²⁹⁶ Ex. NRC-001 at A.12.8 (citing Ex. NRC-065 at 1).

²⁹⁷ Ex. NRC-010 at 12.

²⁹⁸ *Public Serv. Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-77-8, 5 NRC 503, 527 (1977) ("The fact that a competent and responsible state authority has approved the environmental acceptability of a site or a project after extensive and thorough environmentally sensitive hearings is properly entitled to 'substantial weight' in the conduct of our own NEPA analysis. . . . Such limited reliance is clearly acceptable under NEPA.") (citations omitted).

²⁹⁹ Ex. INT-019 at 3.

³⁰⁰ Ex. NRC-001 at A.12.9 (citing Ex. INT-019 at 16).

be comparable impacts, such as they were, at the Crow Butte site.³⁰¹ The Staff explains that the levels of selenium reported in the FWS at the Highland site greatly exceeded the enforceable MCL limit of 0.05 mg/L for selenium in process wastewater applicable to land application at the Crow Butte project.³⁰² Furthermore, the Staff explains that a comparison of selenium values at various stages of the ISR process for both the Highland and Crow Butte projects reveals that selenium is present in much higher concentrations at all stages of the ISR process at Highland as compared to Crow Butte.³⁰³ Finally, the Staff notes that the information in the FWS study was considered by the NRC in its preparation of the final ISR GEIS. The GEIS discusses the potential environmental impacts of land application on ecological resources and concludes they will be small.³⁰⁴ In sum, none of the evidence submitted by the intervenors indicates that a specific assessment of selenium in the EA is mandated by NEPA.³⁰⁵

I. Contention 14: The Staff Provided Adequate Information About Seismic Activity and Adequately Addressed Impacts of Small Earthquakes on Confinement

In contention 14, the intervenors assert that the Staff violated NEPA and several NRC regulations³⁰⁶ by failing to provide an analysis of impacts from earthquakes, especially as it concerns secondary porosity and adequate confinement. The intervenors make two specific claims: first, that Section 3.4.3 of the EA fails to identify two earthquakes that occurred in 2001

³⁰¹ Ex. NRC-001 at A.12.9.

³⁰² Ex. NRC-001 at A.12.9.

³⁰³ Ex. NRC-001 at A.12.9 (citing Ex. NRC-016 at 19-21).

³⁰⁴ Ex. NRC-001 at A.12.9 (citing Ex. NRC-045 at 4.2-34, 4.2-62).

³⁰⁵ In light of the Board's finding of support for this contention within the intervenors' discussion of other contentions, see LBP-15-11 at 42 n.222, the Staff also responds in its testimony to two claims made by the intervenors in support of other proposed contentions on the EA. See Ex. NRC-001 at A.12.10–A.12.11. Those claims, however, do not directly support the premise underlying the intervenors' claim in this contention; in fact, their claim that selenium levels at the Crow Butte site are low tends rather to undermine their concerns regarding the potential for impacts from selenium at the site.

³⁰⁶ 10 C.F.R. 51.10, 51.70, and 51.71. The Staff notes that 10 C.F.R. 51.70 and 51.71 pertain to EISs, not EAs.

and were felt in Crawford, Nebraska,³⁰⁷ and second, that the EA fails to disclose that small earthquakes can result in greater secondary porosity and undermine the adequacy of confinement of the mined aquifer.³⁰⁸ With respect to the latter claim, the intervenors assert that the failure to evaluate the impact of small earthquakes in the area on the potential for secondary porosity violates NEPA's "hard look" requirement.³⁰⁹ In support of this contention, the intervenors provide a statement from the 2015 opinion of Dr. Hannan LaGarry.³¹⁰

1. The Staff Provided an Adequate Description of Typical Seismic Activity in the EA

The intervenors have not demonstrated that the omission of two recent earthquakes from the discussion in Section 3.4.3 of the EA has any effect on the sufficiency of that discussion for NEPA purposes. Section 3.4.3 includes a description of typical seismic activity and the level of seismic hazard in the vicinity of the CBR facility. As explained in the Staff's testimony, the EA notes that the facility is located in the "Stable Interior" of the United States, and provides information on historical earthquakes in Nebraska, including reported modified Mercalli index (MMI) values at the epicenters.³¹¹

As explained in the Staff's testimony, the 2011 earthquakes cited by the intervenors occurred in South Dakota, approximately 25 miles from the CBR facility, and had magnitudes and depths typical of earthquakes in the region.³¹² As the Staff further explained, and illustrated

³⁰⁷ OST New Contentions at 115. Although not an issue raised by the intervenors, the Board commented in its decision admitting this contention that the EA might be inadequate because it does not consider earthquakes in neighboring states. LBP-15-11 at 59.

³⁰⁸ OST New Contentions at 115-116.

³⁰⁹ OST New Contentions at 116.

³¹⁰ Ex. INT-013 at 3.

³¹¹ Ex. NRC-001 at A.14.2, A.14.3

³¹² Ex. NRC-001 at A.14.3.

with a table of historical earthquakes within 100 miles of the CBR facility,³¹³ providing information on the two earthquakes cited by the intervenors, or even information on all earthquakes within 100 miles of the site, would not significantly change the characterization of typical seismic activity in the area.³¹⁴ Finally, the Staff explained that the magnitudes of the two 2011 earthquakes identified by the intervenors correspond to MMI values of III and IV, which are within the range of MMI values for earthquakes reported in Table 3-8 of the EA.³¹⁵ Thus, even without the information concerning the 2011 earthquakes cited by the intervenors, the EA provides sufficient information for the public to understand the seismic activity and seismic hazard near the CBR facility.

2. The Staff Adequately Addressed the Impact of Small Earthquakes on Secondary Porosity by Addressing Aquifer Confinement

The intervenors' second claim is that the Staff failed to take a "hard look" at impacts of earthquakes on secondary porosity, which the intervenors claim can affect the adequacy of aquifer confinement. The sole support for the intervenors' claim is Dr. LaGarry general assertion that "even small earthquakes represent flexing and shifting of the earth's crust, and are continuously creating, closing and redistributing the secondary porosity of the region's rocks and changing the flow pathways of the region's groundwater."³¹⁶

In its testimony, the Staff responds to this assertion by discussing several reasons why it is highly unlikely for the small earthquakes, such as the 2011 earthquakes in South Dakota, to cause any permanent changes in permeability in the mined aquifer at the CBR facility (the Basal Chadron Sandstone) or the upper or lower confining layers.³¹⁷ First, the Staff defines secondary

³¹³ Ex. NRC-066.

³¹⁴ Ex. NRC-001 at A.14.4.

³¹⁵ Ex. NRC-001 at A.14.3.

³¹⁶ Ex. INT-013 at 3.

³¹⁷ Ex. NRC-001 at A.14.5, A.14.6, A.14.7.

porosity and explains the distinction between porosity and permeability, emphasizing that permeability, not porosity, determines whether and to what extent fluid migration will occur in porous rocks.³¹⁸ The Staff also explains why an increase in porosity does not necessarily lead to an increase in permeability.

Next, the Staff discusses two reasons why it is highly unlikely that a small earthquake would affect permeability and confinement. First, the Staff explains that earthquakes typical of this region do not have sufficient energy to cause a rupture within the mined aquifer (Basal Chadron Sandstone) or its upper or lower confining units.³¹⁹ Second, the Staff explains that the ground shaking associated with typical earthquakes in the region cannot generate stresses sufficient to cause fracture.³²⁰

Finally, the Staff states in its testimony that the impacts from earthquakes on confinement are implicitly considered in the Staff's discussion of confinement in Section 3.5.2.3 of the EA. As explained in the testimony, since the CBR facility began operating, there have been a number of small earthquakes within 100 miles of the facility,³²¹ yet there has been no evidence from excursion monitoring, pumping tests, or water quality data indicating changes in confinement of mined aquifer.³²² The Staff also explains that the thick clay layers above the Basal Chadron are saturated and would "self heal" in the highly unlikely event of an earthquake large enough to cause a fracture in those layers.³²³

In sum, the Staff's description of seismology in Section 3.4.3 of the EA was sufficient to provide the public with an understanding of the typical seismic activity and seismic hazard near

³¹⁸ Ex. NRC-001 at A.14.5.

³¹⁹ Ex. NRC-001 at A.14.7.

³²⁰ Ex. NRC-001 at A.14.7.

³²¹ Ex. NRC-066 at 1-2.

³²² Ex. NRC-001 at A.14.8.

³²³ Ex. NRC-001 at A.14.8.

the CBR facility, despite the omission of two recent earthquakes. With regard to the intervenors' concern about the effect of small earthquakes on confinement, the intervenors have provided no evidence or physical explanation to support their claims. In contrast, the Staff explained that despite the occurrence of several small earthquakes since the CBR facility began operations, there has been no evidence that small earthquakes have caused any changes in permeability or confinement of the Basal Chadron Sandstone aquifer at or near the CBR site. In addition, the Staff has provided physical explanations for why small earthquakes will not cause fracturing of rocks within the Basal Chadron Sandstone aquifer or the upper and lower confinement, and, therefore, why changes in permeability due to typical earthquakes in the area are highly unlikely. For these reasons, the Staff's discussion of confinement in the EA was sufficient to address the intervenors' concerns, and there is no basis for concluding that environmental impacts, such as contamination of groundwater, would be expected from small earthquakes. The Staff has taken the requisite hard look at the issue raised by the intervenors, and the Board should therefore rule in the Staff's favor on Contention 14.

VII. Conclusion

For the foregoing reasons, the Board should dismiss each of the Intervenor's admitted contentions and affirm that the Staff's environmental review of the Crow Butte application complied with applicable law.

Respectfully submitted,

/Signed (electronically) by/

Marcia J. Simon
David M. Cylkowski
Emily L. Monteith

Dated at Rockville, Maryland
this 8th day of May, 2015.