

January 4, 2019

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
	)	Docket No. 40-8943-MLA-2
CROW BUTTE RESOURCES, INC.	)	
	)	ASLBP No. 08-867-02-OLA-BD01
(Marsland Expansion Area)	)	

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CROW BUTTE RESOURCES' REPLY  
FINDINGS OF FACT AND CONCLUSIONS OF LAW

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**CROW BUTTE RESOURCES' PROPOSED REPLY**  
**FINDINGS OF FACT AND CONCLUSIONS OF LAW**

**I. INTRODUCTION**

1.1 This Initial Decision pertains to Crow Butte Resources' Application for Authorization to Operate a Satellite In Situ Uranium Recovery ("ISR") Facility within the Marsland Expansion Area ("Marsland" or "MEA"), including an Environmental Report ("ER") and a Technical Report ("TR"). The Crow Butte facility is a uranium in situ recovery ("ISR") facility subject to safety requirements found in 10 C.F.R. Part 40.

1.2 On December 3, 2018, the parties filed their respective proposed findings of fact and conclusions of law.<sup>1</sup> Crow Butte agrees with the NRC Staff's proposed findings of fact and conclusions of law but does not agree with those presented by the intervenors, OST. Rather than detail every mistake or omission in the intervenors' submission, we focus on the principal areas of disagreement with the intervenors' proposed findings of fact and conclusions of law.

1.3 As discussed below and in light of the reliable and probative evidence presented in this proceeding, we resolve Contention 2 in favor of Crow Butte and the NRC Staff.

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<sup>1</sup> "Crow Butte Resources' Proposed Findings of Fact and Conclusions of Law" ("CBR Prop. Findings"); "NRC Staff's Proposed Findings of Fact and Conclusions of Law" ("NRC Prop. Findings"); "Oglala Sioux Tribe Filing of Proposed Findings of Fact and Conclusions of Law" ("Int. Prop. Findings").

We conclude that the NRC Staff has taken the requisite “hard look” at the environmental impacts of the requested license amendment as required by the National Environmental Policy Act (“NEPA”) and the Commission’s regulations at 10 C.F.R. Part 51. To the extent that the intervenors are seeking to have additional detail incorporated directly into the Environmental Assessment (“EA”) (Exh. NRC007), we note that an EA is not intended to be a “research document” and need not address each and every issue in exhaustive detail.<sup>2</sup> It is enough that the EA describes the proposed action, identifies the sources of data used, assesses the likely impacts of the project across a range of resource areas, and briefly describes bases for its conclusions.

1.4 The EA adequately describes the affected environment, including the effects of the proposed MEA operation on the adjacent surface water and groundwater resources; an acceptable conceptual model of site hydrology that is adequately supported by site characterization data so as to demonstrate ability to ensure the confinement of extraction fluids and expected operational and restoration performance; and a discussion of the basis for conclusions regarding the isolation of the aquifers in the ore-bearing zones. The EA is more than sufficient to satisfy the agency’s obligation NEPA and 10 C.F.R. Part 51.<sup>3</sup> The Licensing Board therefore resolves the environmental aspects of Contention 2 in favor of Crow Butte and the NRC Staff.

1.5 After considering all of the evidence and arguments presented for the safety aspects of Contention 2, we conclude that Crow Butte has presented information and analysis regarding the technical aspects of proposed licensed activities and demonstrated that its activities

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<sup>2</sup> *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)); *Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation)*, CLI-02-25, 56 NRC 340 (2002).

<sup>3</sup> *LES*, LBP-06-8, 63 NRC at 286.

comply with 10 C.F.R. Part 40. In addition to considering the information provided to describe the effected environment and that supports the conclusions in the NRC's SER, Crow Butte (and the NRC Staff and NDEQ) considered the data presented and described effective porosity, hydraulic porosity, hydraulic conductivity, and hydraulic gradient of site hydrogeology, along with other information relative to confinement, control of mining fluids, and prevention of excursions. The Board therefore resolves the technical aspects of Contention 2 in favor of Crow Butte.

## **II. PROPOSED REPLY FINDINGS**

2.1 The following reply findings address certain of OST's Proposed Findings of Fact and Conclusions of Law. To minimize unnecessary repetition, Crow Butte does not provide a direct response to those topics or areas of inquiry that were thoroughly addressed in its Proposed Findings of Fact and Conclusions of Law.

2.2 On page 27, of their proposed findings, OST argues that the "[p]urpose of [aquifer pumping] testing is commercial Uranium production, not identifying contaminant pathways." To the extent this implies that the testing was not designed to characterize the performance of the aquifer and to demonstrate adequate confinement, Mr. Lewis responded to this concern at the hearing: "[T]he purpose of the pump test was to characterize the hydraulic properties and characteristics of the first four mine units that were going to be developed by Crow Butte." Tr. at 356. This includes "identifying any boundaries to the system, any leakage characteristics, the degree of confinement, the radius of influence, as well as all of the hydraulic parameters of conductivity, storage, that would go along with the pump test." Tr. at 356 (Lewis).

2.3 On page 29 of their proposed findings, OST claims, citing Mr. Lewis's testimony on pages 596-597 of the transcript, that there is a leaky aquitard at Marsland. This is a gross mischaracterization of Mr. Lewis's testimony. Mr. Lewis first noted that "there is no such thing as perfectly confined unit." Tr. at 596. Mr. Lewis explained that there is a "very small

amount of recharge or leakage” from the overlying confining there on a regional basis. On the scale of the MEA, this amount of leakage “is insignificant.” Tr. at 597. This small amount of downward flow from confining unit into production aquifer does not meet definition of leaky aquifer, which includes significant and measurable leakage. Less than 200 gpm of downward flow over a radius of influence of more than 13 miles from the main mining area does not imply leaky aquifer conditions; quite the opposite, it confirms confinement. Further, as Mr. Lewis testified (Tr. at 396; Tr. at 496), the 20 feet of drawdown observed at MEA since 2011 due to Crow Butte operations cannot be reproduced using any leaky aquifer assumption, as confirmed by the hydrologic impact assessment model. Accordingly, there is no basis for concluding that the Basal Chadron is a leaky aquifer.

2.4 On page 30, OST cites testimony from Mr. Wireman (Tr. at 600) stating that the Basal Chadron outcrop is solid sandstone. The NRC Staff and Crow Butte, however, disagreed with respect to the underground condition of the aquifer. NRC Staff described the Basal Chadron as, “not a sandstone but more of a sand. It’s a fine-medium sand” (Tr. at 414), and Crow Butte testified, based on direct observation of cuttings and attempted core samples, that the Basal Chadron is “semi-consolidated in places, sand in most places” and adding that, “it comes apart just like a sand you would see in a fluvial environment today” (Tr. at 414).

2.5 Despite the testimony of NRC Staff and Crow Butte witnesses, based on direct observation and particle size analyses, OST concludes, on page 43, that Crow Butte somehow violated NRC regulations requiring licensees and applicants to provide information that is complete and accurate in all respects in violation of 10 C.F.R. § 40.9. There is no basis for concluding that Crow Butte or the NRC Staff have used or relied on incomplete or inaccurate information. Crow Butte’s experts testified based on their direct observations of drill cuttings and

attempts to obtain core samples, and the NRC Staff reviewed particle size analyses, among other data sources. In contrast, Mr. Wireman bases his conclusion on observation of outcrop locations that have been subjected to various weathering and other mechanisms that differ from the underground conditions at the MEA. Nothing in Mr. Wireman's testimony disputes or counters the evidentiary and documentary basis for Crow Butte and the NRC Staff's conclusions.

2.6 On page 33, OST claims that Mr. Lewis testified that the total discharge from the Basal Chadron is 40 gpm from two flowing wells north of Crawford. This is incorrect. Mr. Lewis in fact testified (Tr. at 620-621) that the current total discharge comes from the main mining facility operations and the two flowing wells north of Crawford. The total discharge therefore has historically been more than 225 gpm historically, not the 40 gpm OST claims. Further, it is impossible for the Basal Chadron to discharge to the White River (as OST claims), as it does not subcrop in the White River bottom along any portion of the sub-basin. Tr. at 608.

2.7 On page 40 of their proposed findings, OST states that "Crow Butte modified its models to fit desired results" and that when Crow Butte "didn't like the results in current data, they changed the transmissivity in order to better match historical data rather than match the current data." This is a gross mischaracterization of testimony. Mr. Lewis described, in response to questions from Judge Wardwell, the process of model calibration that was used to match the observed 20 feet of drawdown at MEA since 2011. Mr. Lewis explained, starting on page 923 of the hearing transcript, that in order to reproduce the observed drawdown, the average transmissivity of the entire model domain (including the main mining area) was adjusted slightly, and within expected variability, in the process normally referred to as calibration. Calibration improves the reliability of model predictions and is considered good professional practice. This is far cry from modifying the model to fit desired results, as alleged by OST.

### III. CONCLUSIONS OF LAW

3.1 For the reasons set forth above and in Crow Butte's and the NRC Staff's proposed findings of fact and conclusions of law, as supported by the testimony and evidence in the record in this proceeding, we conclude that the NRC Staff has taken the requisite "hard look" at potential impacts from construction and operation of the MEA. The NRC Staff evaluated the impacts of operations at the MEA in the EA and "has come to grips with all important considerations."<sup>4</sup> The EA adequately described the affected environment, including the effects of the proposed MEA operation on the adjacent surface water and groundwater resources; an acceptable conceptual model of site hydrology that is adequately supported by site characterization data so as to demonstrate ability to ensure the confinement of extraction fluids and expected operational and restoration performance; and discussion of the basis for conclusions regarding the isolation of the aquifers in the ore-bearing zones. The Licensing Board therefore should resolve the environmental aspects of Contention 2 in favor of Crow Butte and the NRC Staff.

3.2 Crow Butte also has presented information and analysis regarding the technical aspects of proposed licensed activities and demonstrated that its activities comply with 10 C.F.R. Part 40. In addition to considering the information provided to describe the effected environment and that support the conclusions in the NRC's SER, Crow Butte (and the NRC Staff and NDEQ) considered the data presented and described effective porosity, hydraulic porosity, hydraulic conductivity, and hydraulic gradient of site hydrogeology, along with other information relative to confinement, control of mining fluids, and prevention of excursions. The Board therefore should also resolve the technical aspects of Contention 2 in favor of Crow Butte.

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<sup>4</sup> *Grand Gulf ESP*, CLI-05-4, 61 NRC at 13.



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CERTIFICATE OF SERVICE

I hereby certify that copies of “CROW BUTTE RESOURCES’ REPLY FINDINGS OF FACT AND CONCLUSIONS OF LAW” in the captioned proceeding have been served on this 4th day of January 2019 via the Electronic Information Exchange (“EIE”), which to the best of my knowledge resulted in transmittal of the foregoing to all those on the EIE Service List for the captioned proceeding.

/s/ signed electronically by  
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