

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

BEFORE THE COMMISSION

In the Matter of

U.S. DEPARTMENT OF ENERGY

(High-Level Waste Repository)

Docket No. 63-001-HLW

May 21, 2009

**CLARK COUNTY, NEVADA'S NOTICE OF APPEAL OF LBP-09-06,
MEMORANDUM AND ORDER OF MAY 11, 2009**

Pursuant to 10 C.F.R. § 2.1015(b) and the terms of the Memorandum and Order (Identifying Participants and Admitted Contentions) issued on May 11, 2009 ("Order"), Clark County, Nevada ("Clark") respectfully submits its Notice of Appeal of the decision of the Atomic Safety and Licensing Construction Authorization Board 01 ("CAB-01"), rejecting the contention proffered by Clark and designated as CLK-SAFETY-001.

Dated: May 21, 2009

Respectfully submitted,

/s/ filed electronically - Debra Roby

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I. INTRODUCTION

The Order's dismissal of the proffered contention designated as CLK-SAFETY-001 is inconsistent with the Order's highlighting of that same contention as a positive example of an admissible contention. Having first selected CLK-SAFETY-001 as a positive example of a properly admitted contention, the Order later dismisses this same contention without articulating the basis for that dismissal. Yet, review of CLK-SAFETY-001 and the supporting affidavit by Dr. Dennis C. Bley, an expert in the relevant field, confirms that the contention should be admitted. The contention complies with the Commission's regulations and is supported by substantial evidence in the record.

Clark County, Nevada ("Clark") thus respectfully submits this Notice of Appeal, and accompanying Brief, of the decision of the Atomic Safety and Licensing Construction Authorization Board 01 ("CAB-01") rejecting the contention proffered by Clark as CLK-SAFETY-001. The appeal is submitted pursuant to 10 C.F.R. § 2.1015(b) and the terms of the Order.¹

II. BACKGROUND

A. Relevant Procedural History

Clark timely filed a Request for Hearing, Petition to Intervene and Filing of Contentions ("Clark's Petition") on December 22, 2008. Clark's Petition sets forth 12 safety contentions and 3 NEPA contentions. The DOE and the NRC Staff each opposed each of Clark's proffered contentions.² In fact, the DOE opposed every contention proffered by every party or potential

¹ *U.S. Dep't of Energy*, Memorandum and Order (Identifying Participants and Admitted Contentions), LBP-09-06, 142, May 11, 2009 ["Order"].

² Answer of the U.S. Department of Energy to Clark County, Nevada's Request for Hearing, Petition to Intervene and Filing of Contentions (Jan. 15, 2009) ["DOE's Clark Answer"]; NRC Staff Answer to Intervention Petitions (Feb. 9, 2009) ["NRC Staff's Answer"].

party. The NRC Staff similarly opposed the vast majority of the contentions proffered by every party or potential party.

Clark timely filed a Reply to the DOE's and the NRC Staff's Answers on February 24, 2009.³ Three Construction Authorization Boards (the "CABs") heard oral argument on the admissibility of contentions submitted by Clark and eleven other petitioners in Las Vegas, Nevada on March 31 through April 2, 2009. On May 11, 2009, the CABs issued the Order, a portion of which is the subject of this appeal. The Order explains that the Chief Administrative Judge had assigned each of the petitions (other than the State of Nevada's petition) to a single CAB for review and that CAB-01, CAB-02, and CAB-03 had each set forth their independent rulings in the Order.⁴ Clark's Petition was assigned to CAB-01, which admitted thirteen (13) of Clark's fifteen (15) contentions.⁵ CAB-01 rejected two of Clark's proffered contentions.⁶ This appeal respectfully challenges only the decision to deny for admission the contention labeled as CLK-SAFETY-001.

B. Overview of CLK-SAFETY-001

CLK-SAFETY-001, titled "The DOE's Inadequate Treatment of Uncertainty,"⁷ states that the DOE's treatment of uncertainty in the Safety Analysis Report ("SAR")⁸ and the Total

³ Reply of Clark County, Nevada to the Answers of the U.S. Department of Energy and the Nuclear Regulatory Commission Staff (Feb. 24, 2009) ["Clark's Reply"].

⁴ See the Order at 2.

⁵ See *id.* at 2 and Attachment A (ruling that CLK-SAFETY-002 through CLK-SAFETY-011 and CLK-NEPA-001 through CLK-NEPA-003 were admissible).

⁶ See *id.* at Attachment B (ruling that CLK-SAFETY-001 and CLK-SAFETY-012 were inadmissible); *id.* at 128-29 (explaining the basis and analysis for its rulings on CLK-SAFETY-001 and CLK-SAFETY-012).

⁷ CLK-SAFETY-001 is discussed in Clark's Petition at 3-22 and Clark's Reply at 25-39.

⁸ United States Department of Energy, Office of Civilian Radioactive Waste Management, "Yucca Mountain Repository License Application Safety Analysis Report," DOE/RW-0573, Rev.0, June 2008 (LSN# DEN001592183).

System Performance Assessment (“TSPA”) does not comport to specific regulatory requirements articulated in Part 63 of the Commission’s regulations.⁹

CLK-SAFETY-001 documents numerous examples of the DOE’s improper treatment of uncertainty, illustrating a systemic problem with the DOE’s treatment of uncertainty in the SAR and the TSPA.¹⁰ Each example is tied to a specific regulatory requirement. The DOE’s failure to adequately address uncertainty means that risks to the public and workers at the proposed repository could exceed those calculated in the pre-closure safety analysis. It also means that the DOE’s analysis could underestimate the consequences and likelihood of post-closure radioactive releases.¹¹ CLK-SAFETY-001 is supported by an expert affidavit from Dr. Dennis C. Bley, a nuclear engineer.¹²

Detailed presentation of the substantive deficiencies of DOE’s analysis as set forth in CLK-SAFETY-001 is set forth in Section IV.C. *infra*.¹³

III. STANDARD OF REVIEW

The regulations and standards governing high-level waste proceedings provide for appeals of the decision on contention admissibility.¹⁴ However, 10 C.F.R. § 2.1015(b) does not articulate a standard of review applicable to appeals. Further, 10 C.F.R. § 2.341, in subpart C, which provides standards for review, specifically states that it does not apply to “a proceeding on

⁹ Sandia National Laboratories, “Total System Performance Assessment Model/Analysis for the License Application Volume III.” Prepared for: U.S. Department of Energy Office of Civilian Radioactive Waste Management Office of Repository Development (LSN# DEN001579005).

¹⁰ See Clark’s Petition at 12-21 (10 page table listing examples of the DOE’s improper treatment of uncertainty in the SAR (“TABLE 1”)); Clark’s Reply at 30-35 (explaining TABLE 1 further, in response to the DOE’s Clark Answer).

¹¹ See Clark’s Petition at 22.

¹² See *id.* at Attachment 4 (Affidavit of Dennis Bley and *Curriculum Vitae*).

¹³ *Infra* at Section IV.C.

¹⁴ 10 C.F.R. § 2.1015(b); See also Order at 142 (quoting 10 C.F.R. § 2.1015(b)); 10 C.F.R. Part 2, App. D (Day 110); U.S. Dep’t of Energy (High-Level Waste Repository: Pre-Application Matters, Advisory PAPO Board), Notice and Memorandum (Requesting Information from Potential Parties), 4-5, March 6, 2008.

the high-level waste repository.”¹⁵ Nevertheless, the CABs’ interpretation of the Commission’s regulations (namely, 10 C.F.R. § 2.309(f)(1)(v) and (vi)) is a legal issue and the appropriate standard for review of legal questions is *de novo*.¹⁶ Furthermore, because the Order does not articulate the bases for denying CLK-SAFETY-001 for admission, there is no stated determination to which any deference can be given, and the Commission must necessarily engage in a *de novo* review of the contention and the reasons why it should be admitted.¹⁷

IV. ARGUMENT

The dismissal of CLK-SAFETY-001 is mistaken for three reasons. First, the Order is internally inconsistent inasmuch as the Order uses CLK-SAFETY-001 as a positive example of admissibility, yet later proceeds to dismiss the contention (possibly on the very grounds for which the contention was selected as an illustrative model). Second, one can only speculate on the reasons why the contention was dismissed because the Order does not articulate the basis or bases for CAB-01’s dismissal of CLK-SAFETY-001, except to cite, without explanation, to 10 C.F.R. § 2.309(f)(1)(v) and (vi). Third, review of CLK-SAFETY-001 reveals that it is consistent with the Commission’s regulations and supported by substantial evidence in the record, including the affidavit of an expert witness, Dr. Dennis C. Bley. CLK-SAFETY-001 should be admitted in this proceeding.

¹⁵ 10 C.F.R. § 2.341(a)(1).

¹⁶ See *Tennessee Valley Authority* (Watts Bar Nuclear Plan, Unit 1 *et al.*), CLI-04-124, 60 NRC 160, 164 (2004) (citing *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-00-13, 52 NRC 23, 29 (2000)).

¹⁷ *Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, Docket No. 50-382-0L, n.12 (1983) (where there were deficiencies in the Licensing Board’s opinion the Atomic Safety and Licensing Appeal Board applied a *de novo* standard of review noting that its “own review of the record . . . will determine the outcome of the case”).

A. The Order Is Internally Inconsistent

The Order’s discussion of TSPA model-based contentions, including CLK-SAFETY-001, begins with an overview of the applicable regulations:

NRC regulations concerning the proposed repository are set forth in 10 C.F.R. Part 63. Among other things, the regulations impose limits on radiological exposures. 10 C.F.R. § 63.311. The regulations further provide that compliance with such limits, over necessarily long time periods, “requires a performance assessment.” *Id.* § 63.102(j); *see also* 10 C.F.R. § 63.113. Under the Commission’s regulations, not any performance assessment will do, but only one that meets a number of very specific requirements. *See e.g.*, 10 C.F.R. § 63.114.

DOE endeavors to satisfy the Commission’s performance assessment requirements through a complex model designated the Total System Performance Assessment (TSPA). Yucca Mountain Repository License Application Safety Analysis Report at 2.4-1 (2008). Nevada and other petitioners proffer more than 100 contentions alleging various defects in the TSPA. The overwhelming majority of such contentions allege that these defects result in one or more violations of the Commission’s regulations and are supported by affidavits from competent experts.¹⁸

The Order’s discussion of this topic includes the conclusion that “[p]roffered contentions that adequately allege violations of such regulatory requirements *raise material issues in and of themselves*.”¹⁹ Quoting from Clark’s Petition in CLK-SAFETY-001, the Order continues by stating:

Clark, for example, contends that alleged errors “could mean that the risk is greater than reported in the TSPA” and that the “TSPA could underestimate the consequences and likelihood of post-closure radioactive releases.” Clark Petition at 6, 22. Separate and apart from alleged violations of other specific regulatory requirements that apply to the TSPA, such qualitative predictions – when adequately supported by reasoned affidavits from competent experts – *are by themselves sufficient to admit contentions*.²⁰

CLK-SAFETY-001 is supported by an affidavit of a qualified, competent expert witness – Dr. Dennis C. Bley.²¹ The Order contains no discussion suggesting in any way that Clark’s contention is not adequately supported by a reasoned affidavit from a competent expert.

¹⁸ Order at 50.

¹⁹ *Id.* at 52 (quoting 66 Fed. Reg. at 55,747 for support) (emphasis added).

²⁰ *Id.* at 53 (emphasis added).

²¹ *See* Clark’s Petition, Attachment 4 (affidavit and *curriculum vitae* of Dr. Dennis C. Bley).

Consistent with the Order's discussion of CLK-SAFETY-001 as a proper contention, CLK-SAFETY-001 should have been admitted.

Inexplicably, however, the Order later deems CLK-SAFETY-001 inadmissible.²² This inconsistency strongly suggests that the Order did not intend to dismiss CLK-SAFETY-001 -- after all, the reasoned and articulated discussion of the contention highlights this contention as an example of the kind of substantive points that "are by themselves sufficient to admit contentions,"²³ whereas the section of the Order dismissing the contention is conclusory and without articulated grounds.

B. The Order Does Not Articulate the Basis For Dismissal

The Order's only explanation for its determination that CLK-SAFETY-001 is inadmissible is limited to two sentences:

The Board finds that CLK-SAFETY-001 is inadmissible because it does not provide the necessary facts or expert opinion required by 10 C.F.R. § 2.309(f)(1)(v). The contention also fails to provide sufficient information to show that there is a genuine dispute of material issue of fact or law as required by 10 C.F.R. § 2.309(f)(1)(vi).²⁴

The analysis and explanation stop there, putting Clark in the difficult position of having to speculate on the basis for denying CLK-SAFETY-001 for admission.

Merely stating the conclusion that CLK-SAFETY-001 is not in compliance with Commission regulations does not substitute for the reasoned decision-making required by the Administrative Procedure Act.²⁵ CAB-01 had a "duty not only to resolve contested issues, but 'to articulate in reasonable detail the basis for the course of action chosen. . . . A board must do

²² Order at 128, Attachment B.

²³ *Id.* at 53.

²⁴ *Id.* at 128.

²⁵ See 5 U.S.C. § 557; *Philadelphia Electric Co.*, (Limerick Generating Station, Units 1 and 2) ALAB-809, 21 NRC 1605, n.13 (1985) *vacated as moot by Philadelphia Electric Co.*, (Limerick Generating Station, Units 1 and 2) 22 NRC 459 (1985).

more than reach conclusions; it must confront the facts.”²⁶ Without articulation of the reasons for dismissing CLK-SAFETY-001, it is impossible to reconcile the dismissal of this contention with the Order’s earlier highlighting of this same contention as one that by its very nature constitutes an admissible contention (if supported by an appropriate expert affidavit, which it is).

Clark cannot conceive of any support for this decision. First, as noted above, the Board itself selected this contention as an example of an admissible contention. Second, it is in fact supported by the affidavit of a competent expert witness (Dr. Bley). Third, it directly challenges aspects of the SAR and TSPA as failing to comply with specific regulatory requirements, thereby raising genuine disputes of material fact. And, except for these two summary sentences, the Order nowhere indicates the grounds for ruling this contention inadmissible.

C. CLK-SAFETY-001 Is Consistent With the Commission’s Regulations and Is Supported by Substantial Evidence in the Record Including an Expert Affidavit from Dr. Dennis C. Bley

CLK-SAFETY-001 meets the requirements of 10 C.F.R. § 2.309(f)(1)(v) and (vi). It is supported by the affidavit of a competent expert witness (Dr. Bley) and raises genuine disputes of material fact by challenging aspects of the treatment of uncertainty in the SAR and TSPA. Rather than speculate on the reasons for CAB-01’s decision to not admit CLK-SAFETY-001, pertinent portions of the contention are discussed and reviewed below.

CLK-SAFETY-001 explains that the DOE’s failure to provide the bases for its treatment of uncertainty in the Safety Analysis Report (“SAR”) is so pervasive and inadequate that it causes the DOE’s evaluation of risk to be unreliable and non-compliant with the Commission’s safety requirements of 10 C.F.R. Part 63. Part 63 pertains to the treatment of uncertainty and

²⁶ *Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, Docket No. 50-382-0L, n.12 (1983) (quoting *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-422, 6 NRC 33, 41 (1977), *aff’d*, CLI-78-1, 7 NRC 1 (1978)).

prescribes the risk-informed analyses that must not only be performed by the DOE, but must also be included in the DOE's application.²⁷

As required by 10 C.F.R. Part 63 paragraphs 10, 21, 101, 114, and 311, uncertainty must be thoroughly addressed qualitatively and quantitatively if the results are to be adequate to support licensing of the facility. Qualitatively, the analysis must properly characterize all uncertainties in all aspects of the model. Quantitatively, the uncertainty must be treated in an integrated and justified way; dependencies must be addressed.²⁸

Despite the specific requirements of Part 63, the DOE's SAR provides only conclusory statements, with chains of references that lead only to other conclusory statements. The DOE's systemic omissions throughout the SAR render its evaluation of risk unreliable and contrary to the reasonable assurance of adequate protection of the public health and safety required.

²⁷ Under 10 C.F.R. § 63.31(a)(2), the NRC may authorize construction of the repository at Yucca Mountain if it determines that there is a reasonable assurance or expectation the materials described in the Application can be disposed of without unreasonable risk to the health and safety of the public. In reaching this determination, 10 C.F.R. § 63.31(a)(3) requires that the site and design comply with Subpart E, Technical Criteria, of 10 C.F.R. Part 63, and that the DOE's proposed operating procedures to protect health and to minimize danger to life or property are adequate.

Subpart E, 10 C.F.R. § 63.111 requires a pre-closure safety analysis that meets the requirements of § 63.112: That the safety analysis include the technical basis for either inclusion or exclusion of specific, naturally occurring and human-induced hazards in the safety analysis; an analysis of the performance of the structures, systems, and components to identify those that are important to safety and their performance; and evaluation of possible mitigation measures.

Subpart E, 10 C.F.R. §§ 63.113 and 63.114 requires a post-closure performance assessment that accounts for uncertainties and variabilities in parameter values, accounts for alternative conceptual models, and provides the technical bases for all aspects of the analysis. Furthermore, 10 C.F.R. § 63.10 requires that the information required by the Commission's regulations is complete and accurate in all material respects. Failure to properly consider uncertainty or to document the basis for its treatment can render this information materially incomplete and inaccurate.

²⁸ Of course, as explained in CLK-SAFETY-001, Clark is not asserting that the DOE must provide *complete* assurances for *each* performance objective. Rather, Clark contends that the DOE has failed *completely* to provide any *reasonable* assurances by providing only conclusory statements in the SAR that it evaluated uncertainty, and by failing to provide the requisite technical bases which underlie its alleged evaluations. An unsupported assertion that the DOE evaluated uncertainty fails to meet the technical requirements of Parts 63.10 (accuracy of information), 63.21 (content of application), 63.101 (purpose and nature of findings), and 63.114 (requirements for performance assessment); and it cannot be demonstrated that it meets the individual protection standards after permanent closure as required under 10 C.F.R. part 63.311. These regulations exist to provide transparency in the risk analyses, and to document the conclusions upon which the DOE rely. 10 C.F.R. Part 63.101(a)(2) acknowledges that uncertainties do in fact exist, but the DOE would read this acknowledgement to be a broad excuse to omit from the SAR any meaningful discussion of the DOE's treatment of uncertainty. The express technical requirements of 63.112 and 63.114 belie this assertion.

As outlined in CLK-SAFETY-001, assumptions at every stage of the analysis are directly related to the uncertainty in the results. There are many ways in which the assumptions used in developing the analysis could be upset. Examples of the types of assumptions that often cause problems in the SAR are detailed in Clark's petition, and include:

- Conservative assumptions in one area, which, while seemingly benign, can mask real problems elsewhere;
- Assumed applicability of data -- lack of thorough review of databases for accuracy, applicability, and their representation of uncertainty can introduce untracked errors;
- Errors and damage that might occur during pre-closure activities can negate assumptions about placement and condition of casks that are essential to the TSPA; and,
- Failure to evaluate alternative assumptions can mask key problems and does not allow complete treatment of uncertainty.

When uncertainty is broad, extreme high values control the mean; *i.e.*, if some low probability, high consequence possibilities are screened, then the mean value will underestimate the risk. Thus, treatment of uncertainty must be held to a high standard. In an analysis that seeks to quantify all events with probabilities greater than 1 chance in 10,000 over 10,000 years (1×10^{-8} per year), uncertainty is of paramount importance; it must be thoroughly treated, allowing for the wide variety of possible futures as well as uncertainty in underlying assumptions, models, and data. This is a very high standard, and the DOE's failure to adhere to it renders the long-term results of the TSPA and SAR unreliable, which in turn fails to provide reasonable assurances of safety.

Clark's review of the SAR and TSPA and existing formal reviews identify a number of cases where the treatment of uncertainty, including the assumptions and screening criteria, is not fully justified. Supporting facts for CLK-SAFETY-001 were provided in table format for ease of reference (see CLK-SAFETY-001, TABLE 1) and include a number of examples that

demonstrate a systemic problem in the Application -- a problem that is pervasive in the documentation and appears to be widespread in the actual analysis.

It was not possible for Clark to identify all of the DOE's cases of insufficient treatment of uncertainty due to the limited resources and time to submit its Petition, and because they are spread throughout the thousands of pages of supporting documents to the Application. Nevertheless, Clark provided a clean presentation of examples in CLK-SAFETY-001, TABLE 1, which are sufficient to demonstrate the DOE's errors and to warrant further inquiry at the hearing. After the DOE's and the NRC Staff's objections to Clark's presentation of the examples of deficiencies in table format, Clark restated the examples in its Reply as the factual bases supporting its contention:

Basis 1. (identified as 1.1.1 in CLK-SAFETY-001, TABLE 1) Clark County noted that “[i]t is not clear that any thorough outside review of the databases used in the SAR was performed.” This raises an uncertainty issue because the data collected from events may differ from the cases being modeled. This violates preclosure safety regulations requiring a “systematic analysis” of hazards at the proposed repository. See 10 C.F.R. § 63.112(b). It also violates postclosure safety regulations that require an accounting of uncertainties such as the uncertainty presented here. See 10 C.F.R. § 63.114(b). Finally it does not allow for verification of the database used in the analysis of the SAR, in violation of the regulation that requires the applicant to provide “complete and accurate” information “in all material respects.” 10 C.F.R. § 63.10.

Basis 2. (identified as 1.1.2 in CLK-SAFETY-001, TABLE 1) Clark County identifies that the analysis supporting SAR 1.6.3.4.1 (LSN# DEN001592183) in BSC 2007c (LSN#DN2002406192) cites unavailable references for an assumed exponential decay factor in the Solomon model for flights through the Beatty Corridor and fails to justify truncated range for the factor. This violates preclosure safety regulations requiring the “technical basis” for “exclusion of specific, naturally occurring and human-induced hazards in the safety analysis.” See 10 C.F.R. § 63.112(d). It also violates postclosure safety regulations that require data for “disruptive processes and events” because said data is missing from the analysis. See 10 C.F.R. § 63.114(a). Finally, it violates the requirement for “complete and accurate” information. 10 C.F.R. § 63.10.

Basis 3. (identified as 1.1.3 in CLK-SAFETY-001, TABLE 1) Clark County identifies that the analysis supporting SAR 1.6.3.4.1 (LSN # DEN001592183) in BSC 2007c (LSN#DN2002406192) provides no basis for the claim that all midair collisions and flights into terrain occur during maneuvering. The DOE's failure to provide an uncertainty analysis here violates the regulations for the same reasons described for 1.1.2, *supra*.

Basis 4. (identified as 1.1.4 in CLK-SAFETY-001, TABLE 1) Clark County identifies that the analysis supporting SAR 1.6.3.4.1 (LSN # DEN001592183) in BSC 2007c (LSN#DN2002406192) uses its Table 10 to support the analysis of aircraft crash, without providing a technical basis for the table. The DOE's failure to provide the data or modeling to support this analysis violates the regulations for the same reasons described for 1.1.2, *supra*.

Basis 5. (identified as 1.2.1 in CLK-SAFETY-001, TABLE 1) Clark County explained that the DOE's analysis supporting SAR 1.6.3.4.1 in BSC 20007c LSN#DN2002406192 "censors data for mishaps with unknown distances to crash and unknown glide ratios, without developing a suitable uncertainty approach to account for them. The DOE's data censoring here lacks a physical and statistical basis, which may have lead to overly optimistic results. This violates preclosure safety regulations requiring a "[d]ata pertaining to the Yucca Mountain site, and the surrounding region." See 10 C.F.R. § 63.112(c). It also violates postclosure safety regulations that require an accounting for "uncertainties and variabilities in parameter valued" and that also require the technical basis for "exclusion of specific features, events, and processes in the performance assessment." See 10 C.F.R. § 63.114(b) and (e). Finally, it violates the requirement for "complete" information. 10 C.F.R. § 63.10.

Basis 6. (identified as 1.3.1 in CLK-SAFETY-001, TABLE 1) Clark County explained that the DOE improperly screened out oxide wedging from risk analysis due to conservative modeling of stress corrosion cracking. This violates preclosure safety regulations that require the DOE to include, identify and systematically analyze naturally occurring or human-induced hazards of the area, which included a comprehensive identification of potential event sequences when it improperly screened out oxide wedging. See 10 C.F.R. § 63.112(b) and (c). It also violates postclosure safety regulations that require an accounting for "uncertainties and variabilities in parameter valued" and that also require the technical basis for "exclusion of specific features, events, and processes in the performance assessment." See 10 C.F.R. § 63.114(b) and (e). Finally, it violates the requirement for "complete and accurate" information. 10 C.F.R. § 63.10.

Basis 7. (identified as 2.1.1 in CLK-SAFETY-001, TABLE 1) Clark County explained that the DOE assumed that deliquescence would not occur at the site of the proposed repository based on improper modeling and partial treatment of uncertainty that contradicted the NWTRB's conclusions. See Minutes of the May 29, 2008 NWTRB meeting (LSN# NEN000000714). This violates preclosure safety regulations requiring a "systematic analysis" of hazards at the proposed repository. See 10 C.F.R. § 63.112(b). It also violates postclosure safety regulations that require consideration of "alternative conceptual models of features and processes that are consistent with available data and current scientific understanding" and evaluation of "the effects that alterative conceptual models have on the performance of the geologic repository." See 10 C.F.R. § 63.114(c). Finally it violates the regulation requiring "complete and accurate" information "in all material respects." 10 C.F.R. § 63.10.

Basis 8. (identified as 2.1.2 in CLK-SAFETY-001, TABLE 1) Clark County explained that the DOE failed to explain the data and model uncertainty accounted for in the final numbers for infiltration (the amount of water that would fall on drip shields) or provide a technical basis for abandoning an original analysis for a second analysis. This violates preclosure safety regulations requiring:

- A "systematic analysis" of hazards at the proposed repository (see § 63.112(b));

- The “technical basis” for exclusion of hazards in the safety analysis (see § 63.112(d)); and
- An analysis of the performance of “the structures, systems, and components to identify those that are important to safety” (see § 63.112(e)).

It also violates postclosure safety regulations that require:

- An accounting of “uncertainties and variabilities in parameter values” (see § 63.114(b));
- Consideration of “alternative conceptual models of features and processes that are consistent with available data and current scientific understanding” (see § 63.114(c));
- The “technical basis for either inclusion or exclusion of degradation, deterioration, or alternation processes of engineered barriers” (see § 63.114(f)); and,
- The “technical basis for models used in the performance assessment” (see § 63.114(g)).

Finally, it violates the regulation requiring “complete and accurate” information “in all material respects.” 10 C.F.R. § 63.10.

Basis 9. (identified as 2.1.3 in CLK-SAFETY-001, TABLE 1) Clark County points to various operational uncertainties not considered by the DOE where it failed to model more than a single scenario with additional optimistic assumptions. This violates preclosure safety regulations requiring a “systematic analysis” of hazards at the proposed repository and the “technical basis” for exclusion of hazards in the safety analysis. See 10 C.F.R. § 63.112(b) and (d). It also violates postclosure safety regulations that require an accounting of “uncertainties and variabilities in parameter values,” consideration of “alternative conceptual models of features and processes that are consistent with available data and current scientific understanding,” and the technical basis for “exclusion of specific features, events, and processes in the performance assessment.” See § 63.114(b), (c) and (e). Finally, it violates the regulation requiring “complete and accurate” information “in all material respects.” 10 C.F.R. § 63.10.

Basis 10. (identified as 2.1.4 through 2.1.7 in CLK-SAFETY-001, TABLE 1) address the same concerns of uncertainty as 1.1.2 through 1.1.4, but with respect to improper modeling. Please see the responses to 1.1.2 through 1.1.4, *supra*.

Basis 11. (identified as 2.1.8 in CLK-SAFETY-001, TABLE 1) Clark County points out that the “[a]nalysis supporting SAR 1.6.3.4.1 in BSC 20007c LSN#DN2002406192 appears to have conflicting assumptions with respect to independence of crashes and over-flights on number of sorties flown.” This violates postclosure safety regulations that require an accounting of “uncertainties and variabilities in parameter values.” See § 63.114(b). It also violates the regulation requiring “accurate” information. 10 C.F.R. § 63.10.

Basis 12. (identified as 2.2.1 in CLK-SAFETY-001, TABLE 1) This mirrors 1.3.1, but with respect to improper modeling. Please see the response to 1.3.1, *supra*.

Basis 13. (identified as 2.2.2 in CLK-SAFETY-001, TABLE 1) - Clark County points out that the effects of stresses caused by surface damage to the disposal canisters introduced during handling mishaps are not considered in the SAR. The DOE’s failure to conduct an uncertainty analysis or a basis for its modeling assumption here violates the regulations for the same reasons described for 2.1.2, *supra*.

Basis 14. (identified as 2.2.3 in CLK-SAFETY-001, TABLE 1) Clark County points to various operational uncertainties not considered by the DOE where it failed to model more than a single scenario with additional optimistic assumptions. This violates the regulations for the same reasons described for 2.1.3, *supra*.

Basis 15. (identified as 2.2.4 in CLK-SAFETY-001, TABLE 1) This mirrors 2.1.4, but with respect to inappropriate screening analyses. Please see the response to 2.1.4, *supra*.

Basis 16. (identified as 2.2.5 in CLK-SAFETY-001, TABLE 1) This mirrors 2.1.5, but with respect to inappropriate screening analyses. Please see the response to 2.1.5, *supra*.

Basis 17. (identified as 2.3.1 in CLK-SAFETY-001, TABLE 1) This mirrors 1.3.1, but with respect to improper modeling. Please see the response to 1.3.1, *supra*.

Basis 18. (identified as 2.3.2 in CLK-SAFETY-001, TABLE 1) Clark County points out that “SAR p. 2.1-40 states that naval SNF are conservatively modeled as commercial SNF, without demonstrating that this is always conservative.” This violates the regulations for the same reasons described for 1.1.1, *supra*.

Basis 19. (identified as 2.3.3 in CLK-SAFETY-001, TABLE 1) Clark County points out that “SAR 2.4.2.2.1 claims that drip shield and waste package early failure mechanisms are represented by conservative assumptions, without demonstrating that specific assumptions are always conservative.” This violates the regulations for the same reasons described for 1.1.1, *supra*.

Basis 20. (identified as 3.1.1 in CLK-SAFETY-001, TABLE 1) Clark County notes that “Appendix I of TSPA Vol. 3 (LSN#: DEN001579005), which lists all of the FEPs and the reasons for their inclusion or rejection, does not consider uncertainties as promised in Chapter 1 of the SAR.” Ignoring steps in a method that search for sources of uncertainty will underestimate risk. The DOE’s failure to consider uncertainties here violates preclosure safety regulations requiring a “systematic analysis” of hazards at the proposed repository. See § 63.112(b). It also violates postclosure safety regulations that require an “accounting of uncertainties and variabilities in parameter values” and the “technical basis for models used in the performance assessment.” See § 63.114(b) and (g). Finally, it violates the regulation requiring “complete and accurate” information “in all material respects.” 10 C.F.R. § 63.10.

Basis 21. (identified as 3.1.2 in CLK-SAFETY-001, TABLE 1) Clark County explains that the DOE’s failure to use unsaturated zone water and the uncertainty in the water composition on the long-term corrosion effects of the drip shield and waste package are not included in its analysis. The DOE’s assumption in a method that searches for sources of uncertainty improperly underestimates risk and violates the regulations for the same reasons described for 2.1.2, *supra*.

Basis 22. (identified as 3.1.3 in CLK-SAFETY-001, TABLE 1) This mirrors 2.1.2, but with respect to improper methods assumptions. Please see the response to 2.1.2, *supra*.

Basis 23. (identified as 3.1.4 in CLK-SAFETY-001, TABLE 1) This mirrors 2.2.2, but with respect to improper methods assumptions. Please see the response to 2.2.2., *supra*.

Basis 24. (identified as 3.1.5 in CLK-SAFETY-001, TABLE 1) Clark County outlines that “SAR 1.7.2.5 human reliability analysis does not discuss dependencies among human failure events that are incorporated into fault trees.” The DOE’s failure to identify and model dependencies among human failure events can substantially underestimate risk from human-involved event sequences. Further, a review of the analysis reports cited by the DOE (e.g., LSN#DEN001578955), do not appear to address this issue. This violates preclosure safety regulations requiring a “systematic analysis” of hazards at the proposed repository and the “technical basis” for exclusion of hazards in the safety analysis. See § 63.112(b) and (d). It also violates postclosure safety regulations that require an accounting of “uncertainties and variabilities in parameter values,” consideration of “alternative conceptual models of features and processes that are consistent with available data and current scientific understanding,” and the technical basis for the exclusion of specific events in the performance assessment.” See § 63.114(b), (c) and (e). Finally, it violates the regulation requiring “complete and accurate” information “in all material respects.” 10 C.F.R. § 63.10.

Basis 25. (identified as 3.2.1 in CLK-SAFETY-001, TABLE 1) Clark County explains that the “[a]nalysis supporting SAR 1.6.3.4.1 (LSN # DEN001592183) in BSC 2007c (LSN#DN2002406192) assumes that, for flights outside the restricted zone, pilots will eject outside the zone.” Thus, there is no allowance for entry into the zone as the pilot tries to control or uncertainty and no convincing technical basis for this optimistic assumption. This violates the regulations for the same reasons described for 2.1.3, *supra*.

Basis 26. (identified as 3.2.2 in CLK-SAFETY-001, TABLE 1) Clark County identifies that “SAR 1.6.3.4.1 (LSN # DEN001592183) in BSC 2007c (LSN#DN2002406192) lacks justification for the technical basis for screening analysis of ordnance.” Thus, there is no support for the DOE’s screening analysis of ordnance, despite the proposed repository’s proximity to Department of Defense operations in the region. This violates preclosure safety regulations requiring a “[d]ata pertaining to the Yucca Mountain site, and the surrounding region.” See § 63.112(c). It also violates postclosure safety regulations that require data for “disruptive processes and events” because said data is missing from the analysis. See 10 C.F.R. § 63.114(a). Finally, it violates the requirement for “complete and accurate” information. 10 C.F.R. § 63.10.

Basis 27. (identified as 3.3.1 in CLK-SAFETY-001, TABLE 1) This mirrors 3.1.5, but with respect to unsubstantiated claims of conservatism. Please see the response to 2.1.2, *supra*.

Admittedly, the Advisory Pre-License Application Presiding Officer (“APAPO”) Board’s Memorandum and Order dated June 20, 2008 directed petitioners to “strive to frame narrow, single-issue contentions” that should be “sufficiently specific as to define the relevant issues for eventual rulings on the merits, and not require the parties or [CABs] to devote substantial

resources to narrow or to clarify them.”²⁹ Nevertheless, in the Order the CABs “contemplate[d] that many contentions that are admitted in this initial phase might have to be narrowed or otherwise restructured at later stages in the proceeding – particularly where petitioners did not strictly adhere to the ‘single-issue’ rule but nonetheless proffered contentions that contain sufficient information to satisfy the Commission’s regulations.”³⁰ Accordingly, Clark should not be criticized for asserting a contention that challenges the DOE’s failure to comply with multiple, but closely related regulations, particularly when the reason for the scope of the contention is the pervasiveness of the very problem being raised.

D. CLARK-SAFETY-001 Is Admissible

To be admitted, Clark must state its belief that the application fails to contain information on a relevant matter as required by law. It is well established that Clark meets its burden of proving admissibility of the contention if it identifies the failure and the supporting reasons for the petitioner's belief.³¹ CLK-SAFETY-001 very clearly states that the DOE has failed to provide the accounting that is required, and it provides the requisite technical discussion supporting the belief, which in turn is supported by an expert nuclear engineer – Dr. Bley.³²

Further, the DOE and the NRC Staff failed to rebut CLK-SAFETY-001’s technical discussion or question the authenticity of Dr. Bley’s affidavit or his qualifications as an expert in their answers to Clark’s Petition. More importantly, the Order does not question CLK-SAFETY-001’s technical discussion or Dr. Bley’s qualifications or competence.

The two statements in the Order purporting to explain the dismissal of this contention are each unsupported. The first statement is that “[t]he Board finds that CLK-SAFETY-001 is inadmissible because it does not provide the necessary facts or expert opinion required by 10

²⁹ Order at 20-21 (quoting *U.S. Dep’t of Energy* (High-Level Waste Repository), LBP-08-10, 67 NRC 450, 454 (2008)).

³⁰ *Id.* at 21.

³¹ *Fansteel Inc.*, (Muskogee, Oklahoma, Site) CLI-03-13, 58 N.R.C. 195, 203 (2003).

³² Clark’s Petition at Attachment 4 (Affidavit and *Curriculum Vitae* of Dennis C. Bley).

C.F.R. § 2.309(f)(1)(v).”³³ As previously discussed, this statement is erroneous, particularly in view of the Order’s citation to this contention as one that is by its nature admissible.³⁴

The second sentence purporting to explain the dismissal states that the contention “fails to provide sufficient information to show that there is a genuine dispute of material issue of fact or law as required by 10 C.F.R. § 2.309(f)(1)(vi).”³⁵ This statement likewise is erroneous. The contention itself, and its supporting affidavit, take issue with specific elements of DOE’s SAR and TSPA, and thus do create genuine issues of material fact. The contention also raises these deficiencies as shortcomings under the applicable NRC regulations governing the SAR and TSPA, and thus raises issues of law as well. In all cases, the analysis and opinions on which the contention is based are supported by the affidavit of a highly qualified expert – Dr. Dennis C. Bley. Thus, the Order’s unexplained conclusion that the contention fails to provide sufficient information to raise genuine issues of material fact is erroneous, and unsupported by the record and by reasoned decision-making. The Commission should correct this error and admit CLK-SAFETY-001.

³³ Order at 128.

³⁴ See discussion, *supra* at Section IV.A-B.

³⁵ Order at 128.

V. CONCLUSION

For the foregoing reasons, the Commission should reverse CAB-01's decision to deny CLK-SAFETY-001 for admission, and should admit this contention for hearing.

Dated: May 21, 2009

Respectfully submitted,

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of:

U.S. DEPARTMENT OF ENERGY

(High Level Waste Repository)

Docket No. 63-001-HLW

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing "Clark County, Nevada's Notice of Appeal and Brief on Appeal of LBP-09-06, Memorandum and Order (Identifying Participants and Admitted Contentions) of May 11, 2009," dated May 21, 2009, was served upon the following persons by Electronic Information Exchange.

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