



Rules of Evidence ("FRE") provide appropriate guidance.<sup>2</sup> In response to Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993), FRE 702 was amended in 2000 thus:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

Staff witness, Dr. Luk, is the principal author of a March 31, 2002 report on the seismic performance of the HI-STORM 100 cask at the PFS site<sup>3</sup> (hereafter "Luk Cask Report"), NRC Staff Exhibit P. The Luk and Guttman testimony relates exclusively to the Luk Cask Report – a report that is summary in nature, is based on information and data to which the State has had no access, and a report whose principal investigator and author the State has not had the opportunity to depose.

Part of Dr. Waters' testimony revolves around multiple dose calculations he performed, yet those calculations are not included in his testimony.

For the most part, the Stamatakis/McCann/Chen testimony presented in panel format gives no indication to whom the questions are directed or which witness is responding. Further, there is no foundational basis for the testimony, and opinions are offered by unidentified persons – answers are given in generic terms as to what the Staff relied upon and concluded with respect to PFS's seismic exemption request. The testimony also suffers from unreliable hearsay.

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<sup>2</sup> See, e.g., Duke Power Company (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-669, 15 N.R.C. 453, 475 (1982).

<sup>3</sup> NRC Project on Seismic Behavior of Spent Fuel Storage Casks Systems, Seismic Analysis Report on HI-STORM 100 Casks at Private Fuel Storage Facility, Rev 1, prepared by Vincent K. Luc, Jeffrey A. Smith, David A. Aube (Sandia National Laboratories), Robert A. Dameron (ANATECH Corp.), and Ignatius Po Lam (Earth Mechanics, Inc.), March 31, 2002.

A. The Luk and Guttman Testimony and the Luk Cask Report, Based on Undisclosed Facts and Data, Unknown Principles and Methods, and Unreliable Application of Principles and Methods to Reach Expert Opinion, Should Be Stricken.

In general, there have been three separate analyses of the seismic stability of the HI-STORM 100 cask during an earthquake: PFS's Holtec Report, HI-2012640, Multi Cask Response at the PFS ISFSI from 2000 Year Seismic Event (Rev. 2), Rev 1 (8/20/01); the State of Utah, Altran Technical Report No. 01141-TR-001, Analytical Study of HI-STORM 100 Cask System for Sliding and Tip-Over Potential During High-level Seismic Event, Rev. 0 (11/30/01), and NRC's Luk Cask Report (3/31/02). Both the State and PFS have made the authors of their reports available for deposition, have produced documents relevant to these reports, and all parties, including the NRC Staff, have had the opportunity to probe the other side's case prior to trial. No such opportunity existed with respect to the Luk Report or the testimony based thereon. See attachment, Timeline - Cask Stability Analysis,<sup>4</sup> showing list of analyses filed in this proceeding.

Answer 3(a) suggests that Mr. Guttman of the NRC Staff requested Sandia Laboratories conduct a "confirmatory analysis . . . to evaluate the potential for cask sliding, collision and tipover at the proposed PFS [f]acility." Nowhere in Mr. Guttman's testimony, however, is there any indication of the input parameters, methods or other specifics of the scope of the confirmatory analysis. Nor does Dr. Luk present specifics – he says the "Staff provided basic information to the research team, with respect to cask design, pad dimensions, soil-cement layers under and adjacent to the pad, the site specific soil profile, and time histories of seismic accelerations." Luk/ Guttman Testimony, A.6 at 4.

The Luk Cask Report is summary in nature. The State has not had access to the back up

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<sup>4</sup> The Staff supported PFS's seismic analysis and evaluation when the Staff issued its Safety Evaluation Report ("SER"), No. 2 Supplement to SER (geotechnical), and in all motions in which the Applicant has filed for summary disposition of the various portions of Utah L.

information from which the Luk cask report was developed. For the type of analyses that Dr. Luk conducted, there are probably 5-6 one to two inch thick binders of back up information consisting of inputs, formulations, outputs, etc. There are innumerable questions that must be posed to Dr. Luk before the State's expert can even begin to analyze his summary report. Here are a few examples. Holtec modeled the pad and the cask by using time history at the base of the cask. Did Dr. Luk apply the same time histories at the same position of the cask pad? Dr. Luk used the SHAKE program to determine the input parameters of the soil properties as a function of depth. How does this input compare with the input parameters Geomatrix provided to Holtec? What horizontal and vertical stiffness values did Dr. Luk use between the cask and the cask pad? For the motion at the top of the pad, how did Dr. Luk change time steps of time history analysis? How did Dr. Luk refine his model? Dr. Luk testified, "Each of the three seismic acceleration components of a set of time-histories was treated with a deconvolution procedure to produce a modified time history of deconvoluted accelerations with properly adjusted amplitudes and frequencies of the surface-defined accelerations." Luk/ Guttman Testimony A10 at 7. Such general descriptions in the testimony provide insufficient facts or data, and the reliability of the principles and methods used cannot be ascertained. Thus, if this testimony is being offered as expert opinion, it is unreliable and does not comport with FRE 702, and should be stricken.

Of particular significance in Dr. Luk's testimony is whether the ABASUS program Dr. Luk used in his soil structure interaction has been compared with industry programs, such as SASSI, which was developed specifically for soil structure interaction. As the Board is aware from the pre-filed testimony, the State has raised significant questions about Holtec's use of the DYNAMO and VisualNastran computer models – as well as with Holtec's input parameters. See Ostadan and Khan testimony. All of the cask stability analyses are highly technical and require a significant

amount of time by experts in the field to analyze – but this cannot be done without knowing the details of the process that went into the computer model upon which Dr. Luk bases his opinions and conclusions.

The simplified report does not provide the technical details to determine whether or not opposing experts can agree or disagree with the Luk Cask Report or Dr. Luk's testimony. The Luk Cask Report has come too late and the State has not and will not have the opportunity to test the accuracy of the data. *See e.g. Alabama Power CO.* (Joseph M. Farley Nuclear Plant, Units 1 and 2), LBP-77-24, 5 NRC 804, 938 n. 268 (1977), *aff. with modifications*, ALAB-646, 13 NRC 1027 (1981). Accordingly, the Luk Cask Report and the Luk testimony should be stricken in their entirety.

If the State's motion is denied, the State will essentially have to conduct a deposition of Dr. Luk during cross examination. This will take at least one day and drag out the hearing unnecessarily. More importantly, such a procedure will hamper the State in formulating trial strategy and proffering its best evidence. Therefore, it is unfair on the State to be at this stage and not have had the ability to probe the basis of Dr. Luk's conclusion that excessive cask sliding or cask collisions will not occur and that the cask will not tipover during a postulated seismic event at the PFS site. Luk/ Guttman Testimony A21 at 13. Accordingly, the testimony and the Report should be stricken.

As an alternative to striking the Luk testimony and Report, the Board could order that the Staff make Dr. Luk available in Salt Lake City to have his deposition taken during the early part of the week of April 22 and thereafter permit the State to supplement its prefiled testimony. Anything less would not accord the State a level playing field.

B. Part of the Waters Testimony, Based on Undisclosed Facts and Data, Unknown Principles and Methods, Is Unreliable and Should Be Stricken.

The Waters Testimony is offered on the potential dose consequences from a hypothetical cask tip over. Waters Testimony, A5 at 3. In answer to question 18, Mr. Waters states he conducted three different analyses or evaluations, and Mr. Waters describes those analyses and evaluations in answers 19 (damage to cask shield), 20 (thermal degradation of concrete shield) and 21 (spatial reorientation of the casks). The Staff has not produced documents to the State of the facts, data, or methodology that Mr. Waters relies upon to base his opinion. Although time consuming, the State can probably elicit sufficient information on cross examination as to Mr. Waters' evaluation and analyses contained in answers 19 and 21. Mr. Waters' answer to question 20 is a different matter. In answer 20, Mr. Waters testifies that the Staff used various computer codes to perform multiple dose calculations as a result of thermal degradation. The inputs to these calculations are not self-evident nor are the calculations presented in Mr. Waters' testimony. Accordingly, there are insufficient facts and data presented upon which Mr. Waters can base his opinion. Moreover, the calculations are unreliable because there is no evidence of the application of principles and methods to reach his conclusions. *See* FRE 702, *supra*. Without this basic information, Mr. Waters testimony in Answer 20 is unreliable and the entire answer should be stricken.

The State will be severely impeded in its attempt to elicit the underlying information from Mr. Waters during cross examination. As an alternative to striking Answer 20, the Board could order the calculations and the various assumptions that went into those calculations referred to by Mr. Waters in Answer 20, be turned over to the State in sufficient time for the State's experts to

analyze them and assist in formulating questions for cross examination during the hearing.<sup>5</sup>

C. Portions of the Stamatakos, McCann and Chen Testimony Are Unreliable, Lack a Witness Sponsor, Lack Foundation and Should Be Stricken.

The Stamatakos, McCann and Chen testimony relates to PFS's seismic exemption request and the Staff's recommended approval thereof. First, Answer 27 to this testimony should be stricken in its entirety. The unattributed answer, based on an unidentified NRC Staff conversation, on an unknown date, purportedly with a DOE official responsible for making a change in DOE-STD 1020-2002, concludes that the revision to DOE-STD 1020 "was not based upon technical considerations...." Stamatakos, *et al* Testimony at 31. The Staff's reliance on a portion of DOE-STD 1020-94 in finding PFS's exemption request acceptable and whether PFS should, at least, have to meet the  $5 \times 10^{-4}$  probability of exceedance for seismic design ground motion in DOE-STD 1020-02, are substantive issues in controversy in Section E (seismic exemption) of Utah L/QQ. The conclusion presented in Answer 27 is rife with speculation, unreliability and lack of factual knowledge, and it should not be allowed to stand.

Second, the testimony is presented in panel format. In NRC proceedings, witnesses are expected to testify individually rather than in panels, unless there is some clear and compelling reason for using the panel format, so that Licensing Board can better apply the usual tests of witness credibility and weight to be given to testimony. Safety Light Corp. (Bloomsbury Site Decontamination), 1991 WL 307322 (N.R.C.), 3 (1991). Moreover, there is no attribution to which panel member is answering the question. Other than the answers to introductory questions (1-3) and question 5 (regulations for seismic analysis and design), for the remaining 28 answers (4, 6-32) in the Stamatakos *et al* testimony it is unknown which witnesses are answering. Coupled with

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<sup>5</sup> Under the parties' current estimate, Mr. Waters would be expected to testify during week two of the hearing, approximately May 7 or possibly May 10.

the lack of a witness sponsor is the lack of foundation for the substantive responses. Answer 8 (no witness attribution) contains a generic reference to “we conducted an evaluation of the Applicant’s seismic exemption request” and “the Staff asked the CNWRA to conduct a technical review of the seismic and faulting hazard investigations,” but otherwise there is no indication whether any of the three witnesses has a foundation for any of the substantive responses or formed his or her opinion on the question asked. For example, in response to the bases of the Staff’s conclusion that the Applicant’s seismic exemption request is acceptable (question 12), there are about six pages of testimony describing what “the Staff” considered but no indication whether any of these three witnesses agrees with the Staff’s position. Questions 15 through 31 (pp 22-35) attempt to elicit the witnesses’ conclusions about the bases for Section E of Unified Utah L/QQ. But in each and every respect, the unattributed answer is in terms of what “the Staff” – not these witnesses – does or does not consider or conclude.

In considering whether applicants could merely rely on a final safety analysis report, the Appeals Board in Southern California Edison Co. (San Onofre Nuclear Generating Station, Units 2 and 3), ALAB-717, 17 NRC 346, 366 (1983) ruled that applicants “are obliged to put forward one or many witnesses ... who are competent to testify about those aspects of the FSAR that are in controversy.” Further said the Appeal Board, “[i]n upholding the exclusion of unsponsored technical analyses, we said that that kind of material manifestly is the type of evidence that calls for sponsorship by an expert who can be examined on the reliability of the factual assertions and soundness of the scientific opinions found in the documents.” *Id.* at 367. Similarly here, the Staff cannot rely on unsponsored technical analyses as are presented in the Stamatakos *et al* testimony by witnesses who do not offer their own factual assertions and who do not have a foundation for the opinions presented in the testimony.



Another significant point is that if the testimony is not stricken, cross examination will be excruciatingly lengthy and confusing. It will need to be established through cross examination which witnesses are responsible for the unidentified 28 responses, then to elicit whether the witnesses have a foundation for answering, and finally whether the opinions offered in the testimony are based on the expertise of the witnesses. Again the State will be hampered in developing its legal strategy and proffering its best evidence. Accordingly, Answers 4, and 6 through 32 should be stricken.

### CONCLUSION

The Board should strike the testimony of Dr. Luk and the Luk Cask Report in their entirety as unreliable because the general descriptions in the testimony and the Report provide insufficient facts or data and the reliability of the principles and methods used cannot be ascertained. As an alternative to striking the Luk testimony and Report, the Board could order that the Staff make Dr. Luk available in Salt Lake City to have his deposition taken during the early part of the week of April 22 and thereafter permit the State to supplement its prefiled testimony.

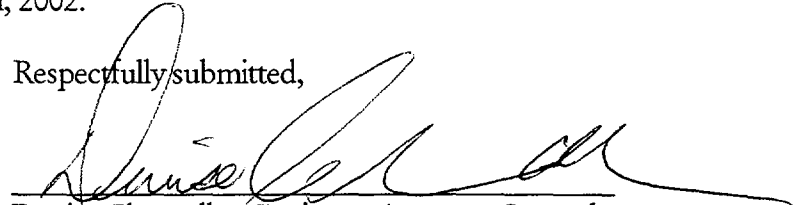
The Board should strike Answer 20 of the Waters testimony in its entirety because it is unreliable, or as an alternative the Board could order that the calculations and the various assumptions that went into those calculations referred to by Mr. Waters in Answer 20, be turned over to the State in sufficient time for the State's experts to analyze them and assist counsel in formulating questions for cross examination during the hearing.

Finally, the Board should strike the 28 answers to the Stamatakos, *et al* testimony – they are in improper format, do not contain a foundation for the responses or opinions by the testifying witnesses, and are otherwise unreliable. Separate and apart from striking the 28 answers, the Board should strike answer to question 27 in its entirety because it is speculative, unreliable and the

witnesses lack factual knowledge to support the opinion contained in the answer.

DATED this 15<sup>th</sup> day of April, 2002.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Denise Chancellor", is written over a horizontal line.

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CERTIFICATE OF SERVICE

I hereby certify that a copy of STATE OF UTAH'S MOTION IN LIMINE TO EXCLUDE PORTIONS OF NRC STAFF'S PREFILED TESTIMONY OF LUK & GUTTMAN; WATERS; AND STAMATAKOS, McCANN & CHEN (Unified Contention Utah L/QQ) was served on the persons listed below by electronic mail (unless otherwise noted) with conforming copies by United States mail first class, this 15<sup>th</sup> day of April, 2002:

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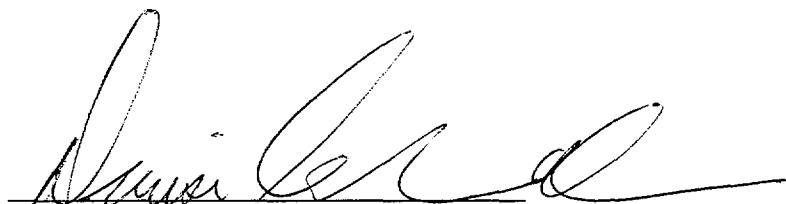
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A handwritten signature in black ink, appearing to read "Denise Chancellor", written over a horizontal line.

Denise Chancellor  
Assistant Attorney General  
State of Utah

### TIME LINE - CASK STABILITY ANALYSIS

Attachment to State of Utah's Motion in Limine to Exclude Portions of NRC Staff's Prefiled Testimony of Luk & Guttman; Waters; and Stamatakos, McCann & Chen (Unified Contention Utah L/ QQ) (April 15, 2002)

Date	Event
9/29/00	NRC Staff Safety Evaluation Report
8/20/01	Holtec Report, HI-2012640, <u>Multi Cask Response at the PFS ISFSI from 2000 Year Seismic Event</u> , (Rev. 2), Rev 1.
11/30/01	Altran Technical Report No. 01141-TR-001, <u>Analytical Study of HI-STORM 100 Cask System for Sliding and Tip-Over Potential During High-level Seismic Event</u>
12/21/01	NRC Staff Supplement No. 2 to SER (geotechnical)
2/25/02	Receipt of the Executive Summary of Luk Cask Report.
3/5/02 & 3/6/02	Depositions in Salt Lake City of cask stability witnesses: Dr. Khan (Utah) and Drs. Singh & Soler (PFS)
3/8/02	Receipt of electronic copy of the Luk Cask Report.
3/9/02 to 3/19/02	Dr. Luk unavailable (out of the country)
3/20/02	Notification by Staff that the Luk Cask Report contains some errors and that Dr. Luk is performing additional computer runs.
3/31/02	Date of Revision 1 of the Luk Cask Report.
4/1/02	Prefiled testimony due for Unified Contention Utah L/ QQ
4/2/02	Receipt of electronic copy Luk Cask Report, Revision 1 (received 5:05 pm EST)