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OFFICE OF SECRETARY
ADJUDICATIONS

**UNITED STATES OF AMERICA**
**NUCLEAR REGULATORY COMMISSION**

Before the Atomic Safety and Licensing Board

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| In the Matter of | ) | |
| | ) | |
| PRIVATE FUEL STORAGE L.L.C. | ) | Docket No. 72-22 |
| | ) | |
| (Private Fuel Storage Facility) | ) | ASLBP No. 97-732-02-ISFSI |

**APPLICANT'S RESPONSE TO STATE OF UTAH'S MOTION TO COMPEL PRODUCTION OF CERTAIN DOCUMENTS UNDER CONTENTION UTAH H**

Private Fuel Storage L.L.C. ("Applicant" or "PFS") files this response to the State of Utah's May 24, 2000 "Motion to Compel Applicant to Produce Supplemental Discovery Documents Regarding Utah Contention H and Request for Expedited Consideration" ("Mot. Compel"). The State seeks to force PFS to produce certain documents regarding a new issue, "the mixing zone," which the State raised for the first time in this proceeding on April 7, 2000. This new issue is outside the scope of Contention Utah H ("Utah H") as it was filed and admitted by the Atomic Safety and Licensing Board (and the State has never sought to file a late-filed contention on the "mixing zone"). Therefore, the documents that the State seeks concerning the "mixing zone" are not discoverable in that they are not relevant to Utah H, nor likely to lead to the discovery of admissible evidence concerning Utah H. Accordingly, the Atomic Safety and Licensing Board ("Board" or "ASLB") should reject the State's Motion to Compel and protect PFS from having to produce documents regarding new issues that are outside the scope of this contention.[1]

[1] PFS plans to file a companion Motion to Strike by the Board's deadline of May 31, 2000 requesting the Board to strike the State's testimony on the new issue of "the mixing zone" as beyond the scope of this contention, and therefore not appropriate for litigation as part of Utah H.

Template = SECY-041

SECY-02

## I. BACKGROUND

Contention Utah H, as admitted by the Board, and modified by subsequent agreement of the parties, contains only Bases 3, 4, and 5, which state:

> 3. PFS's projection that average daily temperatures will not exceed 100°F fails to take into account the heat stored and radiated by the concrete pad and storage cylinders.
>
> 4. In projecting ambient temperatures, PFS fails to take into consideration the heat generated by the casks themselves.
>
> 5. PFS fails to account for the impact of heating the concrete pad on the effectiveness of convection cooling.

See LBP-98-7, 47 NRC 142, 188-89 (1998); see also Mot. Compel at 2.[2] The parties have litigated these issues for the past two and a half years, including a motion for summary disposition filed by PFS based upon the Expanded HI-STORM Thermal ("EHT") model that Holtec developed and ran for the off-normal and extreme ambient temperature limits (of 100°F and 125°F respectively).[3] As reflected in the summary disposition pleadings and the Board decision, the parties understood that these bases raised "three factors" which the State claimed affected the thermal interaction of the casks on the PFSF storage pad. These were solar heating of the concrete pad and storage casks (Basis 3), the heat generated by the casks themselves (Basis 4), and the effect of heating of the concrete pad on the convection cooling of the casks (Basis 5).[4] Moreover, it was understood by

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[2] The page citations to the State's Motion to Compel are to a computer print-out of the State's electronic service of the Motion, as PFS has not yet received the hard copy sent by mail.

[3] Utah Contention H had been interpreted by the parties as being focused on the off-normal (100°F) and extreme hot ambient (125°F) short-term temperature limits which were analyzed in the EHT model. All the parties' filings and the Board's decision on summary disposition for Contention Utah H, LBP-99-42, 50 NRC 295 (November 2, 1999), reflect this focus and understanding. In the March 7, 2000 supplementation of its discovery responses and the March depositions of its witnesses, the State first expressed specific concern about the long term normal temperature limit, and in the April 13 deposition of its witnesses identified the normal temperature limit as the sole limit that it now seeks to litigate under Utah Contention H. See Letter from S. Turk to ASLB (May 26, 2000) and deposition transcripts attached thereto.

[4] LBP-99-42, 50 NRC at 297-303; Declaration of Dr. Marvin Resnikoff Regarding Material Facts in Dispute With Respect to Contention H, ¶¶12-18 (June 25, 1999).

the Board and the parties that the reference in Basis 4 to "heat generated by the casks themselves" concerned alleged "radiative heat transfer" from adjacent casks. Id.

Belatedly on April 7, 2000 – little more than one month before direct testimony was to be filed – the State presented PFS with a host of new issues, including, *inter alia*, "the mixing zone above the casks."[5] As the State acknowledges, this was the first time that the issue of "the mixing zone" had ever been raised by the State. See Mot. Compel at 4. The "mixing zone" had never been mentioned in previous pleadings or communications of the State nor by the other parties or the Board. At the same time, the State proposed that PFS run a new FLUENT analysis, which the State labeled the "Extended EHT (EEHT) model," to address the State's remaining concerns. RWMA Memo at 2. The State also stated that it would have its own consultants, Professors Yiannis Andreopoulos and Latif Jiji from the New York City University, run this same analysis using FLUENT.[6]

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[5] See Memorandum from RWMA to D. Curran "Re: RWMA's Evaluation of Holtec Thermal Analysis, Contention H" at 2 ("RWMA Memo") (Exhibit 2 to Mot. Compel). This memorandum was the result of the State's belated supplementation of its discovery responses. Prior to the initial depositions of the State's witnesses held on March 9-10, 2000, PFS requested the State to supplement its discovery responses, including providing certain information and calculations of its witnesses which the State (in negotiating the resolution of PFS's disputes concerning its June 28, 1999 discovery responses) had agreed to provide prior to the deposition of its witnesses. See Letter from P. Gaukler to D. Chancellor (March 1, 2000) (included as Attachment 1 hereto). During the initial deposition of the State's witnesses, it was clear that they had not yet completed their analysis and calculations and could not even say whether in their opinion the PFSF thermal design failed to meet any of the applicable thermal limits. See Resnikoff Dep. Trans. at 36-37, 39, 87-88 (Mar. 9, 2000): Lamb Dep. Trans. at 32-34, 64, 83-84 (Mar. 10, 2000). The State and PFS agreed that the State would provide the additional analysis of its witnesses on the open issues identified in the depositions by March 20, with the depositions to be continued the last week of March. By March 20, however, the State's witnesses had completed little of their analysis. See Letter from P. Gaukler to D. Curran (March 21, 2000) (included as Attachment 2 hereto). Although promising to complete their analysis by March 24 (id.), the State did not do so and therefore parties agreed to request the Board to continue the depositions yet again. See Joint Request to Extend Date for Completion of Depositions of State's Experts for Utah Contention H at 1 (Mar. 28, 2000).

[6] RWMA Memo at 3; see also Deposition Trans, of Dr. Resnikoff and Mr. Lamb at 9-11 (April 13, 2000) ("Resnikoff/Lamb Dep."). It appears from the State's Motion to Compel that the State did not follow through on its intent to have Professors Andreopoulos and Jiji run the same analysis as PFS. See Mot. Compel at 6. The State claims that it discontinued its own analyses "in anticipation that the new Holtec computer run would accomplish the same goal." Id. PFS, however, did nothing to discourage the State from performing its own independent analyses. To the contrary, at the State's request, PFS made expeditious arrangement to allow the State's new consultants, Professors Andreopoulos and Jiji at the City University of New York, to have access to all of the proprietary Holtec thermal analyses done to that time, to assist

In an attempt to resolve the State's outstanding concerns and reach a settlement of the contention, PFS undertook to analyze the State's new concerns, as suggested, including "the mixing zone above the casks," regardless of whether they were within the scope of the contention.[7] PFS verbally provided the State with preliminary results of the new analyses as they became available and subsequently informed the State that its analyses showed that all the State's concerns, including the mixing zone, were addressed with resulting temperatures considerably below the applicable NRC temperature limit. See Attachment 3 (May 24 Gaukler to Curran letter) at 4-5. The State, however, informed PFS that the results of the analyses it had done were insufficient to resolve the State's concerns. Id.

Thereupon, PFS focused its pre-filed direct testimony generally on the issues in Utah H as written and admitted – and not on the State's new concerns that went outside the bases of the contention – and so advised the State of its intent.[8] Specifically, PFS did not address in its testimony the State's new issue of "the mixing zone above the casks," which PFS could not read into the literal terms of the contention with its stated bases.[9]

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the Professors in completing their thermal analysis. Therefore, the State's decision to discontinue its own analysis efforts cannot be laid at PFS's feet.

[7] See Letter from P. Gaukler to D. Curran at 4-5 (May 24, 2000) (included as Attachment 3 hereto). PFS's decision to analyze issues beyond the contention's scope does not itself now render those issues within the scope of Utah H. As discussed below, the scope of a contention is established by its literal terms, coupled with its stated bases. A contention is not an amorphous, unspecified claim that changes shape as an intervenor develops new issues

[8] PFS did address in its testimony some of the State's newly expressed concerns, including the effects of wind and increased solar insolation on the sides of the casks due to the larger spacing of the PFSF cask array than the Holtec generic array. PFS addressed these issues, even though they were never raised in the contention as filed and admitted by the Board, because they are relatively straightforward to address. Because PFS has chosen to analyze some issues outside the scope of the contention does not obligate PFS to address every issue outside the scope of the contention. To the extent PFS's willingness to address these factors now confounds the State, PFS would have no problem if the Board were to find that none of the State's newly expressed concerns are within the scope of Utah H, which PFS believes would be proper.

[9] Not only is "mixing zone" nowhere to be found in Utah H, but the State never raised the "mixing zone" in its comments filed on the general rulemaking for the HI-STORM 100. See Letter from C. Nakahara to E. Julian re: State of Utah's Comments on NRC Proposed Approval of the Holtec HI-STORM 100 Cask System, Docket No. 72-1014 (Dec 6, 1999) (no comments regarding mixing zone above the casks). As dis-

On May 15, 2000, the State requested PFS to produce additional documents relating to PFS's new thermal analyses, including the *.cas and *.dat files "used to estimate the effect of the mixing zone above the casks." PFS voluntarily produced to the State the documents it had requested concerning the Additional Thermal Analysis (filed as PFS Exhibit A in conjunction with its direct testimony). See Attachment 3 (May 24 Gaukler to Curran letter). However, PFS refused to produce the *.cas and *.dat files used to analyze "the mixing zone above the casks" on the basis that the State's new "mixing zone" concern was outside the scope of the contention, and therefore, as elaborated on below, not within the scope of discovery for Utah H. Id. at 4. On May 24, 2000, the State filed a Motion to Compel production of the *.cas and *.dat files used to analyze "the mixing zone." Mot. Compel at 1.

## II. ARGUMENT

The State's Motion to Compel must be rejected because (1) the "mixing zone" is beyond the scope of Utah H, and (2) the Motion employs an incorrect legal standard.

### A. "The Mixing Zone Above the Casks" is Beyond the Scope of Utah H

As set forth above, Utah H only has three remaining bases which raise "three factors" that the State claims affect the thermal interaction of the casks on the PFSF storage pad – i.e., solar heating of the concrete pad and storage casks (Basis 3), heat generated by the casks themselves (Basis 4), and the effect of heating of the concrete pad on the convection cooling of the casks (Basis 5). None of these bases mentions a "mixing zone above the casks," or questions PFS's analysis of what occurs in the air above the storage casks."[10] (Moreover, Basis 3 addresses solely the off-normal 100°F operating condition,

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cussed below, the mixing zone is a not PFSF site-specific issue, but a generic issue properly raised in the general rulemaking, which the State failed to do. The State cannot now attempt to raise in a site-specific hearing generic issues more appropriate for consideration and resolution as part of the general rulemaking.

[10] Bases 3, 4, and 5 are defined, in their entirety, in the State's November 23, 1997 Contentions filing, at pages 54 - 55. As set forth there, Basis 3, in its entirety, states:

which is no longer in dispute in this proceeding.[11]) These are the bases that the parties litigated for the first two and a half years of this proceeding, prior to the April 7, 2000 RWMA Memo (Exhibit 2 to the Mot. to Compel). Not until that date was any mention made of a "mixing zone" above the casks.[12]

The fact that the "mixing zone" issue is outside the scope of Bases 3, 4, and 5 of Utah H is confirmed by the Board's decision denying summary disposition with respect to

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> Second, PFS's projection that average daily temperatures will not exceed 100°F fails to take into account the heat stored and radiated by the concrete pad and by the concrete cylinders in which each cask will be stored. These massive concrete structures will serve as reservoirs that trap and radiate heat throughout the day and night, thus having a potentially significant effect on average ambient temperatures.

Basis 4, in its entirety, states:

> Third, in projecting ambient temperatures, PFS fails to take into consideration the heat generated by the casks themselves. [Sentence on distance between TranStor casks deleted.] The Holtec cask is 11 feet in diameter and the spacing between Holtec casks is therefore 4 feet. Holtec HI-STORM 100 TSAR Rev. 2 at 1.2-1. Given the close proximity of the casks, it is likely that additional heat from an adjacent cask would increase the external and internal temperatures of the concrete storage cylinders, and therefore the maximum cladding temperature.

Basis 5, in its entirety, states:

> Finally, PFS has not taken into account the thermal impact of the temperature differential between the level of the concrete pad and the level of the tops of the storage casks, 15 feet above. Because of the heat-retaining nature of the concrete pad, the air temperature near the ground will be higher than the temperature 15 feet above. This will have an impact on the ventilation system for the casks, which relies on convection, in which cool air is drawn into the cask inlets and is heated by the inner canister, causing the air to rise. This 'chimney effect' depends on a difference in temperature between the incoming and outgoing air. If the temperature of air going into the vents is higher than the temperature of the air 15 feet off the pad, the buoyancy and velocity of air through the ducts is reduced. Air moving more slowly through the ducts, and at a higher temperature, will cool the canisters more slowly than cooler air. Thus, the design temperature for the casks (and the cladding inside them) may be exceeded due to the reduced effectiveness of convection cooling.
>
> PFS's design of the ISFSI is inadequate because it fails to take into account these factors in establishing the temperature-related design limits for storage casks, or to establish measures to ensure that the manufacturer's design limits will not be exceeded during storage. PFS should be required to perform the requisite calculations and reevaluate the temperature-related design limits of the facility.

[11] See Resnikoff/Lamb Dep. at 99-100 (attached to S. Turk May 26 letter to the ASLB); see also Testimony of Dr. Krishna P. Singh and Dr. Indresh Rampall on Contention Utah H at 8-9 (May 15, 2000).

[12] The NRC Staff agrees that it had never heard of the "mixing zone" issue prior to the April 7, 2000 memorandum. See Letter from S. Turk to the ASLB at 2 (May 26, 2000).

those bases. Based on its evaluation of the declaration of Dr. Marvin Resnikoff filed by the State, the Board concluded that "material factual disputes still remain regarding the central assertion in subparts three, four, and five of contention Utah H that cask and pad radiative heat have not been considered in the analysis supporting the PFS application." LBP-99-42, 50 NRC at 304 (emphasis added). In reaching its conclusion, the Board identified the specific remaining issues raised by Dr. Resnikoff on which the Board based its denial of summary disposition; none of these issues mentioned any alleged "mixing zone above the casks."[13]

Thus, nowhere in Utah H or in the State's opposition to summary disposition (nor in PFS's summary disposition motion, nor the Staff's response, nor the Board's decision) is there any explicit or implicit mention of, or reference made to, the issue of "the mixing zone above the casks." Therefore, the issue is simply beyond the scope of the remaining bases of Utah H as filed and admitted by the Board, and the documents requested by the

[13] In concluding that the State had raised material issues of fact concerning the "crux of the State's complaint in [Utah H]: the failure to consider cask and pad radiative heat," LBP-99-42, 50 NRC at 302, the Board identified the following specific remaining issues raised by the State. First, "Dr. Resnikoff declares generally that although the effect of radiative heat transfer from adjacent casks is to increase each cask's surface temperature, he does not believe this was taken into account...." Id. (emphasis added). Second, "[h]e also states that adjacent cask radiative heating has not been taken into account given PFS's admission that the original calculation did not account for the thermal effects of casks on each other or of the pad on the cask and the fact that the radiative cask surface temperature in the original calculation and the revised thermal analysis are the same." Id. (emphasis added). Third, "Dr. Resnikoff declares that it is not apparent the heat stored and radiated by the concrete pad was taken into account under the revised analysis because the buoyant force has not been reduced." Id. (emphasis added). Fourth, "according to Dr. Resnikoff, it is not apparent that the heat radiated by the casks themselves or by adjacent, interacting casks has been taken into account...." Id. (emphasis added). Finally, "Dr. Resnikoff also declares... it is not apparent that the revised calculation takes into account concrete pad radiative heat." Id. at 303 (emphasis added).

Based on the State's assertions, the Board concluded that "[t]he upshot of this State showing is to establish that there remain material factual disputes about whether cask and pad radiative heat, the central concern of subparts three, four, and five of contention Utah H, have been addressed in connection with the PFS application thermal effects analysis. As a consequence, partial summary disposition of these matters cannot be entered as requested by PFS." Id. (emphasis added). None of the State's reasons given for opposing summary disposition mention "the mixing zone above the casks." Moreover, the mixing of air above the casks does not concern radiative heat transfer, Declaration of Indresh Rampall at ¶ 12 (May 30, 2000) ("Rampall Dec.") (included as Attachment 4 hereto), whereas the issues raised by the State, and relied on by the Board for denying summary disposition, address only radiative heat transfer. Thus, the issue of "mixing zone above the casks" was not raised by the State as a basis for its opposition to summary disposition of Utah H.

State concerning the "mixing zone" are neither relevant to Utah H nor likely to lead to the discovery of admissible evidence concerning Utah H.[14]

The State's contrary view that the "the mixing zone" documents it seeks are relevant to Utah H, or calculated to lead to the discovery of admissible evidence, is based on a reading of the contention far removed from the issues left to be litigated under Bases 3, 4, and 5, a reading which conflicts with governing NRC precedent on the scope of admitted contentions. In its motion to compel, the State asserts that Utah H encompasses two related global issues to which the requested documents are relevant: (1) "the overall adequacy of the thermal analysis" and "the thermal design of the ISFSI," and (2) the adequacy of the EHT Model "to model likely thermal conditions at the PFS facility."[15] The State's new expanded definition of Utah H goes far beyond the remaining bases of Utah H, which (as discussed above) challenge the alleged failure to take into account specific thermal considerations, radiative heat from adjacent casks and heating of the concrete pad. (Indeed, the new, expanded definition goes beyond the original scope of Utah H.) The remaining bases of Utah H do not, and never did, encompass the entire "thermal design of the ISFSI," nor the entire issue of "model[ling] likely thermal conditions at the PFS facility."[16] NRC case law firmly establishes that the scope of a contention is determined by its literal terms, coupled with its stated bases. Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-899, 28 NRC 93, 97 (1988).

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[14] The documents requested by the State, "the *.cas and *.dat files for the analysis of the mixing zone above the casks," are identical to the FLUENT files already produced to the State except for changes made solely to address the "mixing zone above the casks." Rampall Dec. at 11. Therefore, PFS has already produced to the State those parts of the *.cas and *.dat files that are arguably relevant to the remaining bases of Utah H.

[15] Mot. Compel at 11; see also "Declaration of Dr. Marvin Resnikoff in Support of Motion to Compel" at 2 (identifying the same two global issues as the scope of Utah H).

[16] The limited scope of Utah H is confirmed by the Board's distinguishing its grant of summary disposition on Utah C (based on revised radiation dose analyses) from its denial of summary disposition on Utah H. In doing so, the Board stated that the determinative issue under Utah H did not concern the overall "validity of the revised thermal analysis," but whether the revised analysis addressed and took into account "the crux of the State's complaint," namely "the failure to consider cask and pad radiative heat." 50 NRC at 302.

Nothing in the literal terms of Bases 3, 4, and 5 mention anything about a "mixing zone above the casks."

If an intervenor could raise at any time new broad general issues beyond the specific bases of an admitted contention, then the construct of the Commission's pleading rules, which require identification of specific bases with supporting facts, would become meaningless. So to would the Commission's rules allowing for summary disposition. As stated in Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), ALAB-919, 30 NRC 29, 42 (1989), "[t]o permit reformulation of contentions every time their proponents file another pleading would be tantamount to rejecting all notions of an orderly and fair administrative process." Therefore, as the Board has recognized, an intervenor seeking to expand the scope of an existing contention to raise new issues must follow the Commission's regulatory requirements for late-filed contentions.[17]

Finally, the "mixing zone" issue is also beyond the scope of Utah H, because it is an issue of generic import, and not a PFSF site-specific issue. Nowhere has the State identified site specific factors that make mixing above the casks an issue unique to the PFSF, as opposed to the generic cask arrays approved by the Commission in the Certificate of Compliance for the HI-STORM 100. See 65 Fed. Reg. 25,241 (May 1, 2000). Because the issue of the "mixing zone" is a generic issue, it is "not subject to attack...in [this] adjudicatory proceeding." 10 C.F.R. § 2.758(a). As noted above (note 9), the State failed to raise this issue in its comments on the general rulemaking, and cannot now attempt to belatedly raise the "mixing zone" issue in this site-specific hearing.

**B. State's Interpretation of Duty to Supplement is Wrong**

The State also mistakenly claims that PFS is under a duty to supplement its previous discovery responses to the State's document production requests Nos. 1 and 2 in the

[17] LBP-99-23, 49 NRC 485 (1999) (Granting Motion for Summary Disposition on Utah C); LBP-99-43, 50 NRC 306 (1999) (Denying Request for Admission of Late-Filed Amended Contention Utah C).

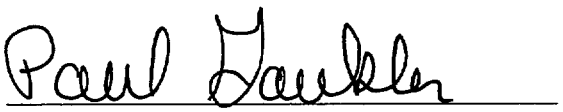
State's First Set of Discovery Requests (which requested, *inter alia*, "copies of all input files and result files, including all *.cas and *.dat files employed....") because PFS's responses "are no longer complete." Mot. Compel at 3, 8. In NRC licensing proceedings, however, a party has no general duty to supplement discovery responses that are "complete when made ... to include information thereafter acquired [with specific exceptions]." 10 C.F.R. § 2.740(e). The State incorrectly asserts that the exception in 10 C.F.R. § 2.740(e)(2)(ii) requires PFS to supplement its responses here. However, the duty to supplement under 10 C.F.R. § 2.740(e)(2)(ii) relates to correctness, not completeness.[18]

Here, PFS responded to the State's requests on November 30, 1999 with a complete set of all FLUENT *.cas and *.dat files, employed up to that time, which response remains true and correct to this day.[19]

## III. CONCLUSION

For the foregoing reasons, the Board should reject the State's Motion to Compel PFS to produce documents on the new issue of "the mixing zone."

Respectfully submitted,



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Dated: May 30, 2000

[18] 10 C.F.R. § 2.740(e)(2)(ii) provides that a party is under a duty "to amend a prior response if he obtains information upon the basis of which . . . (ii) he knows that the response though correct when made is no longer true and the circumstances are such that a failure to amend the response is in substance a knowing concealment." 10 C.F.R. § 2.740(e)(2) (emphasis added to portion of 10 C.F.R. § 2.740(e)(2)(ii) omitted from State's quotation). The State misreads this text to state that there is a duty to supplement if prior responses "are no longer complete" when in fact it applies when prior responses are no longer "correct."

[19] Rampall Dec at ¶¶ 6-7, 10; W. Hollaway letter to D. Curran (Nov. 30, 1999) (included as Attachment 5).

# Attachment 1

## Letter from P. Gaukler to D. Chancellor (March 1, 2000)

ShawPittman

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March 1, 2000

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**Re: Supplementing Utah H Discovery Requests Prior to Depositions**

Dear Denise:

The purpose of this letter is to confirm discussions that we have had concerning supplementation of discovery responses, in particular supplementing the responses to Utah H prior to the depositions scheduled for next week. In our communications last summer concerning the State's responses to PFS's discovery requests concerning Utah H, contained in the "State of Utah's Objections and Response to Applicant's Second Set of Discovery Requests with Respect to Groups II and III Contentions" of June 28, 1999, the State agreed to supplement its Utah H discovery responses prior to the deposition of its expert during the limited discovery window for Group II contentions, then scheduled for January and February 2000.

Specifically, with respect Utah H – Interrogatory No. 4 (which requested the State's position as to the "maximum annual average temperature and the maximum average ambient temperature over a 24-hour period" that could reasonably occur at the PFSF), you indicated that the State had not determined at that time what it believes are the appropriate temperatures, either with or without the storage pads and casks, but you agreed that the State would provide PFS with its calculations of such prior to the deposition of its expert. (See my Discovery Letter to you dated July 20, 1999 at Item 5.) Similarly, with respect to Utah H – Interrogatory No. 5 (which requested the State to provide what it contends are the maximum short-term and long-term temperature limits for the concrete used in the spent fuel storage casks and the bases therefor), the State similarly agreed that it would provide PFS with its position (and supporting calculations/ bases) for what it contends are the appropriate concrete temperature limits prior to the deposition of its expert. (See Id. at Item 6.) We request the State to supplement its responses to Interrogatory Nos. 4 and 5 as previously agreed.

Further with respect to Utah H – Request for Admission Nos. 4-7, the State agreed to confirm that it did not possess, and was not aware of any, recorded temperature data applicable to these Requests. (See July 20, 1999 Discovery Letter at Item 3.) On August 11, 1999, the State produced, however, a chart of temperatures recorded at Dugway Proving Ground (monthly maxima and minima and average daily maxima and minima for each month of the year), and stated further that it was still investigating this matter and anticipated having what it believed to be the maximum average 24-hour temperature and the maximum annual average temperature by the close of discovery in January 2000. (See your Discovery Letter to me dated August 11, 1999.) We request the State to supplement its responses to Utah H – Request for Admission Nos. 4-7 in light of any new information it possesses and to squarely admit or deny PFS's requests regarding the temperatures recorded in Skull Valley and in Utah, the subject of Requests for Admission Nos. 4-7.

Similarly, we request the State to update Utah H – Interrogatory Nos. 1-3 ; Document Requests Nos. 3-5, which asked the State to identify what it contends are the "maximum annual average temperature and the maximum average ambient temperature over a 24-hour period" that have been recorded in Skull Valley (Interrogatory No. 1) and the State of Utah (Interrogatory Nos. 2 and 3). The State had agreed to check further whether it had any information responsive to these requests. (See July 20, 1999 Discovery Letter at Item 4.) The State responded similarly, as it had with respect to Request for Admission Nos. 4-7, that it had obtained the Dugway data and anticipated having what it believed to be the maximum average 24-hour temperature and the maximum annual average temperature by the close of discovery in January 2000. (See August 11, 1999 Discovery Letter.) We request the State to supplement its responses to this discovery in light of any new information it possesses. If the State asserts that the "ambient" conditions are altered by the presence of the ISFSI and the spent fuel storage casks (see August 11, 1999 Discovery Letter), the State should nevertheless answer Interrogatories 1-3 individually, in that they pertain to temperatures that the State claims to have been previously recorded.

Finally, with respect to the "State of Utah's Objections and Response to Applicant's Second Set of Discovery Requests" of January 31, 2000, the State responded to Request for Admissions Nos. 16 and 17 and Interrogatory Nos. 1, 2 and 4 (in part) that it could not answer these requests insofar as they pertained to the December 13, 1999 Holtec sensitivity studies because of insufficient time to evaluate those studies. The State has now had these materials (hand-delivered to counsel January 19, 2000) for six weeks, and we request the State to supplement its responses to these requests prior to the depositions next week.

ShawPittman



Given that the Utah H depositions are scheduled for March 8 and 9, we request the State to provide supplements to the above discovery responses (and any other Utah H discovery that may require supplementation) by Friday March 6, 2000. Please let me know if you have any questions concerning this letter, or if the State will in anyway be unable to supplement its discovery responses as requested above. I can be reached at 202-663-8304.

Sincerely,

Paul

Paul A. Gaukler

cc: Diane Curran, Esq.
Ms. Connie Nakahara

# Attachment 2

## Letter from P. Gaukler to D. Curran
## (March 21, 2000)

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March 21, 2000

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**Re: Private Fuel Storage**

Dear Diane:

I am writing to follow up on our telephone conversations of last Friday and today. In our telephone conversation last Friday, you indicated that the State would not be in a position to provide us its final analysis and position on the open issues from the Resnikoff/Lamb depositions by close of business Monday, March 20, 2000 as we had previously agreed upon at the end of the Lamb deposition. I had understood, however, that we were to receive on Monday most, if not all, of the analysis subject to a potential check by an outside expert. I was obviously disappointed, therefore, as I expressed in our conversation today, that we received the State's position on only three of the nine or ten or so open issues identified in the depositions, which is far from the substantial part of the analysis that I had understood we were to receive Monday. You have assured me, however, that we will have the complete package by this Friday, March 24, and promised to check to see whether portions of the remaining analysis would be ready for delivery to us earlier.

With respect to the three issues on which you have provided us the State's analysis, there does not appear to be any dispute that would even require a deposition. You had also stated in your call last Friday that the State was satisfied that the concrete temperature limits of the storage casks would be met; thus there appears to no longer be a dispute with respect to bases 6 and 7 of Utah Contention H. Please let me know if my understanding in this regard is incorrect.

Further, today you indicated that the State's primary concern was with respect to the normal case for which the Holtec "far field" generic ambient annual temperature limit is 80°F. As we discussed, however, the "far field" ambient maximum annual temperature for the PFSF site – which corresponds to the Holtec 80°F normal case limit – is 51°F. See PFSF SAR at § 4.2.1.5.2 As Dr. Resnikoff has stated, the State has the same

temperature data as does PFS, and there is no dispute regarding the far field ambient temperatures. Therefore, in evaluating whether the cladding or any other temperature limits would be violated for storage casks at the PFSF site, the State needs to take into account that the PFSF site specific far field ambient maximum annual temperature applicable to the normal case is 51°F, not 80°F. Similarly, there are conservatisms between the PFSF site specific "far field" ambient temperatures applicable to the short term, off-normal limits and those of the Holtec generic design. For example, the highest instantaneous temperature recorded at Dugway, as acknowledged by the State, is 109°F (see D. Chancellor letter to P. Gaukler of August 11, 1999), which is far less severe than the 125°F extreme ambient limit assumed by Holtec (over a three day period) for its short term temperature maximum.

I strongly urge the State to consider the above conservatisms – in addition to all the other conservatisms in the Holtec EHT model discussed at the depositions – in evaluating whether it has any remaining concerns that require litigation under Utah H, which, if not, would make unnecessary the continuation of the Resnikoff and Lamb depositions.

With respect to the date for depositions next week, should such prove to be necessary, we have agreed to schedule them for Wednesday at 9:00 a.m. at our offices, subject to our review of the materials you provide us on Friday. If after a review of the materials, we believe that we need more time to prepare for the depositions, we will advise you by close of business on Monday, March 27. In that event, we have agreed that the depositions will be held on Friday, March 31, 2000. I have yet to check with Sherwin to confirm whether these dates are satisfactory to the Staff.

Finally, with respect to your request last Friday for analysis predating the EHT analysis performed by Holtec on behalf of PFS, we have independently confirmed what Sherwin advised in his letter to you of March 17, 2000, that the NRC had not rejected a previous analysis which Holtec "later replaced with the EHT model." Rather, the documents you cite in your e-mail, as best as we can tell, relate to generic issues raised in the HI-Storm docket.

Sincerely,

Paul

Paul A. Gaukler

cc: Denise Chancellor, Esq.
Sherwin E. Turk, Esq.

# Attachment 3

## Letter from P. Gaukler to D. Curran
## (May 24, 2000)

ShawPittman

*A Law Partnership Including Professional Corporations*

PAUL A. GAUKLER
202.663.8304
paul.gaukler@shawpittman.com

May 24, 2000

Diane Curran, Esq.
Harmon, Curran, Spielberg &
Eisenberg, L.L.P.
1726 M Street, N.W., Suite 600
Washington, D.C. 20036

**Re: Additional Document Production for Contention Utah H**

Dear Ms. Curran:

I have received your letter of May 15, 2000 concerning your request for additional discovery concerning Contention Utah H. In your letter of May 15, 2000, you submitted four new discovery requests to PFS:

1. Any documents discussing the basis for Holtec's claim that ignoring the thermospihon effect results in a 150°F conservatism. This request includes but is not limited to the following documents:

   "HI-STORM System Thermal Evaluation," Holtec Report HI-981892, Rev. 0.

   "Topical Report on the HI-STAR/HI-STORM Thermal Model and Its Benchmarking with Full-Size Cask Test Data," Holtec Report HI-992252, Rev. 0.

   "A Revised Thermal Model with Parametric Study of Key Variables," Holtec Report No. HI-971722.

2. *.cas and *.dat files (both on zip disks and in prinout form) of all FLUENT models described in the Additional Thermal Analysis.

3. All *.cas and *.dat files (both on zip disks and in prinout [sic] form) of all FLUENT models used to estimate the effect of the mixing zone above the casks.

4. Any other hand or computer calculations performed by Holtec that were used to obtain results described in paragraphs 2 and 3 above.

Letter from D. Curran to P. Gaukler and W. Hollaway at 1-2 (May 15, 2000) (Re: Discovery on Utah Contention H).

PFS is voluntarily producing certain documents in response to your request – regardless of whether any such production is required under 10 C.F.R. § 2.740(e), and regardless of whether any such documents are relevant under 10 C.F.R. § 2.740(a) to the issues remaining in Contention Utah H. The documents that PFS is producing the in response to your request are the following:

1. In response to your request #1:

   - Holtec Report no. HI-992252, "Topical Report on the HI-STAR/HI-STORM Thermal Model and Its Benchmarking with Full-Size Cask Test Data," Rev. 0 (1999).

   - Holtec Report no. HI-971722, "A Revised Thermal Model with Parametric Study of Key Variables," Rev. X (1997).

   - Holtec Report no. HI-2002413, "Additional Thermal Evaluation of the HI-STORM 100 System for Deployment at Skull Valley," Rev. 0 (2000). A copy of this report was initially provided to you on May 12, 2000.

   (We are not producing "HI-STORM System Thermal Evaluation," Holtec Report HI-981892, Rev. 0 for the reasons stated below.)

2. In response to your request #2:

   - ASCII printouts of *.cas and *.dat files of all FLUENT models described in Holtec Report no. HI-2002413 ("Additional Thermal Evaluation"). This includes ASCII printouts of the following files:

     - wind1.cas
     - wind1.dat
     - wind2.cas

- wind2.dat
- wind3.cas
- wind3.dat
- wind4.cas
- wind4.dat
- wind5.cas
- wind5.dat
- wind6.cas
- wind6.dat
- pfs-eht.cas
- pfs-eht.dat

- A zip disk with electronic copies of the *.cas and *.dat files of all FLUENT models described in Holtec Report no. HI-2002413, listed above.

3. In response to your request #3:

   No documents are being provided, as discussed below.

4. In response to your request #4:

   PFS is unaware of any documents responsive to your request for other hand or computer calculations that were used to obtain results described in your requests #2 and #3.

The documents that we are producing to the State contain Holtec proprietary information, and are clearly identified as containing confidential information and should be treated as such in accordance with the State's confidentiality agreements with PFS and Holtec.

PFS is not producing certain documents requested by you in your letter of May 15, 2000. First, with respect to your request #1, PFS is not producing Holtec Report no. HI-981892, "HI-STORM System Thermal Evaluation." We have reviewed this report and determined that it is a generic HI-STORM report that is beyond the scope of the remaining bases of Contention Utah H. This document

does not discuss or relate to the conservatism in the PFS-EHT analysis of neglecting the effect of convective heat transfer inside the multipurpose canister, which is the subject of your request #1.

Second, concerning your request #3, PFS is not producing *.cas and *.dat files (both on zip disks and in ASCII printout form) of FLUENT models used to estimate the effect of the mixing zone above the casks. The remaining bases of Contention Utah H, as admitted by the Board, do not address a mixing zone above the casks. These documents are not relevant to the remaining issues in Contention Utah H and are not being produced in response to your request.

We hand-delivered these documents to you in an expedited manner yesterday afternoon, May 23, 2000, to provide the State time to review them, if necessary, in preparation for the hearing beginning the week of June 19, 2000. You requested that PFS produce to you hundreds of pages of new documents and we have had PFS's contractor, Holtec International, working throughout the weekend to create and assemble documents for you as quickly as possible. The documents were hand-delivered to you within eight days of receiving your letter.

Finally, I do not agree with your complaint regarding the timing of PFS's production of these documents to the State. PFS produced to the State the documents relating to its analysis of the off-normal (100°F) and extreme hot ambient (125°F) temperature conditions in November, 1999. PFS did not commence its analysis of the matters that you requested in your May 15, 2000 request (analysis of normal operating conditions (52°F), and the long-term temperature limits) until recently, after learning that this was the State's sole concern in the depositions of your witnesses in March and April 2000. Prior to that time, Utah Contention H had been interpreted by all parties as being focused on the off-normal (100°F) and extreme hot ambient (125°F) temperature conditions, and the short-term temperature limits, that was analyzed in the EHT model for the PFSF site. All parties' filings, and the Licensing Board's decision, on summary disposition for Contention Utah H, LBP-99-42, 50 NRC 295 (November 2, 1999), reflect this focus and understanding.

Over the month prior to filing testimony, we had attempted to settle this contention by addressing all of the State's concerns on the general subject of thermal conditions in spent fuel storage, whether or not the State's concerns were technically within the scope of Contention Utah H. When our analysis demonstrated satisfactory answers with substantial margins below the applicable temperature limits, the State

informed us that this was not sufficient. We have therefore returned to addressing the contention as it was admitted by the Board, and not addressing additional issues raised by the State that, as a legal matter, are clearly outside the scope of the contention. We have addressed some issues, such as increased solar insolation on the sides of the cask and the effects of wind, that were never raised in Contention Utah H, and therefore did not have to be addressed. We have provided these analyses to the State. While in the context of attempting to settle PFS has done certain analyses to answer the State's concerns, our choice to analyze them as a matter of discretion does not make them within the scope of the contention. Because PFS has chosen to analyze some issues outside the scope of the contention does not obligate PFS to address every issue outside the scope of the contention. PFS cannot be faulted for providing analyses outside the scope of the contention to the State later than the State would prefer, or even not providing such analyses at all (such as the "mixing zone" analysis). PFS has no obligation to produce to the State, or even to perform, analyses that are outside the scope of this contention.

Moreover, waiting until the deposition of its witnesses to raise its concerns regarding normal operating conditions and the long-term temperature limit, the States' witnesses put PFS in the position of having to develop the new analysis in the PFS-EHT model under short notice. If the State had fully identified its concerns in responses to PFS's written discovery, PFS would have had more time to address that concern, and the State would have had more time to study PFS's response. The State was dilatory in not responding to PFS's written discovery and did not fully respond until the time of the deposition of its witnesses, despite having agreed with PFS to fully respond earlier. I therefore do not share your view that the State has been unfairly deprived of sufficient time to evaluate PFS's response to its concerns regarding normal operating conditions and the long-term temperature limit.

Please contact me if you have any questions regarding this matter.

Sincerely,

Paul A. Gaukler

Paul A. Gaukler

cc: Denise Chancellor, Esq. (w/o attachments)
Sherwin E. Turk, Esq. (w/o attachments)

# Attachment 4

## Declaration of Indresh Rampall
## (May 30, 2000)

May 30, 2000

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

| | | |
|---|---|---|
| In the Matter of | ) | |
| | ) | |
| PRIVATE FUEL STORAGE L.L.C. | ) | Docket No. 72-22 |
| | ) | |
| (Private Fuel Storage Facility) | ) | ASLBP No. 97-732-02-ISFSI |

**DECLARATION OF DR. INDRESH RAMPALL**

I, Dr. Indresh Rampall, state as follows under penalties of perjury:

1. I am a consulting engineer at Holtec International. In that position I am responsible for performing engineering and thermal analysis of spent fuel storage systems. I am providing this declaration to support certain facts in a filing submitted by Private Fuel Storage, L.L.C. ("PFS") on May 30, 2000 in response to a motion to compel certain documents under Contention Utah H filed by the State of Utah ("State") on May 24, 2000.

2. My professional and educational experience is summarized in my resume, which is attached as Exhibit 1 to this declaration. A substantial portion of my work at Holtec International has been directed towards thermal analysis supporting the design and licensing of spent fuel storage systems. I have served as the principal analyst for the thermal calculations for the HI-STORM 100 for the general rulemaking and the thermal calculations for the HI-STORM 100 with respect to its intended use at the Private Fuel Storage Facility ("PFSF").

3. I am the primary author of both the EHT model thermal analysis and the PFS-EHT model thermal analysis performed for PFS to evaluate its use of the HI-STORM 100 spent fuel storage cask.

4. The EHT model thermal analysis evaluated the off-normal operating conditions (i.e., 100°F) and extreme hot ambient operating conditions (i.e., 125°F) for the HI-STORM 100 spent fuel storage cask for the generic HI-STORM cask array, which results bounded the PFSF site specific cask array and temperature conditions. The FLUENT computer runs were documented in the PFS Calculation Package, "HI-STORM Thermal Analysis for PFS RAI, Rev. 0," Holtec Report HI-992134.

5. The PFS-EHT model thermal analysis evaluated the normal operating conditions for the PFSF site (i.e., 52°F) for the PFSF site specific cask array.

6. I am familiar with PFS document production made on November 30, 1999, which provided the State with FLUENT *.cas and *.dat files that had been used to perform the EHT model thermal analyses for the PFSF.

7. The set of FLUENT *.cas and *.dat files that PFS produced to the State on November 30, 1999 was a complete set of all such files that had been employed for the thermal analyses in the PFS Calculation Package. The set of FLUENT *.cas and *.dat files produced to the State on November 30, 1999 related to the EHT model thermal analysis, described above. The information that was provided in the set of FLUENT *.cas and *.dat files that PFS produced to the State on November 30, 1999 was correct when it was made and is still true.

8. PFS produced another set of FLUENT *.cas and *.dat files to the State on January 19, 2000. The set of FLUENT *.cas and *.dat files produced to the State on January 19, 2000 was a complete set of the FLUENT *.cas and *.dat files for the EHT model thermal modeling sensitivity studies which were completed up to December, 1999. The information that was provided in the set of FLUENT *.cas and *.dat files that PFS produced to the State on January 19, 2000 was correct when it was made and is still true.

9. I provided to PFS the set of FLUENT *.cas and *.dat files that PFS produced to the State on May 23, 2000 for the PFS-EHT model thermal analysis and the PFS Wind Effects thermal analysis described in the May 12, 2000 Holtec International Report No. HI-2002413, "Additional Thermal Evaluation of the HI-STORM 100 System for Deployment at Skull Valley." These files were generated after the April 13, 2000 deposition of the State's witnesses, Dr. Marvin Resnikoff and Matthew Lamb.

10. The FLUENT *.cas and *.dat files that the State has requested in its May 24, 2000 Motion to Compel (i.e., the "mixing zone" files) were also generated after the April 13, 2000 deposition of Dr. Marvin Resnikoff and Matthew Lamb.

11. The documents requested by the State in its Motion to Compel, "the *.cas and *.dat files for the analysis of the mixing zone above the casks," are identical to the FLUENT *.cas and *.dat files for the PFS-EHT model thermal analysis that PFS already produced to the State on May 23, 2000 except for changes made solely to address the "mixing zone above the casks."

12. The "mixing zone above the casks" relates to heat dissipation above the casks and does not concern radiative heat transfer.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on May 30, 2000.

Indresh Rampall

Dr. Indresh Rampall

# EXHIBIT 1

to Declaration of Indresh Rampall

(May 30, 2000)

**INDRESH RAMPALL, Ph.D.**

**PRINCIPAL ENGINEER**
**HOLTEC INTERNATIONAL**

---

## EDUCATION

University of Notre Dame
Ph.D. in Chemical Engineering (1992)

University of Notre Dame
M.S. in Chemical Engineering (1989)

Indian Institute of Technology
B. Tech in Chemical Engineering (1978)

## PROFESSIONAL EXPERIENCE

**HOLTEC INTERNATIONAL**
Marlton, New Jersey
April 1993 - Present — Principal Engineer

**CLARKSON UNIVERSITY**
Potsdam, NY
1992 - 1993 — Research Associate

**UNIVERSITY OF NOTRE DAME**
Notre Dame, Indiana
1988-1992 — Graduate Assistant

**ENGINEERS INDIA LIMITED (EIL)**
New Delhi, India
1978 - 1987 — Senior Engineer, Research and Development Department

## PATENTS

*An improved process scheme for production of phthalic anhydride by oxidation of o-xylene in multistage reaction systems*, by I. Rampall, A. Datta and P.K. Mukhopadhayay.

## DRY AND WET SPENT FUEL STORAGE TECHNOLOGY

- Developed the thermal design and evaluation methodologies for metal and concrete dry cask storage systems.
- Devised thermosiphon cooling of spent nuclear fuel in dry casks.
- Developed Computational Fluid Dynamics methodologies for thermal-hydraulic evaluation of wet and dry fuel storage systems.
- Performed site-specific accident evaluations (vegetation fire, fuel explosion, partial cask submergence in flood water) using Computational Fluid Mechanics models for Private Fuel Storage, L.L.C., and other Holtec clients.

- Principal Analyst responsible for thermal-hydraulic qualification of HI-STAR dual-purpose (storage and transportation) and HI-STORM storage casks (Docket Nos. 72-1008, 71-9261, and 72-1014).

- Rerack licensing of Sizewell-B, KEPCO, Waterford-3, Millstone-3, CP&L, and a dozen other spent nuclear fuel pools.

## PROCESS DESIGN AND DEVELOPMENT

1. Process design work including Heat and Material Balance Calculations, preparation of Process Flow and P&I Diagrams, Specifications for Process Instruments, Pumps and Equipment (Pressure Vessels, Heat Exchangers, etc.). Also prepared Operations Manuals for start-up, operations, shutdown, emergency procedures and plant safety.

2. Developed process models for design of two-phase flow high pressure pipelines from off-shore platforms.

3. Developed steady state and dynamic process design models of heterogeneous fixed bed catalytic reactors used in refineries and petrochemical plants. The models were used to analyze industrial and pilot-plant data for the o-xylene and ethylene oxidation reactors to develop a complete reactor simulation model.

4. Development of a process design and simulation model for the zeolites based ZSM-5 catalyst used in the xylenes isomerization reactor for a large petrochemical complex. Appointed as the lead process engineer for planning of bench scale experiments at plant site as well as analysis of data to obtain a detailed kinetic model of the process.

### Chemical Process Plant Operation

1. Appointed as the *lead process engineer* for development of the Ethylene epoxidation technology. Completed the process design, construction supervision and operation of a highly automated, full-scale, single tube, medium pressure, pilot plant for the catalytic oxidation of ethylene to ethylene oxide. Highly experienced with hands-on work involving process instrumentation, continuous on-line analyzers as well as process gas chromatographs. Developed process models from statistical analysis of pilot-plant data to evaluate catalyst/reactor performance.

2. Commissioning of a 25 million lbs/yr industrial plant for the production of phthalic anhydride by oxidation of o-xylene. Worked in pre-commissioning activities, preparation for start-up, establishing stable and safe operating conditions and guarantee test runs to meet all process specifications for yield and purity of products.

## Ph.D. RESEARCH

### Shear induced structure and migration in non-colloidal suspensions

1. *Experimental determination of the pair distribution function for a suspension of spheres in simple shear flow*

A new direct flow visualization technique, employing a thin sheet of laser light, is developed for imaging the interior of suspensions. This is combined with a novel pattern recognition algorithm to simultaneously locate the position and size of particles in a dynamic cross-section of a suspension of 3 mm acrylic spheres sheared in a flow visualization apparatus. Fundamental information on the nature of particle interactions and the suspension micro-structure is obtained. In addition to direct applications in predicting rheological properties of the suspension such as the bulk viscosity, we also gain insight into the more complex phenomena such as normal stress differences, anisotropy, particle migration, etc.

2. *The influence of shear induced migration on turbulent resuspension*

A new model is proposed to predict the condition when particles are first ejected from the viscous sub-layer of a fluid flowing over a settled layer of particles into the turbulent core of the fluid. The resuspension process is modeled in terms of a set of non-linear integro-differential convection-diffusion equations with moving singular boundaries. The equations are discretized and solved as a large set of *dense* differential and algebraic equations using the DASSL solver on the Convex mini-supercomputer.

Important Applications of PhD Research

- Knowledge of the micro-structure (i.e., the local arrangement and orientation of particles) has important applications in the area of Rheology of Suspensions and mechanical properties of Filled Polymer Composites. The bulk properties of the suspension such as effective viscosity, thermal and electrical conductivities are strongly influenced by this local distribution of particles.

- In the area of Multi-Phase Flow, the resuspension and transport of an initially settled bed of particles due to turbulent flow of fluid is solved. This work has applications in viscous systems such as flow of coal-oil slurry or drilling muds.

- Solved the mass transfer due to turbulent eddies near a wall in sedimenting systems. The model is applicable for the analysis of the improved performance of cross-flow microfiltration of suspended particles as well as in ultrafiltration of large molecular species. Increased mass fluxes can be obtained due to an induced secondary eddy flow in the near wall region.

Computational Experience

Developed programs in Fortran and C for solving complex engineering problems using advanced numerical techniques on a variety of hardwares - IBM, Vax, Convex, and Sun workstations - and operating systems - DOS, VAX/VMS, Unix, etc.

Supercomputer Training

Undertaken special training programs to take advantage of the Convex vectorization support in Fortran. Familiar with programming techniques on the massively parallel Connection Machine.

Post-Doctoral Research

- Influence of buoyancy-induced flow temperature fields in closed cavities.

- Developed analytical techniques for computing buoyant flows under time-varying gravity conditions.

**PUBLICATIONS**

1. *Measurement of the shear-induced microstructure of concentrated suspensions of non-colloidal spheres*, by D.T. Leighton and I. Rampall, Review paper in "Particulate Two-Phase Flow", M. Roco (editor), Butterworths, (1993).

2. *The influence of shear induced migration on turbulent resuspension*, by I. Rampall and D.T. Leighton, Submitted to the Int. J. of Multiphase Flow, (1992).

3. *The influence of surface roughness on the pair-particle distribution function in dilute suspensions of non-colloidal spheres in simple shear flow*, by I. Rampall, J.R. Smart, D.T. Leighton, Submitted to the Journal of Fluid Mechanics, (1992).

4. *Studies in reactor configuration for phthalic anhydride production*, by I. Rampall, A. Datta and P.K. Mukhopadhayay, "Frontiers in Chemical Reaction Engineering", vol. II, L.K. Doraiswamy and R.A. Mashelksar (Editors), 241-258, John Wiley and Sons, (1984).

5. *Parameter estimation and simulation of multi-tubular ethylene oxide reactor*, by R. Aggarwal, I. Rampall and A. Datta, "Recent Trends in Chemical Reaction Engineering", vol. II, B.D. Kulkarni, R.A. Mashelkar and M.M. Sharma (Editors), 360-374, Wiley Eastern, (1987).

**PRESENTATIONS**

1. *Flow driven by oscillatory gravitational fields in a vertical channel wall effects*, by I. Rampall and R. Shankar Subramanian, First international workshop on g-jitter, Clarkson University, Potsdam, NY (June 13-18, 1993).

2. *A direct flow visualization method to study the shear-induced microstructure of non-colloidal suspensions*, by I. Rampall, Invited seminar talk at Clarkson University, Potsdam, NY (1993).

3. *Particle dynamics near a solid wall in concentrated suspensions of non-colloidal spheres*, by G. Krishnan, I. Rampall and D.T. Leighton, Presented at the AIChE Annual meeting in Miami, FL (1992).

4. *The influence of shear induced migration on turbulent resuspension*, by I. Rampall and D.T. Leighton, Presented at the AIChE Annual meeting in Los Angeles, CA (1991).

5. *On the pair-particle distribution function in dilute suspensions of non-colloidal spheres in simple shear flow*, by I. Rampall, J.R. Smart and D.T. Leighton, Paper presented at the AIChE Annual meeting in Chicago (1990).

# Attachment 5

## Letter from W. Hollaway to D. Curran
## (November 30, 1999)

ShawPittman

*A Law Partnership Including Professional Corporations*

*Not Admitted in DC*
*Supervised by Members of DC Bar*

WILLIAM R. HOLLAWAY, PH.D.
202.663.8294
william.hollaway@shawpittman.com

November 30, 1999

Diane Curran, Esq.
Harmon, Curran, Spielberg & Eisenberg
1726 M Street, NW, Suite 600
Washington, DC 20036

**Re: Document Production for Contention H Pursuant to Agreement**

Dear Ms. Curran:

Pursuant to our agreement of November 19, 1999 on discovery issues regarding contention Utah H and the Atomic Safety and Licensing Board's November 19, 1999 Order (Granting Protective Order Extension Motion), please find attached the following documents, which PFS agreed to provide to the State by November 30, 1999:

1. The expanded HI-STORM 100 thermal ("EHT") model. This EHT model is documented in the Holtec proprietary report "HI-STORM Thermal Analysis for PFS RAI," HI-992134, Rev. 0, dated February 2, 1999. (Provided under Tab 4).

2. Electronic ZIP copies of all the case (i.e., *.cas) and data (i.e., *.dat) files that comprise the input and output for the EHT model. (Provided on enclosed ZIP disk).

3. ASCII text versions of all the case and data files for the EHT model identified in #2 above. (Provided under Tabs 1, 2, and 3).

4. Copies of the table of contents and the relevant sections of the FLUENT user's manual. (Provided under Tab 5).

Note that all of this material is proprietary and confidential (and is so stamped), and therefore must be held confidential by the State pursuant to its agreements with Private Fuel Storage, L.L.C. and with Holtec International.

Sincerely,

William R. Hollaway

Document #: 851680 v.1

DOCKETED
USNRC

'00 MAY 31 P3:42

OFFICE OF SECRETARY
ADJUDICATIONS STAFF

**UNITED STATES OF AMERICA**

**NUCLEAR REGULATORY COMMISSION**

Before the Atomic Safety and Licensing Board

| | | |
|---|---|---|
| In the Matter of | ) | |
| | ) | |
| PRIVATE FUEL STORAGE L.L.C. | ) | Docket No. 72-22 - ISFSI |
| | ) | |
| (Private Fuel Storage Facility) | ) | |

## CERTIFICATE OF SERVICE

I hereby certify that copies of Applicant's Response to State of Utah's Motion to Compel Production of Certain Documents Under Contention Utah H and attachments were served on the persons listed below (unless otherwise noted) by e-mail with conforming copies by hand delivery or by U.S. mail, first class, postage prepaid, this 30th day of May 2000.

G. Paul Bollwerk III, Esq., Chairman
Administrative Judge
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
e-mail: GPB@nrc.gov

Dr. Jerry R. Kline
Administrative Judge
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
e-mail: JRK2@nrc.gov; kjerry@erols.com

Dr. Peter S. Lam
Administrative Judge
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
e-mail: PSL@nrc.gov

* Susan F. Shankman
Deputy Director, Licensing & Inspection
Directorate, Spent Fuel Project Office
Office of Nuclear Material Safety & Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
Attention: Rulemakings and Adjudications Staff
e-mail: hearingdocket@nrc.gov
(Original and two copies)

* Adjudicatory File
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

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Sherwin E. Turk, Esq.
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U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
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Denise Chancellor, Esq.
Assistant Attorney General
Utah Attorney General's Office
160 East 300 South, 5th Floor
P.O. Box 140873
Salt Lake City, Utah 84114-0873
e-mail: dchancel@state.UT.US

John Paul Kennedy, Sr., Esq.
Confederated Tribes of the Goshute Reservation and David Pete
1385 Yale Avenue
Salt Lake City, Utah 84105
e-mail: john@kennedys.org

Joro Walker, Esq.
Land and Water Fund of the Rockies
2056 East 3300 South, Suite 1
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e-mail: joro61@inconnect.com

Diane Curran, Esq.
Harmon, Curran, Spielberg & Eisenberg, L.L.P.
1726 M Street, N.W., Suite 600
Washington, D.C. 20036
e-mail: dcurran@harmoncurran.com

Danny Quintana, Esq.
Skull Valley Band of Goshute Indians
Danny Quintana & Associates, P.C.
68 South Main Street, Suite 600
Salt Lake City, Utah 84101
e-mail: quintana@xmission.com

* By U.S. mail only

Paul A. Gaukler

Document #: 938717 v.1