December 17, 2010

MEMORANDUM TO: Stewart N. Bailey, Chief
Safety Issues Resolution Branch
Division of Safety Systems
Office of Nuclear Reactor Regulation

FROM: Blake A. Purnell, Project Manager ***/RA/***
Generic Communications and Power Uprate Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF NOVEMBER 19, 2010, TELECONFERENCE WITH PERFORMANCE CONTRACTING, INC. TO DISCUSS ITS NARROW FLUME TESTING

On November 19, 2010, U.S. Nuclear Regulatory Commission (NRC) staff held a teleconference with representatives of Performance Contracting, Incorporated (PCI) and its partners (the vendor) to discuss technical issues concerning PCI's narrow flume testing as it relates to pressurized-water reactor containment sump strainer performance. Client licensees of PCI also participated in the call. This teleconference was closed to the public due to the proprietary nature of the discussions. This teleconference was a continuation of a teleconference held on October 19, 2010. A publicly available summary of the October 19, 2010, teleconference is available in the NRC Agencywide Documents Access and Management System (ADAMS) under Accession Number ML103080861.

The following proprietary PCI document was discussed during the call:

- PDT-2010.11.12, Rev. 0, "Narrow Flume Testing Data & Conclusions," prepared by Alden Research Laboratory, Inc., dated November 2010

DISCUSSION

The NRC staff began the discussion with a recap of past phone calls where the narrow flume testing was discussed. Specifically, the NRC staff made the following points:

1. The NRC staff's concern with the narrowness of the test flume applies to all debris types.
2. The proposed flume width sensitivity testing may provide some insights into debris transport behavior in a flume. However, this testing would be of limited value because it would not bound debris transport conditions that could occur in plant containment pools or in Alden's large test flume with regard to several important scaling parameters (i.e., debris per unit flow channel width, debris per unit floor area, debris per unit fluid volume).
3. Narrowness of the test flume is one of the most significant concerns that the NRC staff has regarding the large flume test protocol, particularly given the length of the flume.

The vendor stated that it understood the staff is concerned about the narrow flume testing, but it still did not understand the bases for the staff's concern. The vendor indicated that it would like the staff to provide a basis for questioning the prototypicality of the narrow flume testing, such as other experiments. The staffs concerns arise from observation and testing. The staff stated that because PCI's testing is somewhat unique, there is no other data with which to make a direct comparison.

The staff then provided the vendor with feedback on its "Narrow Flume Testing Data & Conclusions" document. The staff stated that, for the very limited data provided, the flume width did not appear to have a significant impact on the debris transport results. However, the vendor has not yet shown this data is applicable to plant conditions or strainer qualification test conditions.

The staff also noted that not all the data was provided. The vendor stated that it will provide all data to staff, but had not done so yet because it was still working on understanding some of it. The vendor stated that it expects to provide the additional data by November 24, 2010. The vendor has some concerns that its debris introduction method may have affected the results for the additional data set in a manner that would not represent plant conditions.

The staff asked for additional details about how the tests were conducted and what was observed, some of which are described below. The vendor stated it would present videos of testing at a future meeting to help address these questions.

The staff noted that the vendor-stated accuracy of measured wet debris weights was somewhat higher than similar measurements the staff is aware of. The staff stated that it expects the vendor's measurements to be sufficiently accurate for the purpose described in the report.

The vendor stated that it realized that a form of an equation provided in the proprietary document was incorrect and stated that the evaluation was based on a correct form of the equation. The vendor also stated that the document would be updated to reflect the correct form of the equation.

The vendor agreed to revise the discussion of the preparation of the test debris form to reflect the actual method used to prepare the debris for the narrow flume sensitivity tests. The staff agreed with the vendor that the debris preparation process described during the call should lead to a debris form for the narrow flume testing that has a maximum size that is appropriately conservative for conducting tests. However, further future discussion was found necessary regarding the minimum size of the small pieces used by the vendor. The vendor stated that it did have problems with clogging of its debris injectors, but when this occurred, it would stop the test and not use those results. The vendor stated it was trying to resolve this issue.

The staff asked about how long the vendor waited between each batch addition and whether any long term batch tests were done. The vendor stated it only took about five minutes for one batch to be added and transport to the degree possible. The staff stated that it was important that the debris addition rates and times between batches be sufficiently similar between the sensitivity tests and strainer head loss tests to ensure applicability. The staff asked if any longer timescale tests of a single batch were done, which could provide insight into erosion and delayed transport of debris that may have temporarily stalled in the flume. The vendor stated it

had not done any longer timescale tests on single batches, but it would consider doing so in the future.

The staff suggested that the vendor review and compare its results to NUREG/CR-6772, "GSI-191: Separate-Effects Characterization of Debris Transport in Water," since this technical report describes experiments of a similar nature to the vendor's testing. In particular, the staff noted that NUREG/CR-6772 showed that, for the low debris concentrations tested, 100 percent of the shredded pieces of fiberglass debris transported at a flume flow rate of 0.19 feet per second.

The vendor agreed to consider the available information and subsequently respond to the staff's question concerning how much fiber had transported past the fiber collection basket, both while installed and while removed for cleaning.

The staff summarized several important scaling parameters regarding the application of the sensitivity test results to plant conditions and to strainer head loss test conditions, including the following:

- Debris load scaling to flow channel geometric dimensions
- Transport effects from interactions involving other debris types not tested
- Effects of debris addition rate and timing of batches and measurements
- Depth of the flume
- Length of the flume

The staff requested that the vendor provide justification that the conditions used for the narrow flume sensitivity tests are representative of both plant post-accident conditions and the conditions to be used for strainer qualification tests, with respect to small pieces of fiberglass as well as other debris types. Based on the information currently provided, it was not clear whether the sensitivity test conditions adequately envelop the plants that plan to participate in the vendor's strainer qualification test program.

The staff and vendor agreed to hold a closed meeting on December 2, 2010, to further discuss issues associated with the narrow flume sensitivity testing. The vendor stated that it would present videos of the testing at this meeting.

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ADAMS ACCESSION NO.: ML103270378

OFFICE	LA:DPR:PGCB	PM:DPR:PGCB	BC:DSS:SSIB	PM:DPR:PGCB
NAME	CHawes	BPurnell DPB for	SBailey	BPurnell
DATE	11/23/10	11/30/10	12/17/10	12/17/10

List of Participants for November 19, 2010,
Teleconference with Performance Contracting, Inc. and Licensees

Name	Affiliation
Ron Holloway	Wolf Creek Nuclear Operating Corp.
Chuck Feist	Comanche Peak
Bill Beckius	Entergy Nuclear Operations, Inc. (Palisades)
George Goralski	Entergy Nuclear Operations, Inc. (Palisades)
Jim Bleigh	Performance Contracting, Inc.
Chris Kudla	Performance Contracting, Inc.
Fariba Gartland	AREVA
Ludwig Haber	Alden Research Laboratory
Stu Cain	Alden Research Laboratory
Steve Smith	NRC
John Lehning	NRC
Blake Purnell	NRC
Stewart Bailey	NRC

Enclosure

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RidsAcrsAcnwMailCenter
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