

December 20, 2012

GROUP: PERFORMANCE CONTRACTING, INC.

SUBJECT: SUMMARY OF NOVEMBER 14, 2012, CLOSED TELECONFERENCE WITH PERFORMANCE CONTRACTING, INC., AND ALDEN RESEARCH LABORATORY REGARDING LARGE FLUME TESTING FOR WOLF CREEK GENERATING STATION AND CALLAWAY PLANT

On November 14, 2012, U.S. Nuclear Regulatory Commission (NRC) staff held a teleconference with representatives of Performance Contracting, Incorporated (PCI) and Alden Research Laboratory to discuss the preliminary test results and challenges for its Large Flume Test Protocol for emergency core cooling system strainer testing for Wolf Creek Generating Station and Callaway Plant. This teleconference was closed to the public due to the proprietary nature of the discussions.

On October 22, 2012, PCI submitted responses to NRC staff comments dated July 11, 2012, regarding the Wolf Creek/Callaway Bypass Test Plan and Report (ADAMS Accession No. ML12298A031). The PCI responses contain proprietary material and are not publicly available.

During the November 14, 2012, teleconference, the NRC staff discussed each PCI response as well as concerns/questions that the staff had with these responses. The NRC staff found that the PCI responses frequently addressed the staff question adequately, but some responses required further discussion. The following is a summary of the areas where significant discussion occurred.

#### **SUMMARY OF DISCUSSION:**

##### Test Procedure

The NRC staff requested additional explanation of the test termination criteria which was discussed in question 2 of the referenced document. The NRC staff noted that the termination criteria was based on a single data point that may not be repeatable and that test termination should be based on fiber bypass measurements for each test. PCI responded that the test will be run for a time equal to the point where hot leg switchover occurs for each plant. The NRC staff agreed that this is an acceptable methodology.

The NRC staff requested additional information regarding the potential for hideout of debris in the test loop and the potential for agglomeration of debris being reintroduced to the loop (questions 5, 16, and 18 of the referenced document). PCI stated that the debris addition portion of the loop was being redesigned so that debris could not be retained within that portion of the facility. Without additional details, the NRC staff could not validate that the redesign would prevent debris retention, but agreed that the concept for the redesign appeared adequate. Additionally, the potential for retention of debris in the flume was discussed. The NRC staff was concerned that debris could be retained in low flow areas upstream of the debris addition point. PCI was confident that debris would not be retained in these areas due to flow,

and that for bypass tests, debris would be visible if trapped in such areas. PCI stated that any debris being reintroduced would be adequately diluted to prevent agglomeration.

The NRC staff stated that some controls on valve manipulations may be required to ensure that all flow is through the intended filter housing (question 6 of the referenced document). PCI stated that there are only two filter housings so that if one was left in service while the filter was being changed, that water would spill from the out of service housing. The NRC staff agreed that this provides assurance that flow is through the correct filter housing during many stages of the test.

The NRC staff stated, with respect to question 8 of the referenced document, that the use of city water may result in questions regarding the results due to the effects of water quality. Although the NRC staff has not observed that water quality affects bypass, industry has noted that water quality may affect head loss observed in fuel assembly and strainer testing. The NRC staff stated that tests conducted with city water may later be questioned and that the use of buffered, borated water, similar to that used in the reactor systems, would eliminate such questions. The NRC staff also suggested that bench scale testing may be able to show that there are no significant effects due to water quality and the NRC staff mentioned that some testing was being conducted by other parties that may bolster this argument. PCI stated that if it could not show that water quality was inconsequential to the test results that prototypical water would be used.

The NRC staff emphasized, with respect to question 9 of the referenced document, that even though many steps involving manipulations, drying, and weighing of filters are procedurally controlled, there is significant opportunity for the introduction of error due to human actions. The NRC staff cautioned that filter handling must be conducted with care to prevent the introduction of bias or error into the tests.

The NRC staff requested additional explanation, regarding question 19 of the referenced document, with respect to flume level control and the reintroduction of debris that could be removed by a level control system. PCI stated that any water removed from the flume would be filtered and the debris reintroduced after being adequately diluted to prevent agglomeration.

### Test Results

The NRC staff requested clarification regarding question 1 of the referenced document and the guide vanes discussed with respect to the strainer installed in the Wolf Creek containment. The NRC staff was unsure of the status of the guide vane installation at Wolf Creek. PCI stated that the guide vanes had not yet been installed, but that computational fluid dynamics calculations had verified that the installation of the guide vanes would control turbulence in the area of the strainer to levels modeled in the testing.

The NRC staff requested that PCI provide additional information regarding the observed collection of fiber on the test strainer (questions 2-6 of the test results section of the referenced document). The observation is of concern because the NRC staff was not aware that debris had collected in this manner during previous tests and such collection could result in non-conservative results. PCI stated that in head loss tests of strainers installed in a pit, less debris collected on the bottom discs of each strainer stack. PCI additionally stated that bypass tests using fibrous debris similar to that used in the head loss tests was observed to collect

similarly on the strainers during bypass testing. Additionally, the tests were conducted under conditions similar to those expected in the plant. PCI stated that during several previous tests that debris had been prepared non-prototypically fine so that it would be expected to collect differently from prototypical fiber. PCI also noted that a more uniform bed would likely result in less bypass. The NRC staff agreed that the observations made by PCI were accurate. However, the NRC staff expressed interest in observing how debris collects during head loss tests using prototypically prepared fibrous debris.

The NRC staff asked one clarifying question with respect to PCI's response to question 8 of the referenced document regarding test termination. PCI stated that the time of hot leg switchover will be based on clock time and not the number of turnovers. The NRC staff considered this to be appropriate.

With respect to question 13 of the referenced document, the NRC staff did not agree that the recommended fiber concentrations were extremely conservative, but did agree that they were adequate for the test purposes. The NRC staff also stated that factors other than debris concentration could affect bypass test results. These were discussed in the paragraph above that addressed questions 2-6.

The NRC staff noted that question 16 of the referenced document, in the test results area, had a response similar to question 2 in the test procedure area. That is, the test termination and results will be based on plant event clock time and not the number of pool turnovers that occur.

The NRC staff considered the other PCI responses to adequately address the issues identified. There were no action items as a result of this teleconference.

Please direct any inquiries to me at 301-415-8553, or [Andrea.Russell@nrc.gov](mailto:Andrea.Russell@nrc.gov).

**/RA/**

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**ADAMS Accession Nos.:** PKG: ML12338A015 Meeting Notice: ML12306A116  
Meeting Summary: ML12338A019 PCI Submittal: ML12298A031 \* via e-mail TAC MC2628 NRC-001

OFFICE	PM:DPR:PGCB	LA:DPR:PGCB	BC:DSS:SSIB*	BC:DPR:PGCB	PM:DPR:PGCB
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DATE	12/17/12	12/17/12	12/20/12	12/20/12	12/20/12

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**List of Participants for November 14, 2012  
Phone Call with PCI and Alden**

<b>Name</b>	<b>Affiliation</b>
Ron Holloway	Wolf Creek
Paul Young	Wolf Creek
Jim Bleigh	PCI
Patrick Reyes	PCI
Roger Andreasen	Callaway
Brian Dannaker	AREVA
Matt Horowitz	Alden Research Laboratory
Steve Smith	NRC
Andrea Russell	NRC
Stewart Bailey	NRC

Enclosure