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February 23, 2005

Mr. Jim Kottan
U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

**SUBJECT: REPORT FOR ANALYSIS OF A CONCRETE SAMPLE FROM THE
YANKEE NUCLEAR POWER STATION, ROWE, MASSACHUSETTS
[INSPECTION NO. 50-029/2004-002] [RFTA NO. 05-001]**

Dear Mr. Kottan:

The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) received a concrete sample on November 4, 2004 from the Yankee Nuclear Power Station in Rowe, Massachusetts that was collected on October 25, 2004. The sample was analyzed as follows: by gamma spectroscopy (GS) (Procedure CP1, Revision 14), by alpha spectroscopy (AS) (Procedure AP11, Revision 2; Procedure CP2, Revision 12), by liquid scintillation analysis for tritium (H-3) and carbon-14 (C-14) (Procedure AP6, Revision 14; Procedure CP4, Revision 3), by liquid scintillation analysis for nickel-63 (Ni-63), (Non-Routine Procedure AP12, Revision 3; Procedure CP4, Revision 3) and for strontium (Sr-90) by gas-flow proportional counting (Procedure AP4, Revision 12; Procedure CP3, Revision 2). The GS results are presented in Table 1. The AS results are presented in Table 2. The results for H-3, C-14, Ni-63, and Sr-90 have been combined and are presented in Table 3.

The request to analyze the sample for nickel-59 and iron-55 could not be met. ESSAP does not presently have procedures available for those two radionuclides in a concrete matrix.

ESSAP's Quality Control (QC) requirements were met for these analyses. The QC files are available for your review upon request.



Mr. Jim Kottan

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February 23, 2005

Please contact me at (865) 241-3242 or Wade Ivey at (865) 576-9184 should you have any questions.

Sincerely,



Dale Condra
Laboratory Manager
Environmental Survey and
Site Assessment Program

RDC:WPI:ar

Enclosures

cc: T. McLaughlin, NRC/NMSS/TWFN 7F27 E. Abelquist, ORISE/ESSAP
E. Knox-Davin, NRC/NMSS/TWFN 8A23 T. Vitkus, ORISE/ESSAP
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| Distribution approval and concurrence : | Initials |
|---|----------|
| Technical Management Team Member | TJV |
| Quality Manager | ATP |

ORISE TABLE 1

**CONCENTRATIONS OF SELECTED
GAMMA EMITTING RADIONUCLIDES
IN A CONCRETE SAMPLE
BY GAMMA SPECTROSCOPY CP1, REVISION 14
YANKEE NUCLEAR POWER STATION
ROWE, MASSACHUSETTS**

| ESSAP Sample ID | NRC Region I Sample ID | Radionuclide | Concentrations^a (pCi/g) |
|------------------------|-------------------------------|---------------------|---|
| 1621M0001 | STC-CB-01 | Mn-54 | 0.01 ± 0.01 ^b |
| 1621M0001 | STC-CB-01 | Co-60 | 0.01 ± 0.01 |
| 1621M0001 | STC-CB-01 | I-129 | 0.05 ± 0.06 |
| 1621M0001 | STC-CB-01 | Cs-137 | 0.05 ± 0.01 |
| 1621M0001 | STC-CB-01 | Eu-152 | -0.02 ± 0.01 |
| 1621M0001 | STC-CB-01 | Eu-154 | -0.04 ± 0.03 |
| 1621M0001 | STC-CB-01 | Eu-155 | 0.03 ± 0.02 |
| 1621M0001 | STC-CB-01 | Np-237 by Pa-233 | 0.01 ± 0.01 |
| 1621M0001 | STC-CB-01 | Am-241 | 0.00 ^c ± 0.01 |

^aThe range of MDCs for the selected radionuclides is 0.01 pCi/g to 0.08 pCi/g.

^bUncertainties represent the 95% confidence level, based on total propagated uncertainties.

^cZero values are due to rounding.

ORISE TABLE 2

**CONCENTRATIONS OF SELECTED
ALPHA EMITTING RADIONUCLIDES
IN A CONCRETE SAMPLE
BY ALPHA SPECTROSCOPY
PROCEDURES AP11, REVISION 2 AND CP2, REVISION 12
YANKEE NUCLEAR POWER STATION
ROWE, MASSACHUSETTS**

| ESSAP Sample ID | NRC Region I Sample ID | Radionuclide | Concentrations^a (pCi/g) |
|------------------------|-----------------------------------|---------------------|---|
| 1621M0001 | STC-CB-01 | Pu-238 | -0.01 ± 0.02 ^b |
| 1621M0001 | STC-CB-01 | Pu-239/240 | 0.00 ^c ± 0.01 |
| 1621M0001 | STC-CB-01 | Am-241 | 0.00 ± 0.02 |
| 1621M0001 | STC-CB-01 | Cm-244 | 0.00 ± 0.02 |

^aThe range of MDCs for the selected radionuclides is 0.02 pCi/g to 0.04 pCi/g.

^bUncertainties represent the 95% confidence level, based on total propagated uncertainties.

^cZero values are due to rounding.

ORISE TABLE 3

**CONCENTRATIONS OF SELECTED
BETA EMITTING RADIONUCLIDES
IN A CONCRETE SAMPLE
YANKEE NUCLEAR POWER STATION
ROWE, MASSACHUSETTS**

| ESSAP Sample ID | NRC Region I Sample ID | Radionuclide | Concentrations and MDCs^a (pCi/g) |
|------------------------|-------------------------------|---------------------|--|
| 1621M0001 | STC-CB-01 | H-3 ^b | 28.9 ± 4.2 ^c (5.5) |
| 1621M0001 | STC-CB-01 | C-14 ^b | 3.8 ± 1.3 (2.0) |
| 1621M0001 | STC-CB-01 | Ni-63 ^d | 0.80 ± 0.93 (1.6) |
| 1621M0001 | STC-CB-01 | Sr-90 ^e | 0.19 ± 0.45 (0.79) |

^aMDCs are in parenthesis.

^bAnalyzed by Procedures AP6, Revision 14 and CP4, Revision 3.

^cUncertainties represent the 95% confidence level, based on total propagated uncertainties.

^dAnalyzed by Non-Routine Procedure AP12, Revision 3 and Procedure CP4, Revision 3.

^eAnalyzed by Procedures AP4, Revision 12 and CP3, Revision2.