OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

December 7, 2006

Mr. Robert Evans
U.S. Nuclear Regulatory Commission
Region IV: DNMS: NMLB
Suite 400
611 Ryan Plaza Drive
Arlington, TX 76011

SUBJECT: FINAL REPORT OF ANALYTICAL RESULTS FOR SWIPE, SOIL, AND WATER SAMPLES COLLECTED OCTOBER 3 THROUGH OCTOBER 5, 2006 FROM PATHFINDER GENERATING PLANT, SIOUX FALLS, SOUTH DAKOTA
(INSPECTION REPORT # 030-05004/06-001) [RFTA NO. 06-001]

Dear Mr. Evans:

The Oak Ridge Institute for Science and Education (ORISE) received six swipe, 10 soil, and two water samples for analysis from the Pathfinder Generating Station, Sioux Falls, South Dakota on October 6, 2006. An interim letter report containing all requested analyses except radium-226 (Ra-226) was issued on November 16, 2006. This final letter report contains the data from that letter report plus the Ra-226 results. The swipes were analyzed for gross alpha and gross beta activity by low background alpha/beta counting methods (AP1, Revision 14; CP3, Revision 2). The gross alpha Minimum Detectable Concentration (MDC) is 8.9 pCi/smear and the gross beta MDC is 15 pCi/smear. The gross alpha and gross beta concentrations of all smears were below the MDC for each analysis. The soil and water samples were analyzed by gamma spectroscopy (GS). After the decay of radon and its progeny, none of the contaminants of interest were detected in the water samples. Six of the soil samples were requested to be analyzed for isotopic uranium and Ra-226 by alpha spectroscopy (AS). The sample identifications for the soil and water samples are in Table 1, the GS results are in Table 2, the AS results for isotopic uranium are in Table 3, and the Ra-226 results in Table 4.

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

Docket No. 030-05004
License No. 22-03799-02

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My contact information is listed below. You may also contact Wade Ivey at 865.576.9184 with any questions or comments.

Sincerely,

Dale Condra

Dale Condra, Manager
Laboratory

RDC/WPI:km

Enclosures

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TABLE 1

SAMPLE IDENTIFICATIONS
AND COLLECTION DATA
PATHFINDER GENERATING PLANT
SIOUX FALLS, SOUTH DAKOTA

| ORISE Sample ID | NRC Region IV Sample ID | Collection Date | Collection Time |
|---|---|---|---|
| 1721R0001 | 13-18 | 10/5/2006 | 2:45-3:08 PM |
| 1721S0001 | 1 | 10/3/2006 | 2:35 PM |
| 1721S0002 | 2 | 10/3/2006 | 2:15 PM |
| 1721S0003 | 3 | 10/3/2006 | 2:20 PM |
| 1721S0004 | 4 | 10/3/2006 | 2:25 PM |
| 1721S0005 | 5 | 10/3/2006 | 2:45 PM |
| 1721S0006 | 6 | 10/3/2006 | 2:50 PM |
| 1721S0007 | 8 | 10/4/2006 | 3:40 PM |
| 1721S0008 | 9 | 10/4/2006 | 3:50 PM |
| 1721S0009 | 10 | 10/5/2006 | 12:00 PM |
| 1721S0010 | 11 | 10/5/2006 | 12:20 PM |
| 1721W0001 | 7 | 10/3/2006 | 2:30 PM |
| 1721W0002 | 12 | 10/4/2006 | 3:07 PM |

# TABLE 2

## CONCENTRATIONS OF SELECTED GAMMA EMITTING RADIONUCLIDES IN SOIL SAMPLES BY SAMPLE PREPARATION SP3, REVISION 4 AND GAMMA SPECTROSCOPY CP1, REVISION 15 PATHFINDER GENERATING PLANT SIOUX FALLS, SOUTH DAKOTA

| ORISE Sample ID | NRC Region IV Sample ID | Radionuclide Concentrations (pCi/g)[a] | | |
|---|---|---|---|---|
| | | Ra-226 by Pb-214 | U-235 | U-238 by Th-234 |
| 1721S0001 | 1 | 0.77 ± 0.11[b] | 0.01 ± 0.11 | 0.84 ± 0.48 |
| 1721S0002 | 2 | 109.9 ± 4.5 | 0.02 ± 0.65 | -0.4 ± 2.6 |
| 1721S0003 | 3 | 92.2 ± 3.9 | -0.15 ± 0.63 | 0.7 ± 2.0 |
| 1721S0004 | 4 | 66.3 ± 2.9 | 0.88 ± 0.59 | 2.2 ± 2.1 |
| 1721S0005 | 5 | 6.77 ± 0.35 | 0.40 ± 0.25 | 6.3 ± 1.3 |
| 1721S0006 | 6 | 5.07 ± 0.25 | 0.44 ± 0.18 | 4.68 ± 0.82 |
| 1721S0007 | 8 | 1.48 ± 0.11 | 0.05 ± 0.14 | 1.48 ± 0.62 |
| 1721S0008 | 9 | 8.09 ± 0.41 | 0.15 ± 0.28 | 5.0 ± 1.0 |
| 1721S0009 | 10 | 130.9 ± 5.4 | 0.14 ± 0.64 | 0.8 ± 2.4 |
| 1721S0010 | 11 | 1.68 ± 0.16 | 0.11 ± 0.15 | 1.49 ± 0.99 |

[a]The average MDCs for these radionuclides range from 0.06 pCi/g for Ra-226 by Pb-214 to 3.7 pCi/g for U-238 by Th-234.

[b]Uncertainties represent the 95% confidence level, based on total propagated uncertainties.

# TABLE 3

## CONCENTRATIONS OF URANIUM IN SOIL SAMPLES BY ALPHA SPECTROSCOPY AP11, REVISION 3; CP2, REVISION 12 PATHFINDER GENERATING PLANT SIOUX FALLS, SOUTH DAKOTA

| ORISE Sample ID | NRC Region IV Sample ID | Radionuclide Concentrations (pCi/g)[a] | | | |
|---|---|---|---|---|---|
| | | U-234 | U-235 | U-238 | Total U[b] |
| 1721S0001 | 1 | 0.45 ± 0.06[c] | 0.04 ± 0.02 | 0.50 ± 0.07 | 0.99 ± 0.10 |
| 1721S0002 | 2 | 1.83 ± 0.18 | 0.06 ± 0.02 | 0.89 ± 0.11 | 2.78 ± 0.21 |
| 1721S0003 | 3 | 1.12 ± 0.12 | 0.04 ± 0.02 | 0.70 ± 0.09 | 1.86 ± 0.15 |
| 1721S0004 | 4 | 1.04 ± 0.11 | 0.02 ± 0.02 | 0.63 ± 0.08 | 1.69 ± 0.14 |
| 1721S0007 | 8 | 1.17 ± 0.12 | 0.08 ± 0.03 | 1.24 ± 0.13 | 2.49 ± 0.18 |
| 1721S0009 | 10 | 1.57 ± 0.15 | 0.08 ± 0.03 | 1.26 ± 0.13 | 2.91 ± 0.20 |

[a]The average MDCs for these radionuclides range from 0.01 pCi/g to 0.04 pCi/g.

[b]Total uranium is calculated using the equation U-234 + U-235 + U-238.

[c]Uncertainties represent the 95% confidence level, based on total propagated uncertainties.

TABLE 4

CONCENTRATIONS OF RADIUM-226
IN SOIL SAMPLES
BY ALPHA SPECTROSCOPY
AP7, REVISION 16; CP2, REVISION 12
PATHFINDER GENERATING PLANT
SIOUX FALLS, SOUTH DAKOTA

| ORISE Sample ID | NRC Region IV Sample ID | Radionuclide Concentrations (pCi/g)[a] | | | |
|---|---|---|---|---|---|
| 1721S0001 | 1 | 0.84 | ± | 0.28[b] | (0.22) |
| 1721S0002 | 2 | 158.9 | ± | 8.2 | (0.3) |
| 1721S0003 | 3 | 131.3 | ± | 6.0 | (0.2) |
| 1721S0004 | 4 | 162.3 | ± | 7.7 | (0.3) |
| 1721S0007 | 8 | 1.16 | ± | 0.38 | (0.37) |
| 1721S0009 | 10 | 163.6 | ± | 7.9 | (0.4) |

[a]The MDCs are in parentheses.

[b]Uncertainties represent the 95% confidence level, based on total propagated uncertainties.