

ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

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Mr. John Hickman
Division of Waste Management
and Environmental Protection
U.S. Nuclear Regulatory Commission
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**SUBJECT: RADIOLOGICAL SURVEY RESULTS FOR THE INDUSTRIAL AREA AND
SELECTED OUTSIDE OPEN LAND AREA SURVEY UNITS AT THE
YANKEE NUCLEAR POWER STATION, ROWE, MASSACHUSETTS
[DOCKET NO. 50-29; RFTA NO. 05-008]**

Dear Mr. Hickman:

The Oak Ridge Institute for Science and Education (ORISE) performed radiological survey activities at the Yankee Nuclear Power Station in Rowe, Massachusetts on October 24, 2006. These survey activities were requested and approved by the U.S. Nuclear Regulatory Commission (NRC). Enclosed are the radiological survey results documenting these survey activities. The survey activities included gamma surface scans within the Industrial Area and within selected survey units in the Outside Open Land Areas. Also, a soil sample was collected from an area with elevated gamma radiation detected during gamma surface scans in one of the Outside Open Land Areas.

If you have any questions or comments, please direct them to me at 865.576.0065 or J. Scott Kirk at 865.574.0685.

Sincerely,



Wade C. Adams
Health Physicist/Project Leader
Survey Projects

WCA:ar

Enclosure

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**RADIOLOGICAL SURVEY RESULTS
FOR THE INDUSTRIAL AREA AND
SELECTED OUTSIDE OPEN LAND AREA SURVEY UNITS
AT THE YANKEE NUCLEAR POWER STATION
ROWE, MASSACHUSETTS**

INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) requested the Oak Ridge Institute for Science and Education (ORISE) to perform radiological surveys of the Industrial Area and selected Outside Open Land (OOL) Area survey units (SU) at the Yankee Nuclear Power Station (YNPS) (Figure 1).

The OOL SUs included OOL-03-02, OOL-05-05, OOL-05-06, OOL-05-09; OOL-05-10, and OOL-08-07. Figure 2 identifies the SUs that were part of these survey activities. These radiological surveys were performed on October 24, 2006. The Yankee Atomic Electric Company (YAEC) final status survey (FSS) results were not reviewed prior to these survey activities; hence, ORISE could not confirm that the ORISE results were commensurate with the licensee's results for these SUs.

PROCEDURES

The radiological surveys were performed in accordance with a site-specific survey plan that was submitted to and approved by the NRC (ORISE 2005a). The site-specific survey plan follows the guidance provided in the ORISE Survey Procedures and Quality Assurance Manuals (ORISE 2006a and 2005b).

Industrial Area

Gamma surface scans were performed on approximately 50% of accessible land areas within the Industrial Area using sodium iodide (NaI) scintillation detectors coupled to ratemeters with audible indicators (Figure 2). Due to the elevated gamma radiation levels associated with the nearby independent spent fuel storage installation (ISFSI), gamma surface scans were not performed in the southern portion of the Industrial Area immediately adjacent to the ISFSI. This area had previously been backfilled by YAEC personnel to support the return of the area back to a natural landscape.

Outside Open Land Areas

Gamma surface scans were performed on 100% of accessible portions of OOL-03-02, OOL-05-05, OOL-05-06, OOL-05-09, and OOL-05-10 and approximately 40% of accessible portions of OOL-08-07 (Figure 2). Gamma scans were performed using NaI scintillation detectors coupled to ratemeters with audible indicators. A soil sample was collected from a location of elevated gamma radiation detected during surface scans in OOL-05-06 (Figure 2).

SAMPLE ANALYSIS AND DATA INTERPRETATION

Radiological data and sample media were returned to ORISE's laboratory in Oak Ridge, TN for analysis and interpretation. Radioanalyses were performed in accordance with the ORISE Laboratory Procedures Manual (ORISE 2006b). The soil sample was analyzed by gamma spectroscopy for the primary radionuclides-of-concern [ROC (i.e., Co-60 and Cs-137)]. However,

spectra were also reviewed for additional gamma-emitting fission and activation products associated with the YNPS and other identifiable total absorption peaks. The soil sample results were reported in units of picocuries per gram (pCi/g).

FINDINGS AND RESULTS

Gamma surface scans identified one location of elevated direct gamma radiation on the soil surface in SU OOL-05-06. Additional investigation determined that the elevated gamma radiation detected was due to a rock that was located 20 centimeters (cm) below the surface. The rock was provided to YAEC personnel prior to ORISE collecting a soil sample from this location. The radionuclide concentrations in the soil sample collected by ORISE (minus the rock) for Co-60 and Cs-137 were both measured at 0.00 pCi/g which is below the release criteria of 1.4 and 3.0 pCi/g, respectively.

SUMMARY

ORISE conducted radiological surveys of the Industrial Area and selected OOL SUs at YNPS on October 24, 2006. A confirmatory survey was not performed because the licensee did not have FSS data available for review.

Gamma surface scans identified one location of elevated direct gamma radiation within SU OOL-05-06. ORISE collected a soil sample and unearthed a small rock that contained the elevated gamma radiation. The rock within this soil sample was provided to YAEC personnel. Gamma spectroscopy results for the one soil sample (minus the rock) was below the approved derived concentration guideline levels (DCGLs) (Table 1).

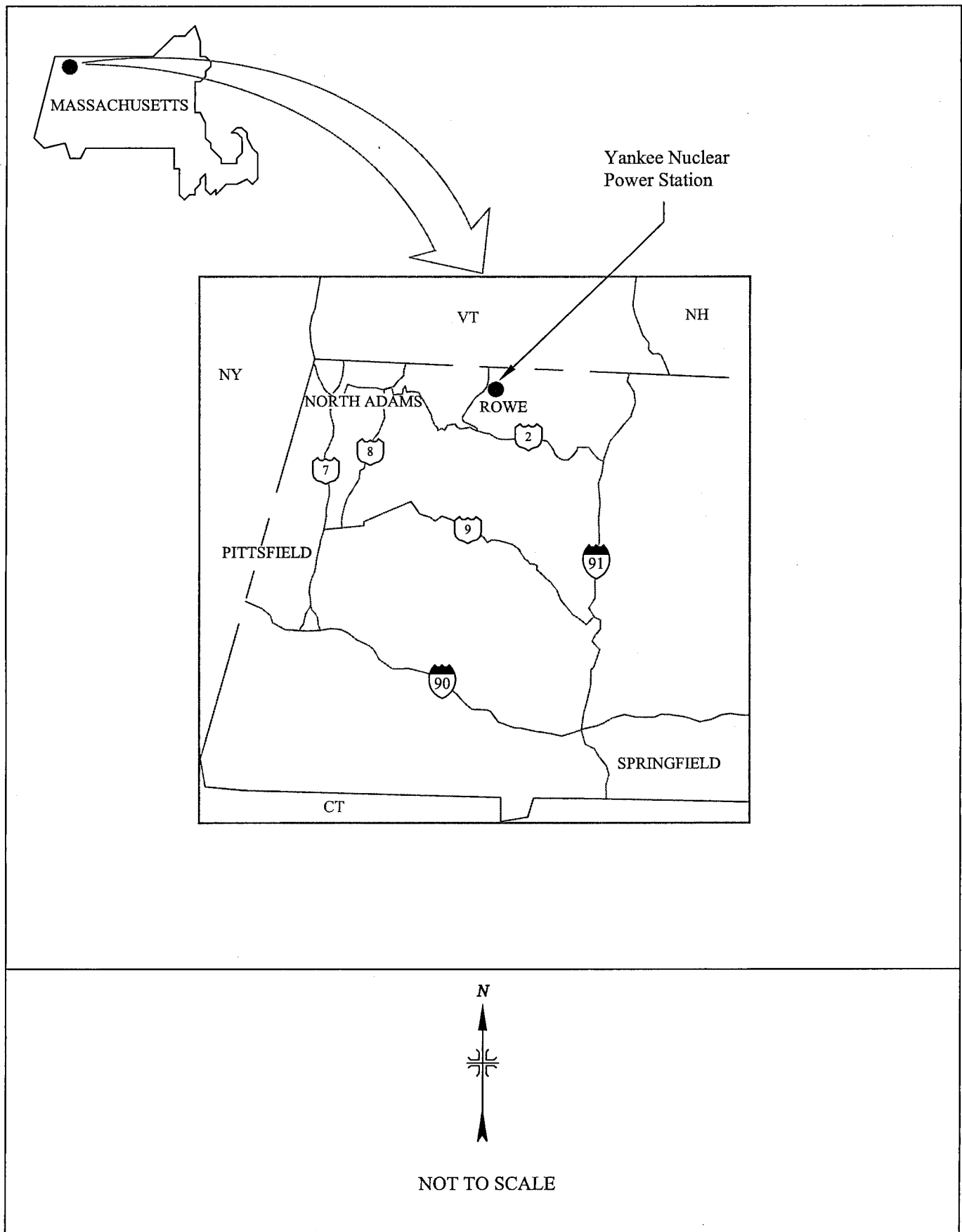


FIGURE 1: Location of the Yankee Nuclear Power Station - Rowe, Massachusetts

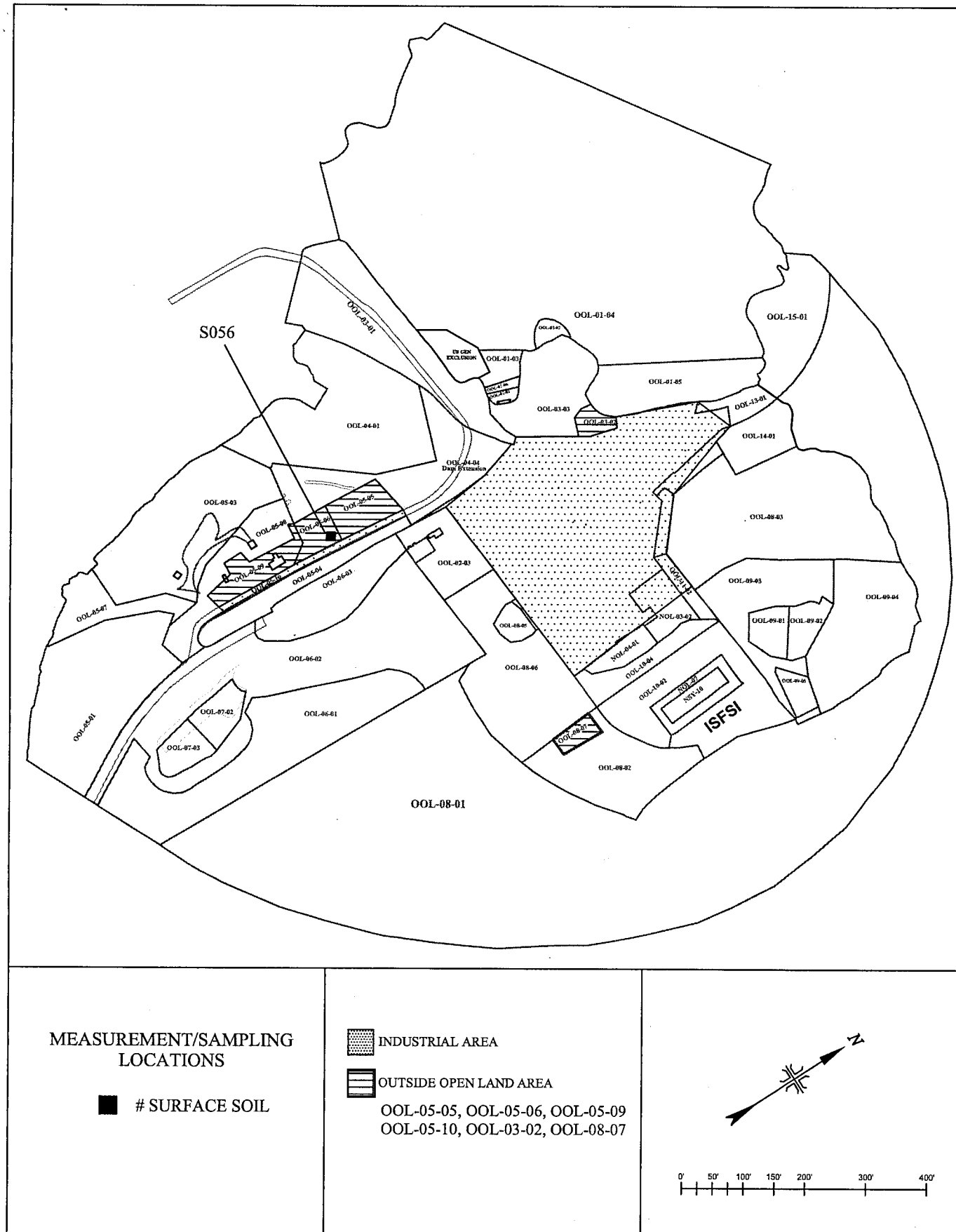


FIGURE 2: Location of the Yankee Nuclear Power Station - Rowe, Massachusetts

TABLE 1

**SUMMARY OF SOIL DCGLs
FROM TABLE IN FINAL STATUS SURVEY PLANNING WORKSHEET
YANKEE NUCLEAR POWER STATION
ROWE, MASSACHUSETTS**

Radionuclide	Soil DCGLs (pCi/g) ^a
H-3	1.3 E+02
C-14	1.9 E+00
Fe-55	1.0 E+04
Co-60	1.4 E+00
Ni-63	2.8 E+02
Sr-90	6.0 E-01
Nb-94	2.5 E+00
Tc-99	5.0 E+00
Ag-108m	2.5 E+00
Sb-125	1.1 E+01
Cs-134	1.7 E+00
Cs-137	3.0 E+00
Eu-152	3.6 E+00
Eu-154	3.3 E+00
Eu-155	1.4 E+02
Pu-238	1.2 E+01
Pu-239	1.1 E+01
Pu-241	3.4 E+02
Am-241	1.0 E+01
Cm-243/244	1.1 E+01

^aSoil DCGL's based on annual doses 8.73 mrem/yr (the 10 mrem/yr DCGL adjusted for the dose contributions from sub-surface concrete structures and tritium in ground water (YAEC 2004).

REFERENCES

Oak Ridge Institute for Science and Education (ORISE). Proposed—In-Process Survey Plan for the Remaining Spent Fuel Pool and Northeastern Upper RCA Yard Excavations, Yankee Nuclear Power Station, Rowe, Massachusetts [Docket No. 50-29; RFTA No. 05-008]. Oak Ridge, Tennessee; December 1, 2005a.

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