U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.	030-05615
License No.	34-00410-02
Licensee:	Ohio State University
Facility:	Ohio Agricultural Research and Development Center
Location:	1680 Madison Avenue Wooster, OH 44691-4096
Dates:	May 7, 1996
Inspectors:	G. M. McCann, Senior Radiation Specialist J. E. House, Senior Radiation Specialist
Accompanying Personnel:	F. Talbot Ohio Department of Public Health
Approved By:	J. W. McCormick-Barger, Chief Decommissioning Branch

EXECUTIVE SUMMARY

Ohio State University/Ohio Agricultural Research and Development Center(OARDC)
NRC Inspection Report No. 030-05615/96002(DNMS)

This was a special, announced inspection to assess the condition of two 10 CFR 20.304 burial sites by performing limited radiological surveys and collecting soil and water samples and reviewing records pertinent to the burial sites. The purpose of the surveys and collection of samples were to determine the current radiological condition of the sites and to determine if there were any immediate environmental concerns associated with the burial sites.

The sites were determined to be fenced, grass covered, and uninhabited field areas with no observable intrusion into the burial areas. The NRC inspectors' survey measurements and analysis of water and soil samples did not identify any immediate radiological concerns. The inspectors also determined that the licensee had maintained records of the past burials at the OARDC sites which may be useful in assessing these burial sites. No immediate environmental concerns associated with the burial sites were identified.

Report Details

1. Persons Contacted

* S. Kinney, Environmental Safety and Radiation Safety Officer
* M. Brugger, P.E., Assistant to the Director, Facilities Administration

* Attended onsite exit meeting conducted May 7, 1996.

2. Background

The current license was issued to the Ohio Agricultural Research and Development Center (OARDC) on April 13, 1959. This license replaced its predecessor license 34-00410-01, which was issued on May 7, 1956. These licenses authorized possession of millicurie quantities of byproduct materials for training of college students, and the performance of byproduct material tracer studies in soils, plants and lower animals.

During an NRC inspection on April 17, 1996 (Inspection Report 030-05615/96001), the inspector confirmed the existence of burial sites, and informed the licensee of the need to assess the burial sites in accordance with the Timeliness Rule for decommissioning found under 10 CFR Part 30.36. Based on information from OARDC staff, the inspectors determined that radiological waste materials had been buried in two different locations. Maps of the OARDC Campus and the burial sites on OARDC property, are attached as Figures 1, 2 and 3. From the inspectors' review of records and discussion with OARDC staff, they determined that burials occurred at Site 1 from October 28, 1963 to September 6, 1974, and Site 2 from June 5, 1975 to December 20, 1990. Burials in accordance with 10 CFR 20.304 were authorized until January 28, 1981; subsequent burials after that date were authorized pursuant to 10 CFR 20.306 (superseded by 10 CFR 20.2005 (disposal of specific waste)).

The NRC inspectors, accompanied by OARDC staff, conducted a walk-over survey of the two burial sites. Both sites are uninhabited, grass covered pasture-like field areas, surrounded by a woven wire fence, approximately 4 feet high. Both sites were intact, and no apparent digging or erosion was noted.

The licensee possessed detailed records of the radiological materials buried at the sites. The records included date of burials, form of material buried, radionuclides contained in the materials buried, quantities of radionuclides buried, and names of departments or users of the radionuclides. The radionuclides buried were carbon-14 (C-14), calcium-45 (Ca-45), cesium-137 (Cs-137), chromium-51 (Cr-51), hydrogen-3 (H-3), iodine-125 (I-125), manganese-54 (Mn-54), promethium-147 (Pm-147), selenium-75 (Se-75), sodium-22 (Na-22), sulfur-35 (S-35), strontium-90 (Sr-90), technetium-99 (Tc-99), and ytterbium-169 (Yb-169). The individual quantities of radionuclides disposed of per burial ranged from low microcurie to low millicurie quantities.

As stated above, some of the materials buried may have been done in accordance with 10 CFR 20.2005, *Disposal of Specific Wastes* (still in effect) which allows the disposal of 0.05 microcurie (1.85 kBq), or less, of H-3 or C-14 per gram when contained in liquid scintillation media or animal tissue. Further, the OARDC staff agreed during the above discussion, since it may be necessary to evaluate potential doses to the general population as a result of these various disposal options, that OARDC would review the disposal records and separate the materials according to burial option. Additionally, OARDC staff agreed to determine hydrology and geology parameters specific to the burial sites.

3. Independent Measurements

The NRC inspectors conducted independent radiological measurements, and collected soil and water samples in and around the two former burial sites. The radiation survey instrumentation used to conduct surveys is identified in Table 1.

The NRC inspectors collected two water samples and two soil samples, one each from both sites (see Figures 2 and 3 for sample locations). These samples were sent to NRC Region III laboratory for analyses.

4. Survey Results and Laboratory Analyses

The NRC inspectors conducted direct radiation survey measurements for beta and gamma radiation. The inspectors did not identify any radiation levels greater than ambient radiation background levels for the OARDC campus.

Region III laboratory gamma spectroanalysis was performed on the surface water and soil samples. In addition, gross beta analysis were performed on the surface water samples. The sample analysis results were found to be at the analytical counting system's minimal detectable activity. Therefore, no immediate radiological concerns were identified with the surface areas of the two burial sites. Some of the principle regulations and guidelines used when assessing burial sites are cited in Table 2.

5. Exit Meeting

At the conclusion of the onsite inspection on May 7, 1996, the preliminary results of the inspection were discussed with the individuals identified in Section 1 of this report. Additionally, OARDC staff agreed to continue to review and evaluate the former burial site disposals including review of applicable hydrology and geology data and records, and to provide this information to the NRC.

Attachments: Table 1 - Survey Instrumentation
Table 2 - Survey Data
Figure 1 - OARDC Site Map
Figure 2 - OARDC Burial Site 1 Map
Figure 3 - OARDC Burial Site 2 Map

TABLE 1

Survey Instruments

Instrument	Model No.	Serial No.	Detector (Type/Model)	Last Calibration
Ludlum	19	014809	Internal NaI	11/17/95
Ludlum	3	045632	44-9	08/14/95

The two meters were serviced and calibrated on an annual basis. Calibrations were performed with National Bureau of Standards (NBS) traceable sources. Background checks were performed during the inspection to verify detector constancy. The background for the Ludlum Model 3 averaged 45 counts per minute. The Ludlum Model 19 meter varied from 4 to 5 microroentgens per hour background radiation (μR/h) (1.0 to 1.6 nanocoulombs per kilogram per hour (nC/kg/h)).

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TABLE 2

Survey Data

Sample #	Location/Description	beta analysis pCi/ml[1]	gamma analysis[2]	
			pCi/ml	pCi/g
1	Soil sample Burial Site 1	-	-	< MDA3
2	Surface water from stream sample near Burial Site 1	< MDA1	< MDA2	-
3	Soil sample Burial Site 2	-	-	< MDA3
4	Standing surface water collected from depression in Burial Site 2's soil cover	< MDA1	< MDA2	-

1. The isotopes chosen for analysis were based on the burial dates and half-lives of the radioactive materials. Those isotopes believed to have had potential to exist, as of the date of the inspection were: Cs-137, Tc-99, Sr-90, C-14, and Pm-147.

2. Minimal Detectable Activity (MDA): MDA1 is based on liquid scintillation analysis and MDAs 2 and 3 are based on gamma analysis.

MDA1 (H-3, C-14, Tc-99) 1 pCi/ml, (Sr-90) 0.5 pCi/ml
MDA2 (Cs-137) 0.2 pCi/ml
MDA3 (Cs-137) 0.2 pCi/g

The principal regulations and guidance for assessing the above burial sites are:

- 10 CFR Part 20
- 10 CFR 30.4, 30.32, 30.35, and 30.36
- 40 CFR Part 141, "Interim National Primary Drinking Water Regulations"
- Policy and Guidance Directive FC 83-23, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Byproduct, Source and Special Nuclear Material Licenses", November 1983
- Policy and Guidance Directive PG-8-08, "Scenarios for Assessing Potential Doses Associated with Residual Radioactivity", May 1994
- Policy and Guidance Directive FC 91-2, "Standard Review Plan: Evaluating Decommissioning Plans For Licensees Under 10 CFR Parts 30, 40, and 70"

Figure 1 - OARDC Site Map

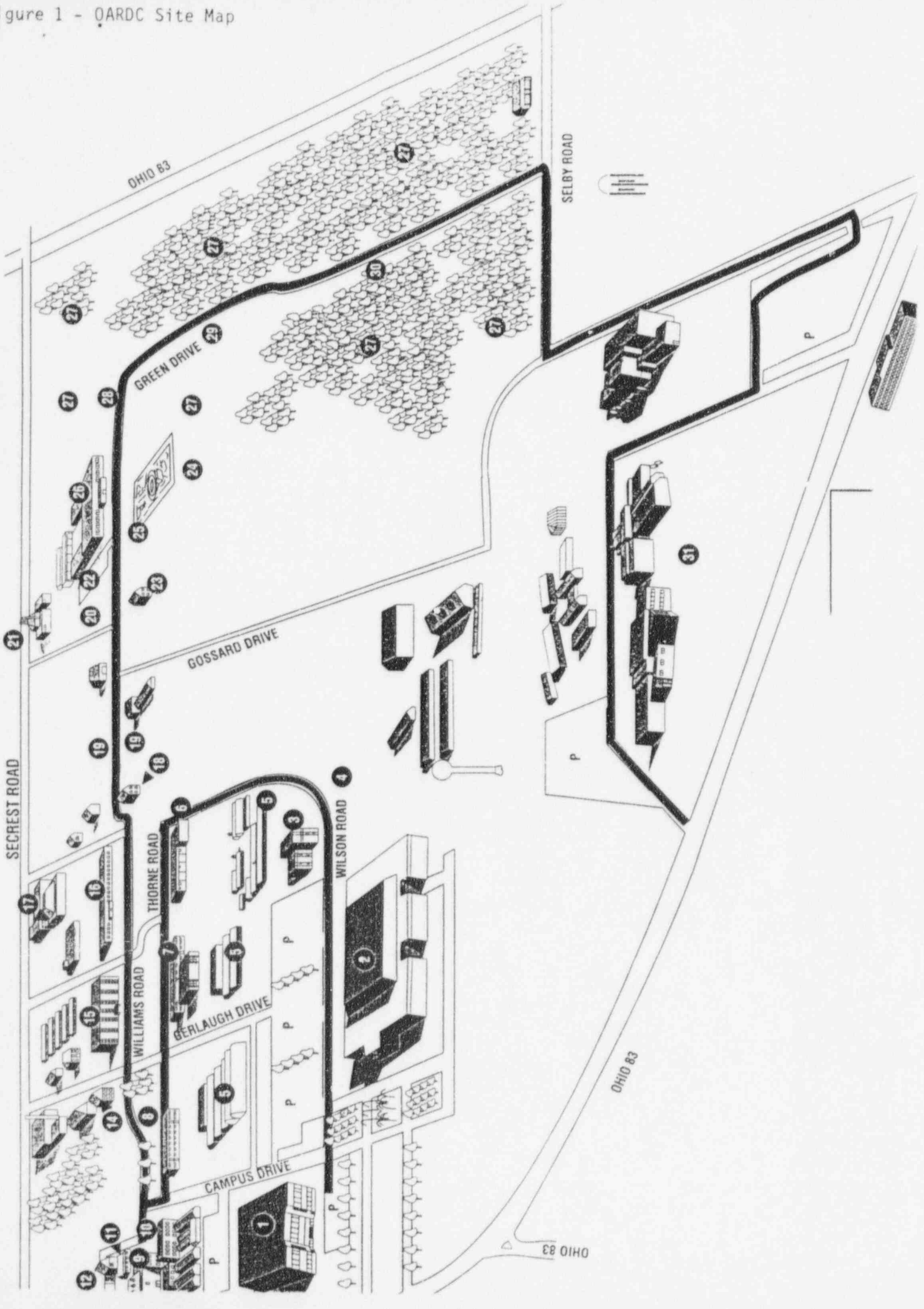

Figure 2 -
OARDC Burial Site 1 Map

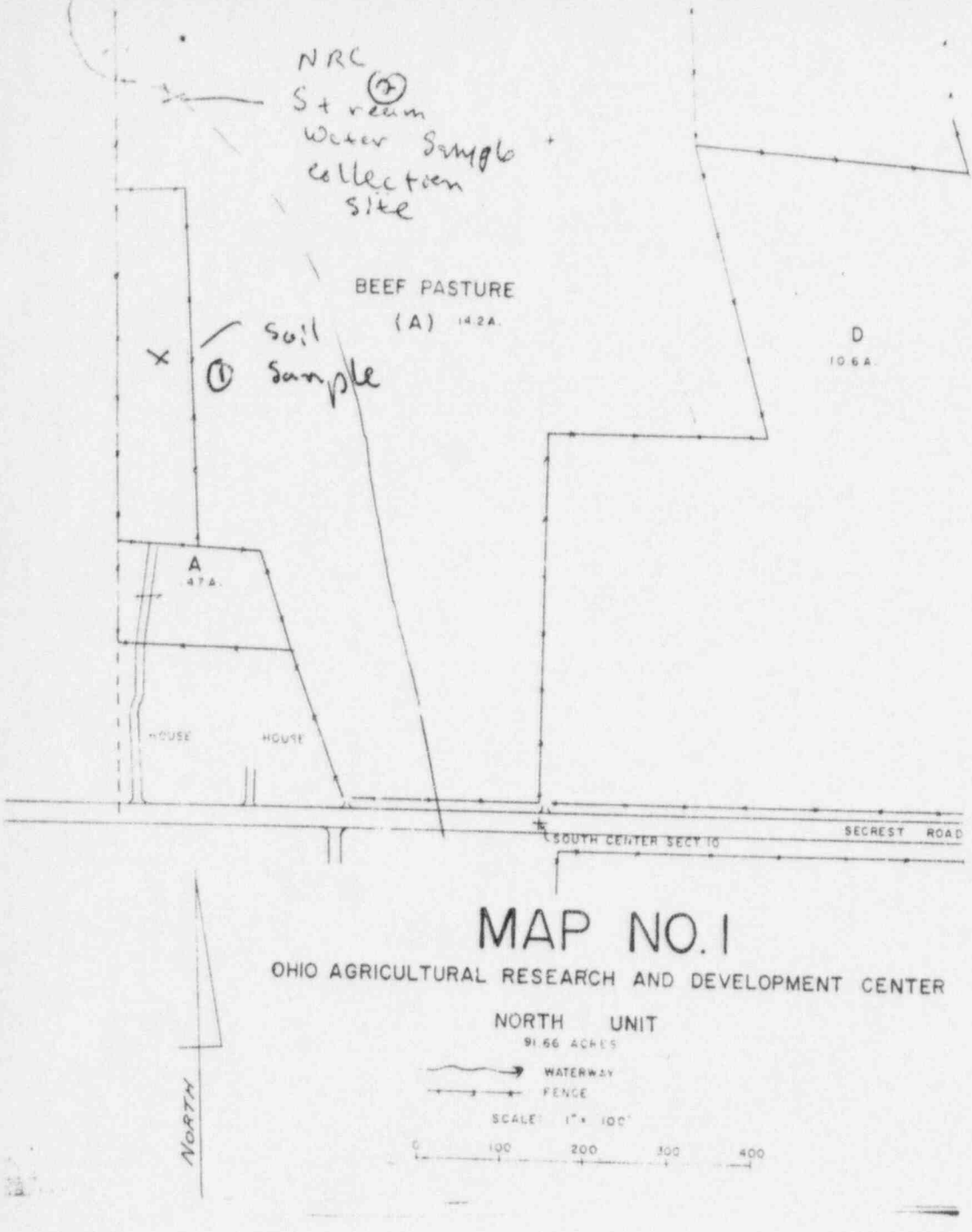

Figure 3 - OARDC Burial Site 2 Map