

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 99990003/84-74(DRSS)

Docket No. 99990003

Licensee: None

Facility: SCA Services Landfill (formerly owned by Hartley & Hartley)  
Kawkawlin, MI, and adjacent properties owned by Michigan  
Department of Natural Resources (MDNR) and by Mr. Wayne Hartley

Inspection Conducted: May 1, 1984 through August 24, 1984

Inspection At: Landfill site and adjacent properties; Michigan Department of  
Public Health and Michigan Department of Natural Resources  
Offices in Lansing, MI

Inspectors: *M. C. Schumacher*  
M. C. Schumacher

*S. Rozak*

S. Rozak (May 1-2, 1984)

*M. J. Oestmann*

M. J. Oestmann (August 22-23, 1984)

*C. D. Paperiello*

C. D. Paperiello (May 1-2, 1984)

Reviewed By: *M. C. Schumacher*  
M. C. Schumacher, Chief  
Independent Measurements and  
Environmental Protection Section

*C. D. Paperiello*

Approved By: C. D. Paperiello, Chief, Emergency  
Preparedness and Radiological  
Protection Branch

Inspection Summary

Inspection from May 1, 1984 to August 24, 1984 (Report No. 99990003/84-74(DRSS))  
Areas Inspected: This special inspection was conducted to review containment  
measures pursued by the Michigan Department of Natural Resources (MDNR) to  
stabilize and close a landfill containing toxic chemicals. Thorium-magnesium  
slag materials are also present in the landfill. The inspection included meet-  
ings with the Michigan Departments of Natural Resources and Public Health,

observations and radiological measurements at the landfill and adjacent properties, and a review of an ongoing radiological survey being performed by Oak Ridge Associated Universities (ORAU) at the request of the NRC.

Results: The State of Michigan through SCA Services, Inc., is proceeding with containment measures (bentonite slurry wall, clay capping, and monitor well installation) to encapsulate toxic chemicals present on the MDNR and SCA properties. These measures together with post-closure monitoring may be acceptable for the radioactive material (thorium-magnesium slag) present which is perceived to be considerably less of a health hazard. The results of the ORAU site characterization survey will be used in the NRC's evaluation of these measures.

## DETAILS

### 1. Persons Contacted

#### Site Visit of May 1, 1984

- J. M. Hennigan, Chief, Nuclear Facilities and Environmental Monitoring Section, Division of Radiological Health, Michigan Dept. of Public Health (MDPH)
- A. J. Boerner, Oak Ridge Associated Universities (ORAU)
- C. Williams, SCA Site Manager
- C. J. Paperiello, NRC Region III
- S. Rozak, NRC Region III
- M. C. Schumacher, NRC Region III

#### May 2, 1984 Meeting, Lansing, Michigan

- G. W. Bruchmann, Chief, Division of Radiological Health, MDPH
- J. M. Hennigan, MDPH
- D. Dennis, Chief of Compliance, Region 6, Michigan Department of Natural Resources (MDNR)
- D. Schultz, Water Quality Specialist, MDNR
- S. Lewis, NRC Region III
- C. J. Paperiello, NRC Region III
- M. C. Schumacher, NRC Region III
- S. Rozak, NRC Region III

#### Site Visit of July 16-17, 1984

- C. Williams, SCA Site Manager
- D. Schultz, MDNR
- L. L. Sowell, Oak Ridge Associated Universities (ORAU), Site Team Leader
- S. Coughlin, Ground Water Technology Inc. (GWT)
- \*Mrs. Wayne Hartley
- M. C. Schumacher, NRC Region III
- S. Rozak, NRC Region III

\*Telephone discussions on July 12, and July 17, 1984.

#### Site Visit of July 23-24, 1984

- C. Williams, SCA
- D. Schultz, MDNR
- L. L. Sowell, ORAU
- M. C. Schumacher, NRC Region III

#### July 30, 1984, Meeting, Licensing, Michigan

- T. F. Schimpf, Michigan Department of Attorney General
- D. Hall, MDNR
- D. Schultz, MDNR
- G. W. Bruchmann, MDPH
- J. M. Hennigan, MDNR

B. A. Berson, NRC Region III  
R. M. Lickus, NRC Region III  
M. C. Schumacher, NRC Region III

Site Visit of August 22-23, 1984

C. Williams, SCA  
J. M. Hennigan, MDPH  
D. Schultz, MDNR  
D. A. Cool, NRC, Office of Nuclear Material Safety and Safeguards  
M. J. Oestmann, NRC Region III  
M. C. Schumacher, NRC Region III

2. General

This report summarizes chronologically, NRC activities for the period May 1, 1984 to August 24, 1984, concerning containment measures being taken at the contaminated (combined toxic chemicals and low-level radioactivity) SCA landfill and adjacent State of Michigan property in Kawkawlin, Michigan. It includes meetings with State of Michigan and SCA representatives and onsite observation by NRC representatives.

3. Hartley and Hartley Landfill Site Tour May 1, 1984

On May 1, 1984, representatives from Region III and Oak Ridge Associated Universities (ORAU) (Section 1) toured the Hartley and Hartley landfill and adjacent property (Figure 1) owned by the Michigan Department of Natural Resources (MDNR), in the company of J. M. Hennigan of the Michigan Department of Public Health (MDPH).

The landfill, in Kawkawlin, Michigan was purchased by SCA Services, Inc. of Somerville, Mass. from Hartley and Hartley in 1972. In 1983, it was identified by State of Michigan representatives as a site where thorium-magnesium waste sludge material had been disposed of improperly,<sup>1</sup> apparently during the early 1970's. The purpose of this site visit was to acquaint NRC representatives with the site before meeting with MDNR and MDPH representatives the following day to discuss possible remedial action.

Mr. Hennigan (MDPH) pointed out two principal areas (Figure 2) found by MDPH surveys where the thorium material had been deposited.

The first was a peninsula on DNR property extending northward about 300 feet from the northwest corner of the SCA property. The peninsula, which was generally bounded by water and marsh, had reportedly been acquired by MDNR in a land swap with Wayne Hartley, former landfill owner, in 1972.

The peninsula was relatively flat, with largely sandy soil, having blue-grey granular material intermixed over much of the area. The blue-grey material, which contained small pieces of metallic material, appeared to be associated with elevated survey meter readings.

<sup>1</sup> Ltr dtd 5/16/83 G. Bruchman (MDPH) to J. R. Miller (Region III).

A few drums or fragments of drums said to have contained toxic chemical wastes were visible at the surface in special locations. MDNR correspondence<sup>2</sup> indicated that a magnetometer survey in 1983 resulted in an estimate of some 18,000 buried drums. Radiation levels observed by NRC representatives on the peninsula varied greatly ranging from 10  $\mu$ R/hr to a maximum of 150  $\mu$ R/hr at the surface and up to about 50  $\mu$ R/hr at waist level.

The thorium bearing waste was said to have been used as roadway fill and possibly as cover for drums containing the waste chemicals. Mr. Hennigan stated that on days of little wind, foul odors prevailed in the area.

The second area noted by Mr. Hennigan was on SCA property about 300 feet south of the boundary between the SCA and DNR property. This area was of considerably smaller extent and the radiation readings were less variable ranging up to a maximum of about 80  $\mu$ R/hr (surface and waist levels).

Meeting with State Officials in Lansing, Michigan on May 2, 1984

Region III representatives met with MDNR and MDPH representatives (Section 1) at the MDPH offices on May 2, 1984, to discuss actions underway by MDNR for site stabilization and closure.

MDNR was in the process of negotiating with SCA for a solution for both SCA and MDNR properties. The solution would provide a relatively impermeable bentonite slurry wall around each property, a clay cap cover, and monitoring of adjacent surface and ground water. The slurry wall would intersect and key into a highly impermeable silt/clay layer said to underlie the site. Geological studies<sup>3</sup> indicated this layer to be more than 40 feet thick according to MDNR representatives. The principal hazard of concern was agreed to be the buried toxic chemicals, which had been detected in surface waters onsite.<sup>4</sup> However, MDNR representatives indicated that the site failed to score high enough to place on the USEPA National Priority List for cleanup under "superfund". The results of radiological analyses of site surface water samples taken by the USEPA in 1983 were unremarkable.<sup>5</sup>

It had previously been determined<sup>6</sup> that the material probably came from a facility formerly licensed by the AEC to use thorium in the manufacture of

<sup>2</sup> Ltr dtd 7/27/84, G. Gettel (MDNR) to J. Fredle (USEPA) and R. Klaviter (MDPH).

<sup>3</sup> "Hydrologic Investigation and Closure Certification, Hartley and Hartley, Inc. Sanitary Landfill, Kawkawlin, Michigan," report prepared by Wehren Engineering, Middletown, New York, September 19, 1979.

<sup>4</sup> Interoffice Memorandum dated April 28, 1983, D. Schultz (MDNR) to B. Bradford (MDNR).

<sup>5</sup> Ltr dated April 17, 1984, L. Jensen (USEPA) to D. Schultz (MDNR)

<sup>6</sup> Region III Inspection Report 40-1790/83-01(DRMSP), 40-17/83-01(DRMSP).

thorium-magnesium alloys. NRC representatives indicated that although successful legal action against the former licensee was possible, the process would almost certainly be protracted and significantly delay meaningful corrective action. Moreover, the presence of toxic chemicals would most likely result in onsite containment measures essentially no different than those already being considered.

MDPH representatives agreed that the toxic chemicals presented the principal health and safety concern at the site but requested that the NRC provide some assurance that the thoriated material in the landfill would not present a significant hazard.

NRC representatives agreed to commission a survey of the site by Oak Ridge Associated Universities (ORAU) to better define the radiological characteristics of the site. The survey would form the basis of a radiological hazards evaluation. However, suitability of the proposed containment measures would likely be predicated on the state's judgments that they are suitable for the more mobile and more hazardous chemicals, assuming the survey produces no significantly unexpected results. MDNR representatives agreed to forward their evaluation to the NRC.

Because the MDNR appeared to be moving rather quickly in its negotiations with SCA, it was agreed to begin the survey by mid-July in order to finish before significant onsite earth movement took place.

#### ORAU Survey, July 11-24, 1984

A four member ORAU team began the survey of SCA and MDNR properties on July 11, 1984. SCA representatives onsite were able to point out the contaminated areas of MDNR property and the general location of the contamination on SCA property. The contamination on SCA property was difficult to find at first because of earth moving that had taken place since May 1, 1984. Several feet of clay cover had been placed on the area reducing radiation levels essentially to background. However, it was located with the aid of site maps and the assistance of the SCA site manager and Mr. Hennigan (MDPH), who visited the site on July 13. SCA workers were able to peel back the covering material to expose the original soil horizon.

In its initial reconnaissance on July 11, the ORAU team was unable to reconcile survey markers with SCA's description of the boundary between its property and that retained by Mr. Wayne Hartley to the west. On July 12, SCA representatives indicated that a mistake had been made and that the western boundary was actually about 200 feet east of where originally presumed.

Mr. John DeNapoli of SCA informed Region III by telephone on July 12, that as a result of this finding the west and north slurry walls would be relocated (Figure 2). Subsequent direct radiation surveys showed no evidence of radioactive material between the original and final proposed wall locations.



Prior to discovery of the boundary anomaly, an ORAU survey along the SCA site perimeter found elevated readings from an area west of the road on the Hartley property. Region III representatives in a telephone call with Mrs. Wayne Hartley on July 12 requested permission to survey the Hartley property. Mrs. Hartley said permission could not be given until the matter could be discussed with Mr. Hartley and with legal counsel. Mrs. Hartley later agreed to the survey during a telephone call from Region III representatives at the SCA site on July 17, 1984.

Region III representatives (Section 1) were onsite July 16-17, to meet with the ORAU survey, SCA, and DNR representatives. Also present was an engineer from Ground Water Technology, Inc., who was responsible for quality control aspects of the slurry wall construction. The change in slurry wall location owing to the boundary correction was described by SCA. The west wall would be moved east of the north-south running lagoon to keep it entirely within SCA property. The north wall was to be moved just south of the east-west running lagoon. The reduced area of enclosure appeared to include all of the contaminated area on the SCA site.

Both the MDNR and SCA expressed concern for safety of ORAU surveyors when collecting subsurface soil samples lest penetrating a buried drum of toxic or explosive chemicals create a dangerous condition. It was agreed that ORAU surveyors could abide by SCA and MDNR safety requirements when working on their respective properties.

A Region III inspector returned to the site July 23-24, 1984, to again check on the progress of the ORAU survey and to meet with MDNR and SCA representatives.

Subsurface soil sampling had been completed on the SCA property without incident with the assistance of the SCA site manager.

Sampling on MDNR property took place on July 24, using only hand tools and with the area cleared of all but the sampling crew who were furnished with protective clothing and full-face respirators. The alternative of using power tools, with the sampling crew in supplied air respirators, was rejected because of expected unfavorable weather (hot) and the difficulty in obtaining the respirators locally. The sampling was completed without incident. Visual observation and survey meter reading indicated the thoriated material was mainly in a distinct, readily identifiable band about ten centimeters thick lying about 25 to 35 centimeters below the original surface. A similar condition had been noted on the SCA property.

The possibility of placing the thoriated material from the Hartley property within the slurry walls on either the MDNR or SCA properties was discussed with MDNR and SCA representatives. It was agreed that it might be a desirable solution provided that Mr. Hartley could agree to pay for the move, that either MDNR or SCA would be willing or able to accept it, and that it could be accomplished within the time schedule of the solution currently being negotiated between MDNR and SCA. The preliminary ORAU survey data indicated that the Hartley contamination was mainly on the

surface and significantly less extensive than on the MDNR and SCA properties. The total volume of soil requiring removal was estimated at less than 150 cubic meters. SCA and MDNR representatives agreed to discuss the matter with their respective managements.

4. Meeting with State Officials in Lansing, Michigan on July 30, 1984

Region III representatives met with representatives of Michigan Department of Natural Resources (MDNR), Department of Public Health, and Attorney General to discuss the closure agreement being negotiated with SCA.

NRC representatives described the ORAU survey and preliminary results known at the time. Average soil concentrations of thorium would likely exceed option 4 of the Branch Technical Position for onsite burial. However, the mixture of toxic chemicals and low level radioactivity effectively precluded its acceptance at either a chemical or radioactivity burial site leaving onsite stabilization as the only reasonable alternative currently available. Moreover, the measures being taken are not irrevocable. The survey findings indicate the thorium is concentrated mainly in a distinct layer about ten centimeters thick which could be recovered should future conditions so dictate.

It was agreed that the proposed monitoring of the relatively mobile chemical markers would probably give the best indication of encapsulation performance. However, NRC and Michigan Department of Public Health (MDPH) representatives indicated these agencies' interest in periodic radiological analyses of some of the water samples and agreed to cooperate in such a program.

Regarding the proposed closure agreement, NRC representative stated that the deed to the SCA property should be amended to restrict future use and to prohibit intrusion into the encapsulated material and that permanent monuments should be placed onsite indicating the nature of the materials. State officials present indicated these should pose no problems.

State officials stated that both MDNR and SCA may be required to obtain a "Wetlands Permit" for the encapsulation work and that SCA may have acted prematurely in starting slurry wall construction without one. The procedure for such a permit normally involves a 45-day review period.

Regarding the material on the Hartley property, it was agreed that it would be sensible to handle it in the context of the proposed agreement, if possible. SCA representatives were described as not receptive to receiving the material; however, putting in on the MDNR property for encapsulation was a possibility if suitable arrangements could be made.

5. Site Visit on August 22-23, 1984

Region III and NMSS representatives toured the SCA site and the adjacent DNR and Hartley properties on August 22, 1984. The slurry wall around the SCA site had been completed and vehicle access across the wall was restricted to a single point while the wall cured. Capping was in progress



within the wall using clay material obtained from several miles away. No containment work had been done on the DNR site.

Nine surface soil samples were collected from the contaminated area on the Hartley property to provide additional data for averaging soil thorium concentrations. The samples were given to ORAU for analysis. Contact radiation levels at the points of sample collection ranged approximately from background to 90  $\mu\text{h}/\text{hr}$ .

NRC representatives met with Joseph Hennigan (MDPH) and Daniel Schultz (MDNR) at the SCA site on August 23, 1984, to discuss water monitoring and other matters pertaining to site closure. The current proposed agreement<sup>7</sup> for closure stipulated three monitoring wells inside the SCA slurry wall containment, three wells outside the wall directly opposite the inside walls, nine additional wells outside the slurry walls and seven surface water sampling points from lagoons outside the slurry wall. SCA will sample water from these locations twice yearly through 1990 and yearly thereafter for another 25-year period with the stipulation that after January 1, 2005, SCA may attempt to demonstrate that the monitoring requirements are no longer necessary. The agreement stipulates analyses for various nonradiological chemical parameters and provides for split samples at the request of MDNR. Mr. Hennigan (MDPH) stated that the state would collect and analyze split samples taken outside the slurry walls for evidence of thorium migration. NRC representatives stated that the NRC would also want to analyze some split samples.

Mr. Hennigan provided a map showing the location and depth of seven shallow residential wells sampled by local Health Department representatives July 15, 1983, and analysed for thorium (all samples < 7pCi/l detection limit). The locations were within approximately one mile, mostly to the east and south of the landfill site. It was agreed that MDPH would contact the local health department to ascertain availability of any close-in shallow wells to the south that may be better sampling locations than the seven wells sampled in 1983. However, the number of homes in the area not connected to public water supplies was said to be decreasing and the seven wells previously sampled may be the best available. MDPH will arrange for local health department to obtain baseline samples from selected local wells. Subsequent well sampling would be dependent on results from the onsite wells and the local health department representatives would serve as the principal contact with the residents.

Mr. Schultz stated that the basic details of the draft closure agreement had been agreed to in principle by both parties, although the takeover of SCA by Waste Management, Inc., currently in progress, introduces uncertainty. The SCA officials with whom the State was dealing were described as optimistic that the agreement would go through. If so, SCA would construct the same containment measures (slurry wall, clay cap and monitoring wells) on the State's property as on the SCA property with the State being responsible for its own adequate maintenance and monitoring.

<sup>7</sup> Ltr dtd August 22, 1984, T. F. Schimpt (Michigan Assistant Attorney General) to J. W. Voelpel (Honigman Miller Schwartz and Cahn)

Regarding the Michigan Wetlands Act, Mr. Schultz stated that MDNR was given an emergency permit by the Corps of Engineers to construct the containment measures on its property. If the agreement with SCA falls through, funding will be sought under Michigan Act 307 or through a legislative appropriation. If the agreement holds, MDNR intends to proceed as quickly as possible with the containment measures. Mr. Schultz stated that it appears that movement of the Hartley material would not be allowed under the permit and that a decision as to whether Mr. Hartley would need a separate permit was yet to be made by MDNR management. It was also possible that a permit would not be needed because of the relatively small amount of material involved. NRC representatives noted that the Hartley material appeared to be a relatively thin layer near the surface with activity concentration an order of magnitude less than that on the MDNR property. Requirement of a separate permit with an extended preliminary comment period would foreclose this option if the work on MDNR property moved quickly. However, if negotiations between MDNR and SCA break down or are delayed, the option may still be feasible.

Mr. Schultz related that he had preliminary discussions with Mr. Hartley concerning movement of the material from his property to the MDNR property. Mr. Hartley was told that if the material is accepted by the State, he would be required to pay for the work plus a lump sum to help underwrite the post closure monitoring. The cost of the movement itself was estimated at \$1000 based on an estimated 150 cubic meters of material. No agreement was made, but Mr. Hartley requested information regarding the extent and nature of the material on his property so that he could discuss the matter with his lawyer and others. The NRC representatives agreed to furnish the preliminary information obtained by ORAU in its survey. Following this meeting, the NRC and Michigan representatives called at Mr. Hartley's office to discuss the matter with him. He was out of town and could not be reached the following day (Friday) as well. The information obtained from ORAU together with the results of two samples analyzed by Region III were mailed to Mr. Schultz on August 27 to give to Mr. Hartley at their next meeting.

The proposed closure agreement provides for a restrictive covenant in the same form as required for the Solid Waste Management Act. NRC representatives stated the wording should record the fact that radioactive material as well as toxic chemical are present in the encapsulation. They also pointed out that if the NRC accepts the proposed measures it would probably require that monuments noting the fact of burial be placed on the SCA site at the two logical points of entry. The proposed agreement contains no such provision. Mr. Schultz stated that he would discuss this matter with SCA management. NRC representatives also requested information about access controls. Mr. Schultz stated the MDNR plans to fence its site and that SCA has indicated the gate giving vehicle access to its property will be locked.

NRC representatives again stated that NRC acceptance of the containment measures would be predicated on their acceptance by the State for the toxic chemicals. Mr. Schultz stated that the State will accept the containment measures constructed in accordance with SCA's bid specification and that post closure performance monitoring was an integral part of the

agreement. Deterioration in performance would require remedial action. It was also pointed out that the contained material was not irretrievable should a different solution be dictated in the future. Certainly this is true for the thorium slag which appears to be confined in a well defined horizon on both the SCA and MDNR properties. Mr. Schultz agreed to forward information regarding the MDNR geologist's review for use by the NRC in its evaluation.

Following the meeting, NRC representatives and Mr. Hennigan toured the southern and western edges of the involved areas. Vehicle access other than through the front gate appears to be effectively precluded by water and/or heavy vegetation. Pedestrian access is possible but would be discouraged by the same terrain features. In addition, the clay cap over the encapsulation will reduce direct radiation levels to effectively background. NRC representatives, accompanied by Mr. Hennigan also collected a surface water sample from a lagoon in the down drainage pathway from the site. It was forwarded to the NRC reference laboratory (RESL) in Idaho Falls for radiological evaluation. The analyses, completed October 4, 1984 gave  $3 \pm 4$  pCi/l compared with the 15 pCi/l EPA limit for drinking water.

#### 6. Summary

The SCA owned landfill at Kawkawlin, Michigan and an adjacent property owned by the Michigan Department of Natural Resources (MDNR) are contaminated with toxic chemicals and with thorium-magnesium slag, as a result of operations before the site was closed in 1978. Monitoring of site environs has identified chemicals but not thorium in adjacent waters of the Toigo Marsh State Game Area. The State of Michigan is negotiating with SCA to take containment measures on both SCA and DNR properties to preclude further movement of chemical contaminants into the aquatic environment.

The agreement under consideration would also provide for post-closure monitoring of specified chemicals for 20 and possibly 30 years to confirm the efficacy of the encapsulation. These measures, which are already underway on the SCA property, will likely be acceptable for containment of the less mobile and apparently less hazardous thorium-magnesium slag. Given the absence of sites willing to accept mixed chemical and radioactive contamination, it appears to be the most reasonable solution currently available.

NRC acceptance, if given, would be based on State of Michigan's acceptance of the measures for containment of the chemicals present. It will also include evaluation of the final results of the ORAU characterization survey. In any event, both the NRC and the Michigan Department of Public Health (MDPH) agree that samples from the aquatic pathway should be periodically analysed for radioactivity and are cooperating to establish such a program.

The ORAU survey also found residual thorium contamination on abutting property still owned by Wayne Hartley. Its extent and concentration appears about an order of magnitude lower than that as the MDNR and SCA properties. Michigan officials have discussed with Mr. Hartley the poss-

ibility of including this material in the MDNR encapsulation but no commitments have yet been made by either party.

Figure 1. SCA Landfill and Adjacent Area





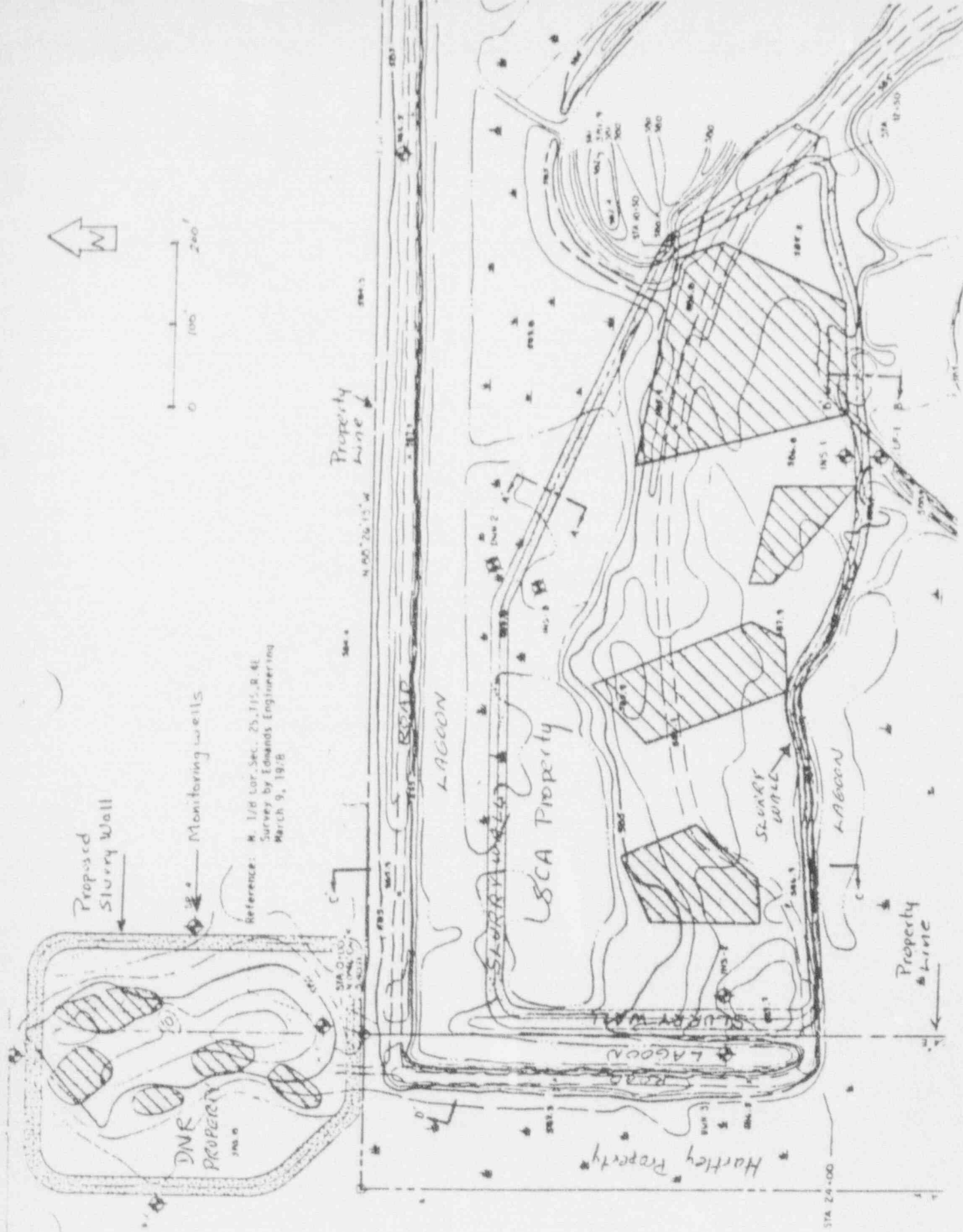


Figure 2. SLURRY WALL LOCATION (7/25/84)



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RONALD D. SKOOG, Director

December 7, 1984

CERTIFIED LETTER

Mr. Tyrus Hartley  
d/b/a Hartley and Hartley  
579 S. Linwood Beach Road  
Linwood, Michigan 48634

Dear Mr. Hartley:

Re: 84-8-203W General Permit

The Department of Natural Resources has determined that a permit can be granted under authority of the Goemaere-Anderson Wetland Protection Act, 1979, P.A. 203 to authorize the dredging of contaminated materials on property owned by your firm in Tobico Marsh provided that no fill is required for the construction of access roads.

However, prior to issuance of the permit, it will be necessary to demonstrate that you have obtained authorization from appropriate regulatory agencies approving of the disposal site. Written approval must be obtained from the Departments Groundwater Quality Division and the Nuclear Regulatory Commission for the use of any proposed disposal site.

We are placing your file in a closed status awaiting submittal of the necessary authorization documents for the proposed work.

Should you have any questions or require further information, do not hesitate to contact this office.

Sincerely,

*Hal F. Harrington*

Hal F. Harrington, Chief  
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HFH:mo

cc: Groundwater Quality Div.  
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