U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 078-154

Subject: Norton and Attleboro Surveys
Radioactive Material in Uncontrolled Locations

Investigation at: Norton and Attleboro, Massachusetts

Investigation conducted: October 24, October 31 to November 2, November 14, November 28 to December 1, and December 21, 1978

Investigators: J. J. Kottan — 2/12/79
J. J. Kottan, Radiation Specialist — date signed

J. Both — 2/12/79
J. Both, Fuel Facility Inspector — date signed

R. E. Shepherd — 2-12-79
R. E. Shepherd, Physical Security Inspector — date signed

Approved by: J. P. Stohr — 2/12/79
J. P. Stohr, Chief, Environmental Protection and Special Projects Section FF&MS Branch — date signed

Summary of Findings

Evaluation Summary

Special investigative efforts conducted October 24, October 31 thru November 2, November 14, November 28 thru December 1, and December 21, 1978 by members of the Nuclear Regulatory Commission, Region I (NRC:I): completed numerous radiological surveys of selected locations in Norton and Attleboro, Massachusetts on the basis of an allegation and requests from local municipal officials; identified the location and extent of areas surveyed in which radiation levels above the background radiation level were observed; performed initial analyses and arranged for other detailed analyses of environmental samples; provided continuing consultative services, in conjunction with officials of the Commonwealth of Massachusetts Department of Public Health, to officials of the City of Attleboro and the Town of Norton.

Significant Findings

A. Radiological Surveys

During surveys conducted on October 24, October 31 thru November 2 and November 28 thru December 1, 1978, two areas were identified in which radiation levels exceeded background, indicating the presence of radioactive material. One area was at a privately owned landfill on Union Road in the Town of Norton, Massachusetts. The second area was at Finberg Field in the City of Attleboro, Massachusetts. Radiation levels at the identified areas ranged from less than 1 mR/hr to approximately 20 mR/hr at contact with the ground.

B. Analysis of Environmental Samples

Analyses of all samples have been completed and indicated the following:

1. The material found at Finberg Field, Attleboro is radium.

2. The material found at the privately owned landfill in Norton is primarily uranium of varying forms and enrichments. There is also some radium.

3. The material found at the two locations, therefore, do not appear to be of common origin.

C. Protective and Remedial Actions

The privately owned landfill area in Norton (Shpack property) is in a remote area. However, subsequent to a meeting with Town of Norton officials, as a precautionary measure, it was decided to post this area with official "No Trespassing" and "Caution - Radioactive Material" signs to inhibit access. This was done on the northern perimeter along Union Road.

Because of the very low level radiation at the Finberg Field, Attleboro site, during the meeting on November 30 and December 1, 1978 with City of Attleboro and Commonwealth of Massachusetts officials, it was decided that no precautionary posting was necessary at that time. The low levels of radioactivity found were located in areas not expected to be used, especially during the winter months.

D. Attachments

1. Attachment A - List of Meeting Attendees
2. Figure 1 - Privately Owned Norton, Massachusetts Landfill (diagram with sampling locations)
3. Figure 2 - Norton-Attleboro Area Map (map indicating locations surveyed)
4. Figure 3 - Finberg Field Area (diagram with sampling locations)
5. Table 1 - Norton, Massachusetts Landfill Sample Analysis Results
6. Table 2 - Areas Surveyed in Attleboro and Norton
7. Table 3 - Finberg Field Sample Analysis Results

Report Details

1. Background - Receipt of Allegation

On September 22, 1978, Mr. H. W. Crocker, Chief, Fuel Facility Projects Section of the NRC Region I Office (NRC:I) received a telephone call from Mr. John Sullivan, of Attleboro, Massachusetts. Mr. Sullivan reported that he had visited a private landfill area on Union Road near the border of Norton and Attleboro, Massachusetts which contained discarded industrial equipment. Mr. Sullivan stated that he has observed several items at the site that indicated they had been discarded by Texas Instruments, Inc. (TI) of Attleboro, Massachusetts. Mr. Sullivan further stated that no materials had been disposed of at this location within the last several years. However, since TI does have an NRC license to use radioactive materials, Mr. Sullivan believed it was possible that the discarded TI items might be radioactive. Mr. Crocker informed Mr. Sullivan that: the TI plant is involved in large metallurgical operations; only a small part of TI's work involves radioactive materials; NRC:I was not aware of any radioactive material being discarded at this site. Mr. Crocker told Mr. Sullivan that NRC:I would look at this landfill area in conjunction with the next inspection at TI. Mr. Sullivan was satisfied with this course of action, and indicated he was returning to college in Florida the next week, but that NRC:I could contact him through his Massachusetts address.

On October 16, 1978, Mr. Sullivan called Mr. Crocker from Florida and reported that he had gone to the aforementioned landfill area on October 6, 1978, and using a Civil Defense, beta-gamma, survey meter found the following:

1. A black bowl with yellow residue which read 3 mR/hr.

2. A tube attached to a brick-lined oven which read 2 mR/hr.

3. Several other items were 2-3 times the background radiation level.

4. A soldering hood which, although suspect, read at the background radiation level.

Mr. Sullivan then said another problem has arisen regarding this area, in that, the Massachusetts Division of Water Pollution Control intended to cover over the area with dirt. He gave the name of a member of that organization, for information.

On October 17, 1978, NRC:I personnel contacted Mr. Gerald S. Parker, Director of Radiation Control Programs of the Massachusetts Department of Public Health, to initiate discussion of this issue with Commonwealth of Massachusetts personnel and to discuss the possibility of a joint survey of the landfill area with Commonwealth of Massachusetts personnel. NRC:I was informed that Mr. Parker's personnel were to make a preliminary survey at the site on October 19 and that depending on the results, would perform a survey with NRC:I on October 24 or 25. Subsequently, Massachusett's preliminary survey was cancelled, and the joint survey was set to be made on October 24 in the company of local town officials.

On October 18, 1978, NRC:I received a letter from Mr. Sullivan. This letter requested an NRC investigation of the landfill site. Included was a sketch of the site and the route Mr. Sullivan used in his survey of October 7 and 8 during which he observed radiation readings on equipment items of up to 3 mR/hr.

On November 14, 1978, during an interview with Mr. Sullivan, at his school address in Florida, NRC:I inspectors were informed by Mr. Sullivan that there were about a dozen other places within an area approximately one square mile, some located in Norton and some in Attleboro, which he suspected of having radioactive material. The reasons given were their remoteness and evidence of industrial waste which Mr. Sullivan had seen at those locations. Mr. Sullivan described these locations as being "older" than the Norton site and he said that the industrial waste consisted of solid, liquid and metal material. Mr. Sullivan stated that he had written a letter to Mr. Crocker of NRC:I and had included maps of these additional locations. Mr. Sullivan had not yet mailed the letter. At the conclusion of the interivew, Mr. Sullivan furnished the hand-drawn maps of the additional locations to the NRC inspectors but retained the letter, which he stated he would mail to Mr. Crocker. The final number of sites indicated as "suspect" at this time by Mr. Sullivan was fifteen (15).

2. Inspection Efforts - In Response to Allegation

On October 24, 1978, as a result of the allegation received by NRC:I that radioactive material had been disposed of in a private landfill area located in Norton, Massachusetts, a preliminary radiation survey of the area was conducted, which indicated the presence of radioactive material. (See paragraph 3.b(1) for details.)

On October 27, 1978, NRC:I, based on the results of the preliminary radiation survey, decided to perform a comprehensive radiation survey of the surface of the landfill area.

On October 31 thru November 2, 1978, the comprehensive radiation survey of the area was conducted. (See paragraph 3.b(2) for details.) At the conclusion of the survey on November 2, 1978, a meeting was held with Mr. D. Opatka, Director of Conservation, Town of Norton. (See Attachment A for list of attendees.) Mr. Opatka was informed of the preliminary results of the radiation survey and that a meeting would be held with the Norton Board of Selectmen in the near future to present the findings of the survey and possible future courses of action. This meeting was subsequently scheduled for November 9, 1978.

On November 9, 1978, results of the radiation surveys were communicated to the Commonwealth of Massachusetts and Town of Norton officials and landowners during meetings. A NRC press release describing the allegation and the preliminary results of surveys was also issued on November 9, 1978. (See Attachment A for list of principal attendees).

On November 12, 1978, as a result of the November 9, 1978 meeting, the Norton landfill area was posted with official "No Trespassing" and "Caution - Radioactive Material" signs. (Unofficial signs posted at the site on November 3, 1978 were removed by persons unknown.)

On November 14, 1978, an investigation into the source of the radioactive material found at the landfill dump site was initiated. (The results of this investigation is the subject of a separate report.)

On November 16, 1978, NRC:I established a plan of action to survey the additional sites identified as suspect for radioactive material during the week starting November 27, 1978. This was to be accomplished concurrently with an investigation aimed at identifying the source of radioactive material found at the privately owned landfill in Norton.

On November 28, 1978, prior to the start of the surveys for radioactive materials, meetings were held sequentially in Attleboro and in Norton. The Attleboro meeting was held at 9:00 a.m., at the Attleboro City Hall in the Office of the Mayor. (See Attachment A for list of attendees.) The purpose of the meeting was to establish contact and coordination between the NRC, Massachusetts Department of Public Health, and Attleboro officials. The Norton meeting was held at 10:30 a.m., at the Norton Town Hall in the Office of the Director of Conservation. (See Attachment A for list of attendees.) The purpose of this meeting was to establish contact and coordination between the NRC, Massachusetts Department of Public Health, and Norton officials.

On November 28 through December 1, 1978, radiation surveys of 17 additional landfill sites (two sites were added at the request of local officials) were performed by teams comprised of NRC:I and Commonwealth of Massachusetts personnel accompanied by appropriate town officials. (See paragraph 3.c for details.)

Local media interest was high during the conduct of the surveys of the 17 sites and press personnel were with the survey team at Finberg Field, Attleboro when radioactivity was discovered there on November 29, 1978. TV coverage of the survey activities was carried on 3 local TV stations on November 30, 1978.

On November 30, 1978, a meeting was held at the Attleboro City Hall in the Office of the Mayor. (See Attachment A for attendees.) The purpose of this meeting was to present a progress report on the survey results which were available at that time. The Mayor was informed by NRC:I and Commonwealth of Massachusetts personnel that low level radioactive material had been found at Finberg Field, but that there was no public health and safety hazards associated with the levels of radioactivity found.

On December 1, 1978, at the conclusion of the surveys, meetings were held with appropriate officials from each municipality. The purpose of these meetings was to present the final results of the surveys, discuss the findings, and to present possible future courses of action. The Attleboro meeting was held at 9:30 a.m., at the Attleboro City Hall in the Office of the Mayor. (See Attachment A for list of attendees.) The findings of the Attleboro survey

team were summarized, as follows: radioactivity had been found at one site - Finberg Field; soil samples had been taken for analysis; the preliminary analysis would be performed with NRC:I equipment on December 4, 1978; and the samples would then be sent to the NRC reference laboratory, the Department of Energy, Idaho Radiological and Environmental Services Laboratory for more detailed analysis. The Norton meeting was held at 11:00 a.m., at the Norton Town Hall in the office of Mr. G. Glaiel, the Executive Secretary of the Norton Board of Selectmen. (See Attachment A for list of attendees.) Mr. Glaiel was informed that the survey results indicated that none of the additional five sites surveyed in Norton were found to contain radioactive material and that efforts were still underway to determine the sources of the radioactive material found at the original Norton privately owned landfill site.

On December 12, 1978, a meeting was held at NRC Office of Inspection and Enforcement Headquarters (IE:HQ), Bethesda, Maryland, to discuss the results of the radiation surveys performed in Norton and Attleboro, Massachusetts. (See Attachment A for list of attendees.) A discussion followed in which possible future courses of action were examined. This discussion centered on involving other Federal Agencies such as the Department of Energy (DOE) and Environmental Protection Agency (EPA) in this matter and the relative jurisdiction and responsibilities of these Federal agencies and the Commonwealth of Massachusetts. The necessity for additional sampling was discussed, including core sampling and/or aerial radiation surveys of the area.

On December 18, 1978, the results of the December 12, 1978 meeting and the analytical results on soil and water samples taken were transmitted to the Commonwealth of Massachusetts and Town of Norton, Massachusetts officials for their information. (At this point it had been mutually agreed that, since the material found at Finberg Field, Attleboro was subject to State rather than Federal control, the Commonwealth of Massachusetts was the "lead" agency with regard to subsequent actions in Attleboro.)

On December 19, 1978, NRC:I received a phone call from Mr. D. Opatka, Director of Conservation, Town of Norton, Massachusetts. Mr. Opatka stated that some information had been received by him indicating a possible additional site located in Norton, Massachusetts.

On December 21, 1978, a meeting was held in Norton, Massachusetts with Mr. Opatka. During this meeting, Mr. Opatka stated that an unnamed source had informed him that an extensive gravel pit area in Norton had been previously used as a disposal site for hazardous material wastes, possibly including radioactive material. According to Mr. Opatka, this disposal allegedly took place 10 to 15 years ago.

On December 21, 1978, the inspectors in the accompaniment of Mr. Opatka visually examined this last area and conducted a preliminary radiation survey of about 50% of the area. No radioactively contamination areas were identified. Because of the size of the area involved, and the lack of positive results on the preliminary radiation survey, it was decided that any additional surveys of this site would be postponed until additional specific information was obtained from the original source of the allegation or until any other surveys were performed of the general area. Mr. Opatka concurred in this approach. Mr. Opatka was contacted on January 31, 1979, and he stated that no additional information with regard to the allegation was forthcoming as of this time.

3. Details of Radiation Surveys

a. Instruments Used

Instruments used during the radiation surveys were Geiger-Muller (G-M) and scintillation counters as shown below:

Eberline Ratemeter (G-M) SN-5515 Model E-120
Probe: End-window G-M tube
Background level - 0 to 0.03 mR/hr

Eberline Pulse Ratemeter SN-2662 Model PRM-5-3
Probe: 2" X 2" Sodium Iodide Detector
Background level - 450 cpm

Ludlum Scintillation Analyzer SN-4440 Model 16
Probe: 1" X 1" Sodium Iodide Detector
Background level - 2000 cpm

b. Norton, Massachusetts Private Landfill Site

This area is located at 68 Union Road, Norton, Massachusetts. The owners are Mr. and Mrs. Isadore Shpack.

(1) On October 24, 1978, a joint survey of this privately owned landfill at Norton, Massachusetts was performed by NRC:I and Commonwealth of Massachusetts personnel in the accompaniment of the Norton Director of Conservation. The persons participating were:

George Swibble, Bureau of Radiation Control Programs, Department of Public Health, Commonwealth of Massachusetts
David Opatka, Director of Conservation, Town of Norton, Massachusetts
Jerome Roth, Region I, USNRC
Hilbert Crocker, Region I, USNRC

Results of the survey indicated three areas of radioactive contamination in the soil. Samples of each area were taken, as shown in Figure 1 which is a hand-drawn diagram of this landfill area. The samples read 4 to 5 mR/hr, and the soil contamination extended to at least four inches in depth. The survey team did not find any radioactivity on the pieces of equipment that had been identified by Mr. Sullivan as radioactive. The survey covered the areas that Mr. Sullivan has surveyed. The survey included measurements on numerous other equipment items and was of a somewhat expanded ground area. The three samples were analyzed at NRC:I on October 27 and were found to contain uranium 235 and 238. Relative amounts were not defined. The three samples were sent to the Radiological and Environmental Services Laboratory, Idaho Operations Office, for further analysis. (See paragraph 4 and Table 1 for details of sample analyses.)

(2) On October 31 through November 2, 1978, a more comprehensive radiation survey of the privately owned landfill site was performed by NRC:I and Commonwealth of Massachusetts personnel in the accompaniment of the Norton Director of Conservation. Persons participating in this survey included:

George Swibble, Bureau of Radiation Control Programs, Department of Public Health, Commonwealth of Massachusetts
David Opatka, Director of Conservation, Town of Norton, Massachusetts
Jerome Roth, Region I, USNRC
Todd Jackson, Region I, USNRC
David Gloski, Region I, USNRC

Results of the surveys indicated that extensive areas, of up to a total of 50,000 square feet, contained radioactive contamination in the soil. Radiation readings of between 0.5 and 1 mR/hr at 3 feet and isolated small areas of up to 20 mR/hr at contact were detected. Soil samples were obtained to a depth of about 24 inches below the surface; ground water and mud samples were also obtained for analysis. The samples were first analyzed using the NRC:I Ge(Li) system and were then sent to the Radiological and Environmental Services Laboratory, Idaho Operations Office, Department of Energy, for more detailed analysis. (See paragraph 4 and Table 1 for details of sample analyses.)

Figure 1 shows sampling locations which are designated as Hole A thru D. Observations made at each hole dug on the site on November 2, 1978, included the following:

Hole A - The hole was dug to a depth of 24 inches. At this depth, the radiation level was 1 mR/hr. The hole could not be dug deeper since a container (possibly a drum) was located at this level. A hole was punched through the container and the Ratemeter probe was inserted. The radiation level was determined to be about 1 mR/hr, however, this may have been due to the surrounding dirt. It was noted that the radiation level decreased from 10 to 15 mR/hr at the surface to about 1 mR/hr at a 24 inch depth.

Hole B - This hole was located about 30 feet northeast of hole A. Because of obstructions, only the top 3 inches of soil could be removed. The radiation level at the surface was 12 mR/hr, and no change was detected to the hole depth of 3 inches.

Hole C - The surface at this location was covered with an undisturbed layer of tar-like substance. The general radiation level in this area was about 1 mR/hr. The radiation level at the surface of this hole was 4 mR/hr. The hole was dug to a depth of 10 inches, and the radiation level at the bottom of the hole was 2 to 3 mR/hr. The hole could not be dug deeper because of obstructions encountered.

Hole D - This hole was located about 15 feet in front of a tall juniper tree situated on the east edge of the front half of the landfill site. The surface radiation level was 0.3 mR/hr. The radiation level at this location decreased from 0.3 mR/hr at the surface to the off-site background radiation levels of 0.02 mR/hr at a 15 inch depth.

Hole D-1 - This hole was located at 15 inches behind Hole D. Samples were taken at this location. The surface radiation level indicated 0.3 mR/hr (80,000 cpm Ludlum). The radiation level decreased to 0.08 to 0.1 mR/hr (14,000 cpm Ludlum) at a depth of 16 inches. The general radiation levels in this area at 1 meter above the surface were 0.08 to 0.1 mR/hr (8,000 to 9,000 cpm Ludlum).

(3) On November 9, 1978, additional water samples were taken from the Shpack residence well and from a small pond at the edge of the Attleboro Landfill Corporation Dump. (Samples of the pond water had also been previously obtained on November 2, 1978.) These water samples were first analyzed using the NRC:I Ge(Li) system and then were sent to the Radiological and Environmental Services Laboratory, Idaho Operations Office, Department of Energy, for more detailed analysis. (See paragraph 4 and Table 1 for details of sample analyses.)

c. Additional Landfill Sites in Norton and Attleboro

On November 28 through December 1, 1978, radiation surveys of 17 sites (at the request of local officials, two sites were added to the original 15 identified by Mr. Sullivan) were

performed by teams of NRC:I and Commonwealth of Massachusetts personnel in accompaniment of appropriate town and city officials. Persons participating in the surveys included:

Team A

J. J. Kottan, Region I, USNRC, Team Captain
D. Gloski, Region I, USNRC
L. F. Friedman, Region I, USNRC
W. Rollinson, Civil Defense Director, Attleboro, Massachusetts

Team N

J. Roth, Region I, USNRC, Team Captain
T. Jackson, Region I, USNRC
P. Clemons, Region I, USNRC
D. Opatka, Director of Conservation, Norton, Massachusetts

G. Swibble, Massachusetts Department of Public Health, Bureau of Radiation Control Programs, and J. P. Stohr, Region I, USNRC Project Coordinator, alternated between the two teams during the conduct of the surveys.

A map of the Norton-Attleboro, Massachusetts area depicting the locations of the landfill areas surveyed is shown as Figure 2. The locations are further described in Table 2. The results of the surveys indicated that of the 17 additional sites surveyed in Attleboro and Norton, one site, Finberg Field, located in Attleboro, was found to contain radioactive material. The radioactive material was found at five separate locations in wooded and brushy areas adjacent to Finberg Field as shown in Figure 3. Soil samples were taken at four locations to be analyzed at NRC:I on the Ge(Li) system and then sent to the Department of Energy's Radiological and Environmental Services Laboratory for analysis. (A sample was not taken from a fifth very small area near the left field fence.) The total area containing radioactive material was approximately 50 square feet. The radiation levels at these areas ranged from 0.08 to 0.32 mR/hr on contact and 0.032 to 0.08 mR/hr at three feet from the surface. (See paragraph 4 and Table 3 for details of sample analyses.)

d. Norton, Massachusetts - Gravel Pit

On December 21, 1978, NRC:I inspectors, J. Roth and R. E. Shepherd, accompanied by Mr. D. Opatka, Norton Director of Conservation, conducted a visual examination of approximately 70% of an extensive gravel pit area. The site was bounded on the north by Harvey Street, on the south by West Hodges Street and Goose Branch, on the west by a dirt road and the electric company high tension wires, and on the east by Goose Branch. The entire site consisted of an estimated 225 acres. Using a PRM 5-3 scintillation counter equipped with an 2" X 2" sodium iodide crystal, the inspectors conducted a radiation survey of about 50% of the area for evidence of radioactive material. The visual examination indicated that up to 90% of the surface had been disturbed and/or used as a source of gravel and/or sand. Evidence of dumping (mostly construction debris including black top from parking areas) was sporadically observed throughout the area examined. Radiation surveys of the construction debris and intermediate areas indicated no radioactively contaminated areas.

4. Details of Sample Analyses

NRC:I representatives collected a total of 19 soil and/or solids samples, four mud samples and 6 water samples during the course of this survey effort, as described in Tables 1 and 3. NRC:I personnel performed screening radiological analysis on each sample. The samples were analyzed in detail by the DOE-Idaho Radiological and Environmental Services Laboratory and selected samples were reanalyzed by the DOE-New Brunswick Laboratory, Argonne, Illinois. The screening analysis conducted at NRC:I was accomplished using Ge(Li) gamma ray spectroscopy. DOE-Idaho analyses were accomplished using Ge(Li) gamma ray spectroscopy, radiochemical methods employing alpha spectroscopy, and the chemical form of selected samples was determined using emission spectroscopic and x-ray diffraction techniques. Two metallic samples were destructively analyzed by wet chemical techniques by the DOE-New Brunswick Laboratory.

a. Norton, Massachusetts Private Landfill (Shpack Property)

Table 1 presents the results of the analysis of soil/solid, mud and water samples taken from the Shpack Property and analyzed by DOE-Idaho and DOE-New Brunswick Laboratories. Also

presented are the radiation survey results as taken on contact with the areas sampled. As shown, all of the water samples with the exception of Sample W-A, indicated background levels of alpha activity. Sample W-A was obtained from the center of the landfill area and was surrounded on three sides by large areas of soil which were shown to be contaminated. The mud samples showed the presence of radium with the exception of the Mud A sample which was taken from the same location as the W-A water sample. The soil samples were shown to contain natural uranium, processed natural uranium, depleted uranium, enriched uranium, and radium. The natural uranium samples contained uranium and all of the uranium daughter isotopes. The processed natural uranium samples contained uranium and the thorium and protactinum daughter products only. The depleted uranium samples contained only U-238 while the enriched uranium samples contained U-235 in quantities greater than the 0.71% found in natural uranium up to about 93%. Radium was found in several samples; either mixed with uranium (as a uranium daughter or natural uranium enriched in radium) or as radium alone with no uranium present. The Ra^{-226}/U^{-235} ratio in natural uranium would be expected to be 23. This would indicate that samples 1-7 and 1-8 are natural uranium, sample 1-13 is processed natural uranium, and samples 1-9 and 1-11 are enriched in radium. The presence of radium only in several soil samples appears to suggest that some of radium located in this landfill may have been deposited from a different source from that of the uranium. As shown in Table I, the solid metal samples shown for Samples 1-1 and 1-12 have been analyzed by both DOE-Idaho and DOE-New Brunswick. Analysis results from the two laboratories on Sample 1-12 indicated that the metal casting Sample 1-12 was an uranium-aluminum alloy and that Sample 1-1 was uranium-zirconium containing uranium enriched to 93% U-235.

b. Attleboro, Massachusetts - Finberg Field

Table 3 presents the results of the analysis of soil samples taken from Finberg Field and analyzed by the DOE-Idaho Laboratory. Also presented are the radiation survey results as measured on contact with, and at 3 feet from, the surface of the areas sampled. Each of these samples were found to contain only radium.

5. Protective Measures

The privately owned landfill area in Norton (Shpack property) is in a remote area. However, subsequent to a meeting with Town of Norton officials, as a precautionary measure, it was decided to post this area with official "No Trespassing" and "Caution - Radioactive Material" signs to inhibit access. This was done on the northern perimeter along Union Road.

Because of the very low level of radiation at the Finberg Field, Attleboro site, during the meetings on November 30 and December 1, 1978 with the City of Attleboro and Commonwealth of Massachusetts officials, it was decided that no precautionary posting was necessary at that time. The low levels of radioactivity found were located in areas not expected to be used, especially during the winter months.

6. Pending Subsequent Actions

Subsequent actions are largely related to the matter of ultimate jurisdiction and responsibility.

a. Finberg Field, Attleboro

The radioactive material found at this site was radium, which is a material whose use is regulated by the Commonwealth of Massachusetts. Therefore, responsibility for formulating further actions here has been assumed by the Bureau of Radiation Control Programs, Department of Public Health, Commonwealth of Massachusetts. This Bureau is communicating directly with City of Attleboro officials on this matter.

b. Privately Owned Landfill, Norton

Except for some radium, the radioactive material found at this site would have been used pursuant to a license issued by the former Atomic Energy Commission (AEC) whose functions in this area have been assumed by the NRC or pursuant to an AEC contract which activities are now under the jurisdiction of the DOE. There is presently an ongoing investigation being conducted by NRC to determine the source of the uranium and the associated responsibilities. This investigation will be the subject of a separate report.

Decisions on possible additional surveys needed to further define the extent of the material are pending the outcome of the investigation as to the source of the material.

NRC and DOE are in communication on this matter.

ATTACHMENT A

LIST OF MEETING ATTENDEES

Meeting of November 2, 1978 - Norton, Massachusetts

George Swibble, Radiation Control, Department of Health, Commonwealth of Massachusetts
David Opatka, Director of Conservation, Town of Norton, Massachusetts
Jerome Roth, Region I, USNRC Team Leader
Todd Jackson, Region I, USNRC
David Gloski, Region I, USNRC

Meetings of November 9, 1978 - Norton, Massachusetts with Landowner

Mrs. Isadore Shpack, Landowner, Private Landfill
J. M. Allan, Deputy Director, NRC:I
H. W. Crocker, Section Chief, Fuel Facility Projects Section, NRC:I

With Commonwealth of Massachusetts Officials

E. Comproni, Radiation Control, Department of Health, Commonwealth of Massachusetts
G. Swibble, Radiation Control, Department of Health, Commonwealth of Massachusetts
J. M. Allan, Deputy Director, NRC:I
G. H. Smith, Branch Chief, Fuel Facility and Materials Safety Branch, NRC:I
K. Abraham, Public Affairs Officer, NRC:I
T. C. Elsasser, State Liaison Officer, NRC:I
H. W. Crocker, Section Chief, Fuel Facility Projects Section, NRC:I

With Town of Norton Officials

Norton, Massachusetts Selectmen
E. Comproni, Radiation Control, Department of Health, Commonwealth of Massachusetts
J. M. Allan, Deputy Director, NRC:I
G. H. Smith, Branch Chief, Fuel Facility and Materials Safety Branch, NRC:I
T. C. Elsasser, State Liaison Officer, NRC:I
H. W. Crocker, Section Chief, Fuel Facility Projects Section
(News reporters and concerned citizens also attended).

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Meeting of November 28, 1978 - Attleboro, Massachusetts

G. Keane, Mayor of Attleboro
W. Rollinson, Director of Attleboro Office of Civil Defense
G. Swibble, Massachusetts Department of Public Health, Bureau of Radiation Control Programs
J. Stohr, NRC:I Project Coordinator
K. Abraham, NRC:I Public Affairs Officer
J. Roth, NRC:I Team N Captain
T. Jackson, NRC:I Team N Member
P. Clemons, NRC:I Team N Member
J. Kottan, NRC:I Team A Captain

Meeting of November 28, 1978 - Norton, Massachusetts

D. Opatka, Director of Conservation, Town of Norton
G. Swibble, Massachusetts Department of Public Health, Bureau of Radiation Control Programs
J. P. Stohr, NRC:I Project Coordinator
K. Abraham, NRC:I Public Affairs Officer
J. Roth, NRC:I Team N Captain
T. Jackson, NRC:I Team N Member
P. Clemons, NRC:I Team N Member

Meeting of November 30, 1978 - Attleboro, Massachusetts

G. Keane, Mayor of Attleboro
W. Rollinson, Director of Attleboro Office of Civil Defense
R. Linsey, Fire Chief of Attleboro
H. Cruft, Police Chief of Attleboro
G. Swibble, Massachusetts Department of Health, Bureau of Radiation Control Programs
J. Stohr, NRC:I Project Coordinator
K. Abraham, NRC:I Public Affairs Officer
J. Kottan, NRC:I Team A Captain

Meeting of December 1, 1978 - Attleboro, Massachusetts

G. Keane, Mayor of Attleboro
W. Rollinson, Director of Attleboro Office of Civil Defense
G. Swibble, Massachusetts Department of Health, Bureau of Radiation Control Programs
J. Stohr, NRC:I Project Coordinator
K. Abraham, NRC:I Public Affairs Officer
J. Kottan, NRC:I Team A Captain
B. Landis, Staff Writer, Providence Journal

Meeting of December 1, 1978 - Norton, Massachusetts

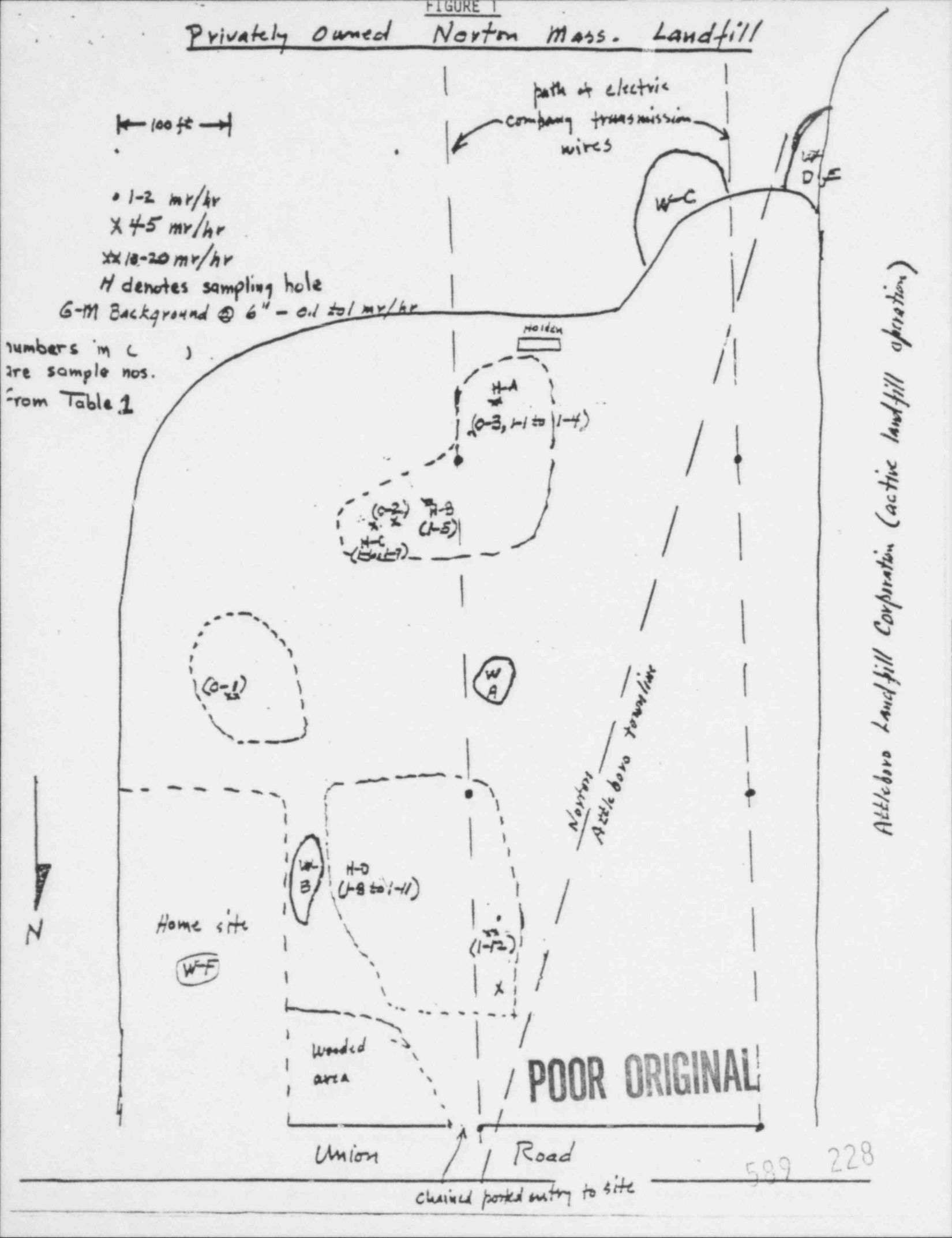
G. Glaiel, Executive Secretary, Norton Board of Selectman
G. Swibble, Massachusetts Department of Health, Bureau of Radiation Control Programs
J. Stohr, NRC:I Project Coordinator
J. Roth, NRC:I Team N Captain

Meeting of December 12, 1978 - IE:HQ

G. Smith, Chief, FF&MS Branch, NRC:I
J. Stohr, Chief, E&SP Section, FF&MS Branch, NRC:I
J. Roth, NRC:I, Fuel Facilities Inspector
R. Shepherd, Physical Security Inspector, NRC:I
J. Kottan, Radiation Specialist, NRC:I
L. Battest, Radiological Engineer, NRC-OSD
D. Sly, FFMSI, IE:HQ
N. Ketzlach, Senior Scientist, NRC:NMSS
E. Howard, Director, Division of Safeguards Inspections, IE:HQ
C. Bauer, Project Specialist, Office of Congresswoman Margaret H. Heckler, Tenth District of Massachusetts

FIGURE 1

Privately Owned Norton Mass. Landfill



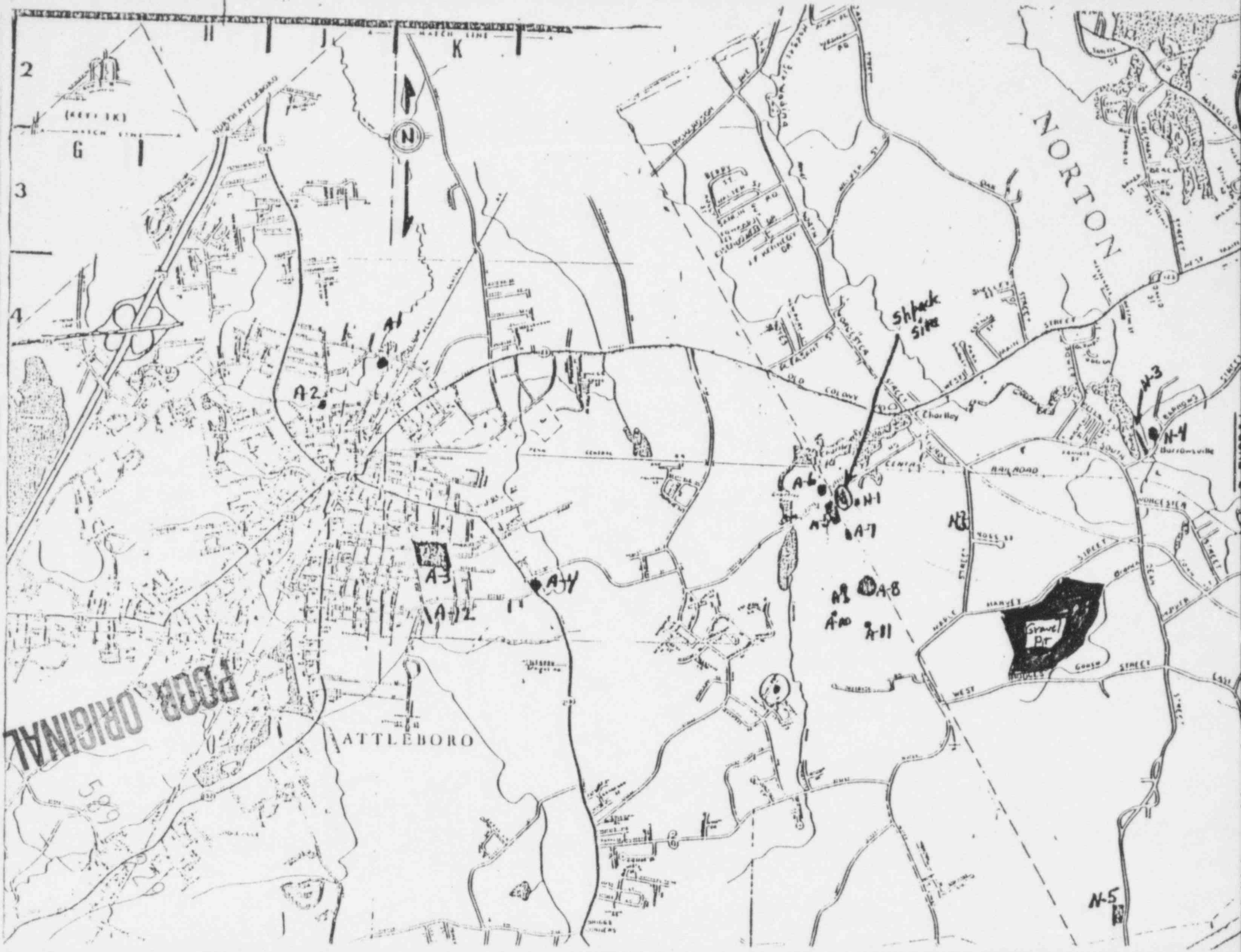
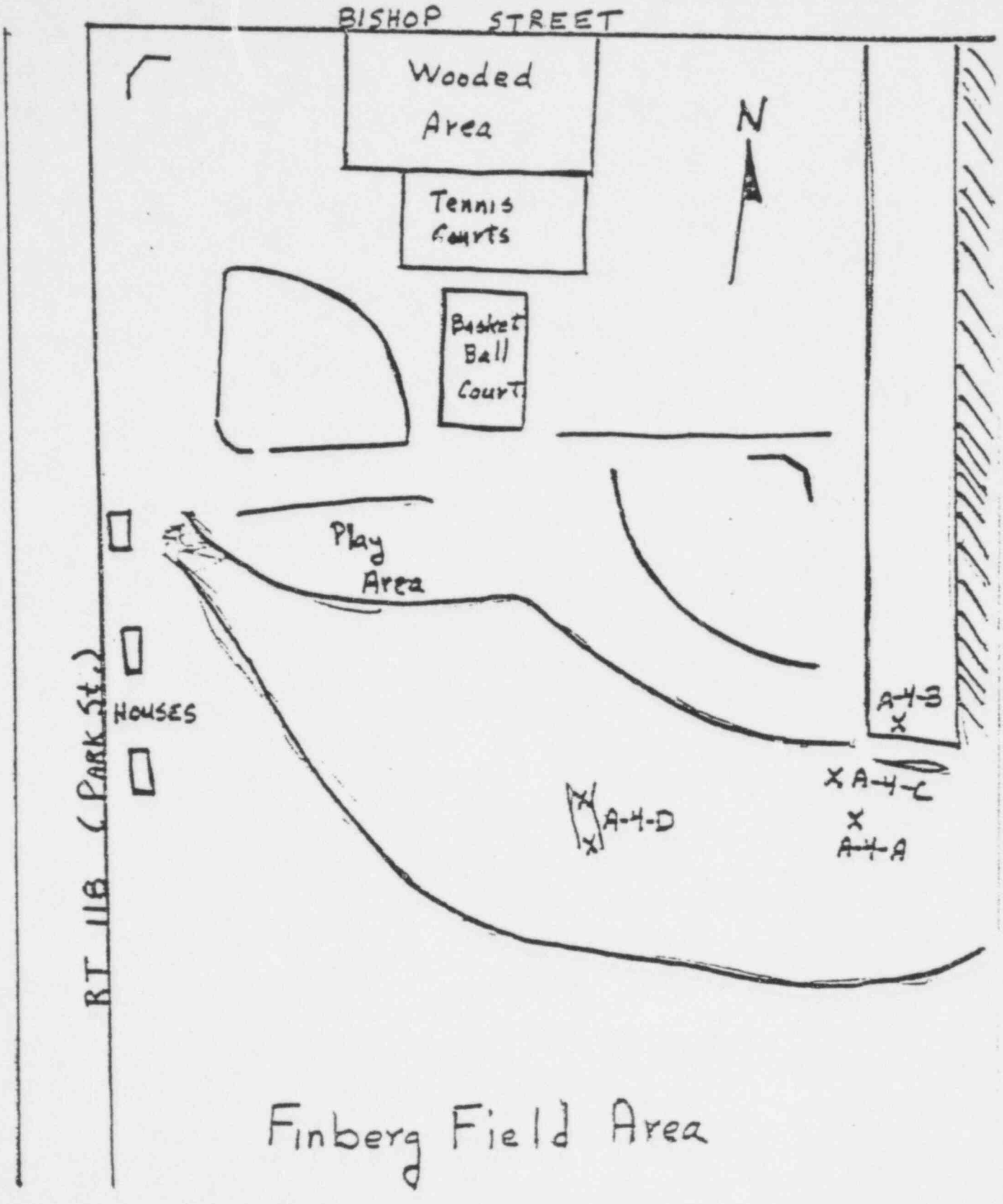

NORTON
ATTLEBORO
Shjack Site
Gravel Pit
A1
A2
A3
A4
A5
A6
A7
A8
A11
N1
N3
N4
N5
POOR ORIGINAL

FIGURE 3



Finberg Field Area

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NOTE: X denotes spots where radioactivity was found. A-4-A, etc., is sample no.

TABLE 1

Norton, M: Landfill Sample Analysis Results

Sample No.	Location	Date Sampled	Laboratory	Sample Analysis Results	Radiation Survey Results contact (G-M)
0-1	See Map	10/24/78	Idaho	Depleted Uranium. U-238 in -35 mesh soil fraction = 2.25 ± 0.9 E-1 uCi/gm. X-ray diffraction and emission spectrographic analyses indicated Uranium and Silica the major components with Uranium as U_3O_8 and UO_2.	2-6 mR/hr
0-2	See Map	10/24/78	Idaho	Natural Uranium. U-238 in -35 mesh soil fraction = 1.35 ± 0.45 E-6 uCi/gm.	2-6 mR/hr
0-3	See Map	10/24/78	Idaho	Depleted Uranium. U-238 in -35 mesh soil fraction = 9.01 ± 0.32 E-2 uCi/gm.	10-15 mR/hr
1-1	Hole A top 6"	10/31-11/2/78	Idaho/New Brunswick	-35 mesh soil fraction is depleted Uranium. The soil is approximately 26% Uranium; the Uranium concentration in the soil = 8.6 E-2 uCi/gm. A metal strip found in the soil contains approximately 8% Uranium enriched to 93% U-235. X-ray diffraction and emission spectrographic analyses indicated the metal strip to be Uranium and Zirconium.	10-15 mR/hr

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Sample No.	Location	Date Sampled	Laboratory	Sample Analysis Results	Radiation Survey Results contact (G-M)
1-2	Hole A (east side) 3" from top	10/31-11/2/78	Idaho	-35 mesh soil fraction is depleted Uranium. The soil is approximately 36% Uranium. X-ray diffraction and emission spectrographic analyses indicated Uranium in the Forms $UO_3 \cdot 2H_2O$ and MgU_2O_6.	∿ 30 mR/hr
1-3	Hole A 12" depth	10/31-11/2/78	Idaho	Depleted Uranium.	2 mR/hr
1-4	Hole A 21-23" depth	10/31-11/2/78	Idaho	Depleted Uranium and Radium.	1 mR/hr
1-5	Hole B top 3"	10/31-11/2/78	Idaho	Radium and Uranium-235 present. Ra^{226}/U^{235} = 36*.	2-3 mR/hr
1-6	Hole C 9" depth	10/31-11/2/78	Idaho	-35 mesh soil sample contains Radium. The radium concentration in the soil = 1.4 ± 0.3 E-2 uCi/gm.	3 mR/hr
1-7	Hole C surface	10/31-11/2/78	Idaho	Radium and Uranium-235 present. Ra^{226}/U^{235} = 20*.	1 mR/hr
1-8	Hole D surface	10/31-11/2/78	Idaho	Radium and Uranium-235 present. Ra^{226}/U^{235} = 26*.	0.3 mR/hr

Sample No.	Location	Date Sampled	Laboratory	Sample Analysis Results	Radiation Survey Results contact (G-M)
1-9	Hole D-1 surface	10/31-11/2/78	Idaho	Radium and Uranium-235 present. Ra^{226}/U^{235} = 78*.	0.3 mR/hr
1-10	Hole D 6" depth	10/31-11/2/78	Idaho	Radium only.	0.2 mR/hr
1-11	Hole D-1 3"-6" depth	10/31-11/2/78	Idaho	Radium and Uranium-235 present. Ra^{226}/U^{235} = 45*.	0.3 mR/hr
1-12	metal casting	10/31-11/2/78	Idaho/New Brunswick	The casting contains about 40% total uranium enriched to about 20 weight percent U-235. X-ray diffraction and emission spectrographic analyses indicated Uranium and Aluminum in the Form UAl_3.	~ 30 mR/hr
1-13	Mud A	10/31-11/2/78	Idaho	Radium and Uranium-235 and 238 present. Ra^{226}/U^{235} = 1.	0 mR/hr
1-14	Mud B	10/31-11/2/78	Idaho	Radium only.	0 mR/hr
1-15	Mud C	10/31-11/2/78	Idaho	Radium only.	0 mR/hr
1-16	Mud D	10/31-11/2/78	Idaho	Radium only.	0 mR/hr

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Sample No.	Location	Date Sampled	Laboratory	Sample Analysis Results	Radiation Survey Results contact (G-M)
W-A	Water	10/31-11/2/78	Idaho	1.4 ± E-7 uCi/ml gross alpha	0 mR/hr
W-B	Water	10/31-11/2/78	Idaho	0 ± 2 E-9 uCi/ml gross alpha	0 mR/hr
W-C	Water	10/31-11/2/78	Idaho	4 ± 2 E-9 uCi/ml gross alpha	0 mR/hr
W-D	Water	10/31-11/2/78	Idaho	6 ± 2 E-9 uCi/ml gross alpha	0 mR/hr
W-E	Water	11/9/78	Idaho	8 ± 4 E-10 uCi/ml gross alpha	
W-F	Water (Shpack well)	11/9/78	Idaho	8 ± 2 E-10 uCi/ml gross alpha	

* Notes: 1. Ra^{226}/U^{235} = 23 for natural uranium. This indicates samples 7 and 8 are natural uranium, sample 13 is processed natural uranium, and samples 9 and 11 are enriched in Radium.

TABLE 2

Areas Surveyed in Attleboro

Number	Date	Location	Area	Results
A-1	11/28/78	Holden St. along Bungay River	approximately 15 acres	no radioactivity detected
A-2	11/28/78	Bank St. along Bungay River	approximately 1-3 acres	no radioactivity found
A-3	11/28/78	area bounded by O'Neil Blvd., East St., Pearl St., and George St. Contains a paved parking lot, bowling alley, and active land fill.	approximately 10 acres	no radioactivity found
A-4	11/28-30/78	Finberg Field	approximately 20 acres	radioactivity found
A-5	11/30/78	Attleboro Landfill Corp. Peckham Road at the Norton-Attleboro town line-South Side of Peckham Rd.	approximately 30 acres	no radioactivity detected on slopes and back of active landfill not surveyed
A-6	11/30/78	Attleboro Landfill Corp. Peckham Road at the Norton-Attleboro town line-North Side of Peckham Rd.	approximately 12 acres	no radioactivity detected
A-7	11/29/78	Attleboro Landfill Corp. Peckham Road at Norton-Attleboro town line-1000 feet south of active landfill	approximately 6 acres	no radioactivity detected
A-8, 9, 10, 11	11/29/78	Attleboro Landfill Corp. Peckham Road at Norton-Attleboro town line-1000 feet south of area A-7	approximately 50 acres	no radioactivity detected
A-12	11/30/78	Thatcher (Speedway) Brook extending south from Maple Street	approximately 1 acre	no radioactivity detected

Areas Surveyed in Norton

Number	Date	Location	Area	Results
--	10/24, 10/27-11/2/78	South of Union St at the Norton-Attleboro town line	approximately 10 acres	radioactivity detected
N-1	11/28/78	Alleged location south east of Shpack dump location	approximately 1 acre	could not find may be Thompson Chemical dump site located at the south end of Shpack dump strattling the Norton-Attleboro town line
N-2	11/28/78	East side of Maple St. just north of power lines	approximately 1 acre	no radioactivity detected
N-3	11/28/78	Barrows St. near the intersection with Worcester St. from the bridge extending northwest toward Barrowsville Pond	approximately 5 acres	no radioactivity detected
N-4	11/28/78	Barrows St. approximately 2000 ft. west of the bridge	approximately 5 acres	no radioactivity detected
N-5	11/30-12/1/78	West side of Dean St. approximately 2000 ft. north of the Rehoboth town line	approximately 8 acres	no radioactivity detected
--	12/21/78	Bounded on the north by Harvey St., on the south by West Hodges St. and Goose Branch (Creek) on the west by a dirt road and the electric company high tension wires and on the east by Goose Branch (Creek)	approximately 225 acres	no radioactivity detected

TABLE 3

Finberg Field Sample Analysis Results

Sample No.	Date Sampled	Laboratory	Sample Analysis Results uCi/gm*		Radiation Survey Results contact (G-M)
			Pb-214	Bi-214	
A-4-A	11/30/78	Idaho	(3.66 ± 0.10) E-4	(3.48 ± 0.15) E-4	0.20 mR/hr
A-4-B	11/30/78	Idaho	(2.05 ± 0.05) E-3	(2.10 ± 0.06) E-3	0.08 mR/hr
A-4-C	11/30/78	Idaho	(6.59 ± 0.18) E-4	(6.20 ± 0.23) E-4	0.32 mR/hr
A-4-D	11/30/78	Idaho	(1.39 ± 0.04) E-4	(1.46 ± 0.09) E-4	0.15 mR/hr
left field fence	not sampled	--	--		0.05 mR/hr

Radiation measurements made using Eberline E-120 survey meter with HP-190 probe.

*includes a systemmatic error of ± 100%