



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

MAY 28 1987

MEMORANDUM FOR: William T. Russell, Regional Administrator
FROM: Thomas T. Martin, Director
Division of Radiation Safety and Safeguards
SUBJECT: BACKGROUND INFORMATION FOR SENIOR MANAGEMENT MEETING

The attached notebook contains background information that I believe will be helpful in preparing for the discussions of problem byproduct materials licensees at the upcoming Senior Management Meeting.

Based on my recommendation that you discuss the Radiation Technology, Inc. facility in Rockaway, New Jersey as the Region I byproduct material licensee that has created the greatest safety concern, much of the attached material focuses on that facility. However, in light of Region V's plans to discuss problems with the radiographer training and qualification program at U.S. Testing, my staff has also provided background information on a large Region I radiography licensee (PTL - Inspectorate, Inc.) that has experienced similar problems (but to a much less degree). The attached material includes a comparison of the similarities and differences between the problems at PTL and U.S. Testing.

If, after reviewing the attached material, you desire additional information, please let me know.

A handwritten signature in cursive script, appearing to read "Thomas T. Martin".

Thomas T. Martin, Director
Division of Radiation Safety
and Safeguards

Attachment: As stated

cc w/o attachment:
J. Allan

B/12

Assessment of Licensee Performance (SALP) conducted for the period from August 1986 thru February 1987 indicated generally acceptable performance, but with improvement needed in the areas of procedure adherence, quality assurance, and plant maintenance (Attachment J).

Investigations/Allegations

OI is currently continuing investigation in support of Department of Justice proceedings concerning RTI. Region I is currently examining the possibility of improper burials of radioactive material on site.

Significant Licensee Accomplishment

A License Renewal Application was submitted February 20, 1987. The present license expired on February 28, 1987, but is currently being maintained on timely renewal. Amendment No. 21 was issued on April 8, 1987, which added an authorized user to the license, and named Mr. Tass Varaklis as the Radiation Safety Officer.

*Renewal
2/87*

In December 1986, the then Radiation Safety Officer initiated a site characterization in an effort to determine the presence of suspected burials of radioactive material. Initial radiation surveys were performed and exploratory excavations were made in areas where burials were believed to have occurred. One of the excavations resulted in a positive indication of radiation, i.e., about 600 uR/hr, before the digging was stopped and the excavation backfilled. Subsequent soil and water samples from the location did not reveal any activity, which lead to the speculation that a contained source may still be buried at this spot.

*Cont.
Soil
issue.
12/86
other
waste,*

In response to this finding a Confirmatory Action Letter (CAL) 87-02 (Attachment K), dated March 24, 1987 was issued. CAL 87-02 documented the licensees commitments to: 1) comprehensively survey the portion of the property suspected to contain buried radioactive material; 2) develop a plan to non-invasively detect buried matter, and 3) inform the regional office prior to performing any invasive action to explore or uncover buried material. Such actions have now been completed by the licensee, and include the results of a magnetometry survey of the site (Attachment L). Several suspected areas were identified that require further evaluation. To supplement this effort, Region I contracted Oak Ridge Associated Universities to perform an independent characterization survey of the unrestricted areas of RTI's property in Rockaway, NJ. While several items containing low-level radioactivity were found on the property, nothing of major significance was detected. Oak Ridge's report to Region I documenting their findings is enclosed (Attachment M).

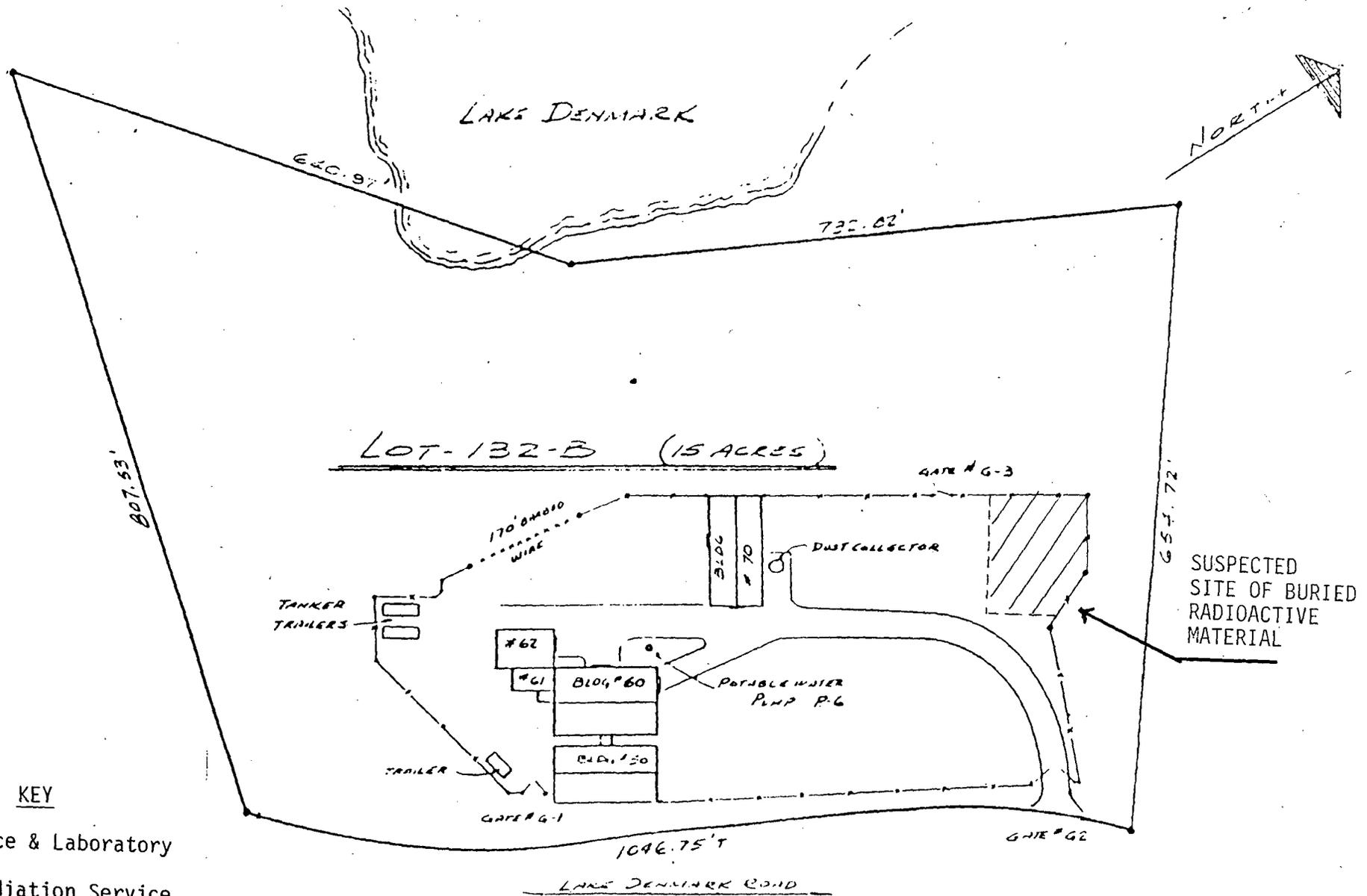
On May 8, 1987, representatives from NRC Region I met with representatives from the New Jersey Department of Environmental Protection (NJDEP) to discuss items of mutual interest relative to RTI. The NJDEP informed Region I representatives of its intent to perform a major site characterization effort, i.e., a

*State
EPA
NRC*

*Lead not
as significant
publically*

Remedial Investigation/Feasibility Study (RIFS), to determine the presence and cause of hazardous chemicals known to be contaminating the ground water in the area of RTI. Such action is expected to commence June 1, 1987. A public meeting in this regard was held May 14, 1987, (Attachment N), and was attended by Region I representatives. Public interest appeared to focus primarily on the nature and extent of the hazardous chemical waste and its impact of the local environment. No significant interest has yet been expressed relative to radioactive waste material disposition.

Currently the Region is preparing a POLICY ISSUE document for the negative consent of the Commission relative to permitting the Region to allow a one year probationary renewal of the license, provided that the area of concern involving the possibility of buried radioactive material is adequately addressed by RTI in a plan of action. The POLICY ISSUE document has been drafted and is currently being reviewed. At the present time, RTI is operating normally and is involved in consolidating all radioactive waste material on-site for proper disposition. The NJDEP has initiated action to commence the RIFS, which is expected to continue for the next 18 months.



KEY

- BLDG 50 Office & Laboratory
- BLDG 60 Irradiation Service
- BLDG 61 R & D Pool Irradiator
- BLDG 62 Processing
- BLDG 70 Warehouse & Finishing

The tract occupied by the irradiation facility



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406
MAR 24 1987

Docket Nos. 030-7022
030-19146
CAL No. 87-02

License Nos. 29-13613-02
29-13613-03

Radiation Technology, Incorporated
Attn: Mr. Tass Varaklis
Vice President
Operations and Engineering
108 Lake Denmark Road
Rockaway, New Jersey 07866

Gentlemen:

Subject: Characterization of Possible Buried Radioactive Material

During a telephone conversation between yourself and Messrs. Thomas T. Martin and John R. White of this office on March 23, 1987, you made the following commitments relative to your actions to characterize the burial of any radioactive materials within the protected area bounding Radiation Technology, Incorporated's (RTI) irradiator facility in Rockaway, New Jersey.

In regard to this matter, we understand:

1. By April 3, 1987, you will perform, document and submit to this office a gridded radiation survey of the fenced area bounding the RTI irradiator facility (excluding buildings and immediately adjacent areas that are directly affected by irradiator operations). Such survey will be sensitive enough to distinguish areas that are twice background and sufficiently comprehensive to identify all anomalous indications of radioactivity at the ground surface that could be the result of buried radioactive material.
2. By April 3, 1987, you will submit to this office a plan for locating and identifying the sources of anomalous indications of radioactivity in the ground that could be the result of buried radioactive material. The plan will incorporate non-invasive techniques, such as Ground Penetrating Radar or other methods capable of detecting and identifying sub-surface objects that may contain radioactive material and provide for soil sampling as necessary to distinguish whether the anomalous radioactivity is from an object or incorporated in the soil.
3. Prior to opening any containers suspected of containing radioactive material that may have been or were buried at the RTI facility, or are otherwise unidentifiable with respect to contents; and prior to initiating any excavation or core boring for the purpose of exploring for or uncovering any buried material, including radioactive material, you will notify Mr. John R. White of this office (215-337-5102) for the purpose of giving the NRC an opportunity to witness either of these activities.

MAR 24 1987

If our understanding of your planned actions, as described above, is not in accordance with the actions being implemented, please contact this office by telephone and in writing within 24 hours of your receipt of this letter.

The response requested by this letter is not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

Sincerely,

Original Signed By:
James H. Joyner

Thomas T. Martin, Director
Division of Radiation Safety
and Safeguards

cc:
Public Document Room (PDR)
Nuclear Safety Information Center (NSIC)
Commonwealth of Massachusetts (2)

bcc:
E. Flack, IE
G. Sjoblom, IE
R. Cunningham, NMSS
J. Lieberman, OGC
J. Hickey, NMSS
V. Miller, NMSS
J. Allan, RI
T. Martin, RI
J. Joyner, RI
J. White, RI



April 15, 1987

Project No. 303382

Mr. Tass Varaklis
Radiation Technology, Inc.
108 Denmark Road
Rockaway, NJ 07866

Letter Report
Magnetic Survey
Radiation Technology, Inc.
Rockaway, New Jersey

Dear Mr. Varaklis:

This letter report presents the results of a magnetometer survey conducted at the Radiation Technology, Inc. (RTI), site in Rockaway, New Jersey by International Technology Corporation (IT). The purpose of the investigation was to detect the presence of buried ferromagnetic materials. The results of the survey will then be used by RTI in their planning of additional investigations with respect to the delineation of buried drums which were reportedly disposed of at that site.

BACKGROUND

The site is a level, grass-covered area approximately 100 by 200 feet surrounded on two sides by a metal, chain-link fence and on a third side by an asphalt roadway (Figure 1). Portions of the eastern edge of the site indicated evidence of previous excavations and small rocks littered this area. It is unknown whether these rocks were indigenous to the site or were imported for use as fill material.

The rocks observed and noted on the site consisted of granites, conglomerates, and sandstones (including arkosic sandstone). Two specimens collected were magnetic and thus inferred to contain a large quantity of magnetite. Therefore, natural interferences from the magnetite-rich rocks encountered in the process of surveying exist but, due to sparse site-specific information, the extent of these interferences cannot be estimated at this time.

Three of the conglomerates observed on site were boulder sized and very well rounded. The variety of rock types and the well-rounded appearance of the conglomerates indicate the rocks may be of glacial origin. However, without more information about local bedrock and geology, no firm conclusions can be provided at this time.

Regional Office

William Penn Plaza • 2790 Mosside Boulevard • Monroeville, Pennsylvania 15146-2792 • 412-243-3230

ATTACHMENT L

Mr. Tass Varaklis

2

April 15, 1987

Magnetic interferences on site included the chain-link fence on the northern and eastern edges of the site, an earthen pile which contained scrap metal, a monitoring well in the northwest corner of the site, and three to four concrete blocks which contained pieces of metal pipe. Locations of any underground pipelines/conduits were unknown.

A three-foot-by-three-foot area on the eastern portion of the site was cordoned off by RTI as part of their radiation protection requirements, and this particular area was excluded from the survey.

SUMMARY OF MAGNETIC SURVEY PROCEDURE

The intensity of the earth's magnetic field can be measured with a magnetometer. The unit of intensity is the gamma, which is defined in terms of the force that a magnetic field will place on a standard magnet. The intensity of the earth's magnetic field ranges from 35,000 to 75,000 gammas (measured at the earth's surface), and differences from the normal or background intensity constitute magnetic gradients or anomalies. The change of the intensity over distance (i.e., the gradient) and relative differences between intensity values are the features which are interpreted to identify magnetic anomalies. The absolute value of a given data point is of little use without another data point to which it can be compared.

A zero value for the magnetic gradient indicates that the total magnetic field is the same at both sensors at the data point location. This would indicate that the immediate magnetic field is not affected by any nearby magnetic objects.

The magnetometer used in this study was an EDA OMNI IV Tie-Line Magnetometer. The solid-state memory has capacity for 1,200 gradient readings. The sensor is external and is separated from the instrument so it is relatively unaffected by the magnetic field generated by the observer and it can be easily positioned away from the recording instrument. The sensor head is mounted on a collapsible aluminum staff and the instrument operates on a large rechargeable battery.

FIELD OPERATIONS

On April 6, 1987, the IT geophysical crew arrived at the RTI site to perform the magnetic survey. A grid was set up on the survey area using pin flags placed at five-foot intervals along the northern and eastern edges of the site, one row through the center of the site (north to south), and a row at 15-foot intervals along the western edge of the site. Lines and positions were set up with line numbers increasing to the south and position numbers increasing to the west. A 200-foot rope marked in five-foot intervals was then stretched from east to west (along Line 10), using the pin flags to align the rope correctly.

Mr. Tass Varaklis

3

April 15, 1987

The magnetometer survey was conducted by entering the coordinates of the first point into the instrument along with the line and position intervals. Readings were taken at known coordinates every five feet along a line. The instrument automatically updated the position when a reading was recorded. When the line was completed, the next line was run and the coordinates updated. The survey was performed by progressing back and forth along each line. The 200-foot rope was moved after every third line (every 15 feet) so that it could be used as a continual guide for position locations. Field notes of the site were also made which included the general location of the grid and any possible magnetic interferences encountered during the survey.

In addition, a preliminary magnetic survey was conducted in the area just south of the roadway. Magnetometer readings were taken and recorded but are not presented in Figure 1. No magnetic objects were detected in this area.

Once the survey was completed, all pin flags were removed except those positioned on the northern and eastern edges of the site. These were left in the ground to aid in locating any magnetic anomalies presented in this report.

DATA REDUCTION

The data stored in the equipment's memory were transferred to a portable computer in the field. Upon return from the site, the data file was then transferred to the mainframe computer. The data were then checked and data suspected to be influenced by cultural interference were deleted. In this case, the only interference appeared to be caused by the metal debris in the northeastern portion of the site (Figure 1). Using the data base of magnetic gradient data points, the computer develops the appropriate contours which are then plotted for subsequent interpretation.

CONCLUSIONS

Based on the magnetic gradient map (Figure 1), it is evident that ferromagnetic materials are buried on parts of the site.

The most extensive anomaly (Anomaly A) has a northwest to southeast trend and extends throughout the center of the site. The width of this anomaly (approximately 30 feet) and its irregular shape appear to preclude the presence of an underground pipeline. Instead, a trench with buried metals is more likely. The dashed line around Anomaly A indicates the approximate boundaries of this trench.

Four other, less-extensive anomalies (B through E) are also present on the site. It is not known what sort of buried metals caused these anomalies. The north portion of Anomaly D contains some very high gradient readings. Even though this area is influenced by the chain-link fence, it is believed that significant quantities of metal are buried below the surface.

Mr. Tass Varaklis

4

April 15, 1987

One small anomaly in the northeastern portion of the site is believed to be due to the metal debris exposed in this area and is so noted in Figure 1.

As may be noted in the figure, there is also a very broad, regular anomaly in the western part of the site, with a gradient value of over 150 gammas. Without more information concerning the geology of the area, it is not possible to determine the reason for this anomaly. A possible cultural reason for this anomaly is a very wide area of shallow, buried metal debris. On the other hand, if natural phenomena are postulated, they may indicate the presence of an igneous dike or sill or glacial outwash, all of which contain magnetite-rich rocks.

A major portion of the site showed higher than normal background readings. Generally, in the gradient mode, zero values are observed in a typical site free from magnetite-rich rock. The higher readings are believed to be due to the presence of the magnetite-rich rocks in the area. These elevated background readings do not appear, however, to have masked any of the stronger magnetic anomalies. A few higher than normal readings were recorded along the northwestern edge of the chain-link fence, but these are believed to be due to the fence proximity. They are not thought to be indications of buried metal.

The portion of the site south of the plant driveway showed generally low readings ranging from absolute values of 0.3 to 99 gammas. These readings were within the range of background levels typical of this site and, therefore, did not indicate the presence of any magnetic anomalies.

SUMMARY

It is obvious from this survey that ferrometallic objects are buried on site. It cannot be determined how much, what type, or at what depth metal objects are buried. A 30-foot-wide, 140-foot-long anomaly was discovered along with other smaller areas within the survey area. The cause of the broad, regular anomaly in the western part of the site cannot be determined without detailed geologic information about the area.

We appreciated the opportunity to conduct this magnetometer survey for RTI and hope we can be of assistance in the future.

If you have any questions, please do not hesitate to call.

Sincerely,

Daniel W. Pringle

D. W. Pringle
Project Leader

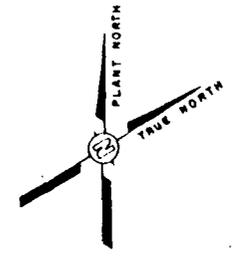
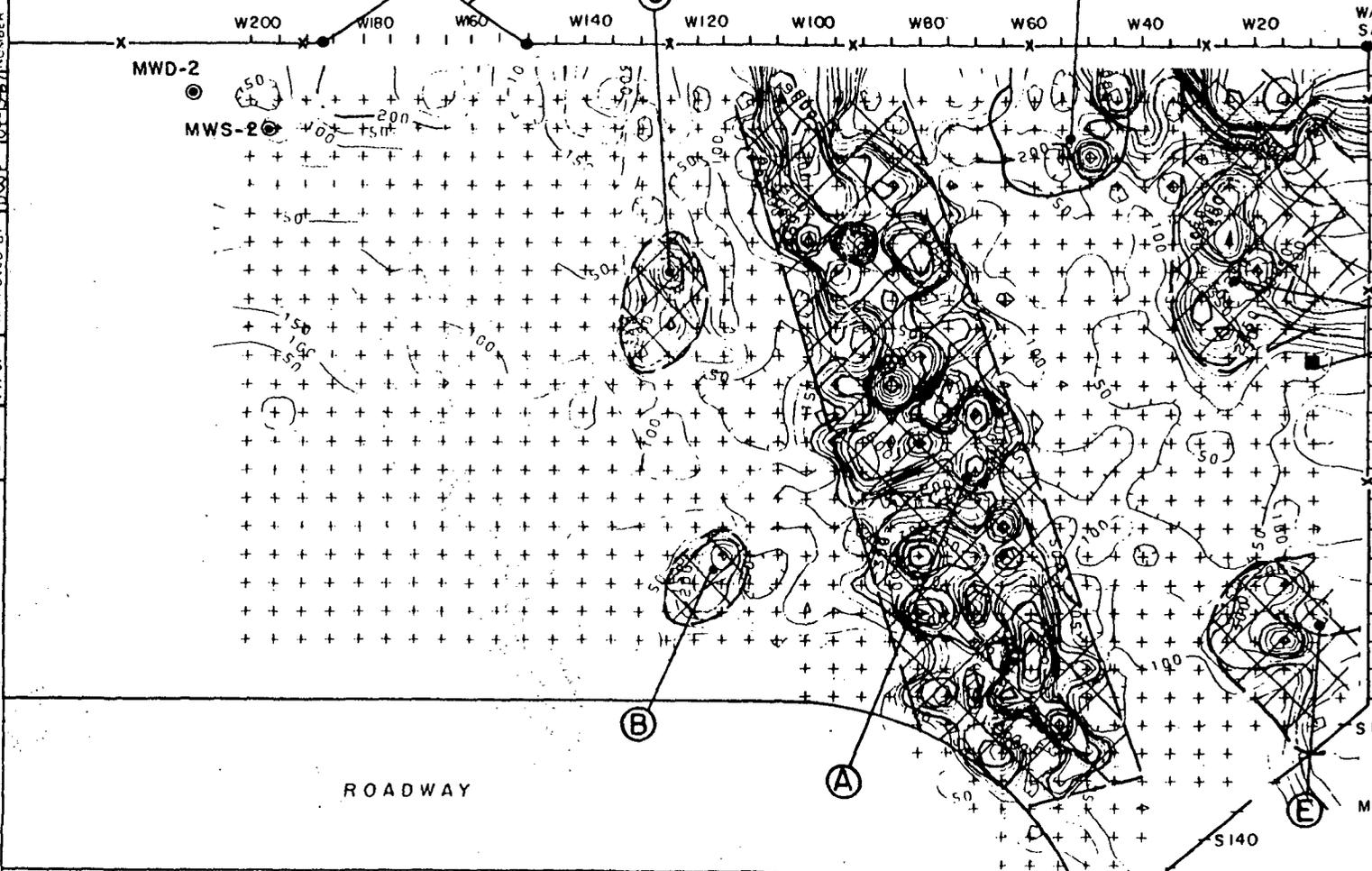
Jane C. Colletta for
S. Chakrabarti
Project Manager

DWP:SC:tkk

cc: Dr. Robert Cockrell

DRAWN BY J. LOGRECO 4-11-87
 CHECKED BY J. M. P. 4-11-87
 APPROVED BY D. W. P. 4-11-87
 DRAWING NUMBER 303082-B1

AREA OF VISIBLE METAL DEBRIS



SEE NOTE 2

LEGEND

- † DATA POINT LOCATION
- 50 MAGNETIC CONTOUR IN GAMMA/METER
- MAGNETIC ANOMALY INDICATING BURIED METAL
- +— METAL FENCE
- A, B, C, D, E ANOMALY DESIGNATION
- APPROXIMATE MONITORING WELL LOCATION

NOTES

1. CONTOUR INTERVALS VARIABLE
2. APPROXIMATE BOUNDARY OF AREA CORDONED OFF DUE TO RADIATION LEVELS TWICE BACKGROUND.

FIGURE 1

MAGNETIC ISOGRADIANT MAP

PREPARED FOR
 RADIATION TECHNOLOGY, INC.
 ROCKAWAY, NEW JERSEY

REFERENCES:
 SITE MAP PROVIDED BY RADIATION TECHNOLOGY, INC. AND FIELD NOTES PREPARED 4-6-87



Creating a Safer Tomorrow



Oak Ridge
Associated Universities
Post Office Box 117
Oak Ridge, Tennessee 37831-0117

Manpower Education,
Research, and Training
Division

May 1, 1987

Mr. John White
Region I
Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406

Subject: PRELIMINARY REPORT OF SURVEY FINDINGS - RADIATION TECHNOLOGY,
INCORPORATED

Dear Mr. White:

During the period April 13-17, 1987, Oak Ridge Associated Universities performed a cursory characterization survey of the unrestricted area of Radiation Technology Incorporated, Rockaway, New Jersey. The survey was conducted in accordance with a survey plan submitted to your office on April 10, 1987. The areas surveyed are shaded in green on the accompanying field sketch of the site. In general, the outdoor areas have radiation levels (9 - 12 $\mu\text{R/h}$) typical of background levels for this area of New Jersey. However, six isolated spots of elevated radiation levels were identified during the survey.

Location	Description	Exposure Rate Range ($\mu\text{R/h}$)	Radionuclide
1	Soil/Rocks	Up to 150 at contact	Soil/rock sample returned for analysis
2	Stainless Steel Drum	Up to 165 at contact	Co-60 confirmed onsite
3	Metal Frame	Up to 600 at contact	Co-60 confirmed onsite
4	Soil/Rocks	Up to 150 on contact	Soil/rock sample returned for analysis
5	Metal Drum	Up to 20 on contact	Co-60 confirmed onsite
6	Soil	Up to 27 on contact	Soil samples from large area returned for analysis

With the exceptions noted above, gamma and beta-gamma scans did not indicate the presence of elevated radiation levels within the buildings or their associated outdoor areas. Photographs of the items described above are being developed, and the soil/rock samples are being analyzed by gamma spectrometry. A draft report will be submitted on or before June 1, 1987.

ATTACHMENT M

John White

2

May 1, 1987

If you have any questions, please call Glenn Murphy at FTS 626-0048 or myself at FTS 626-2908.

Sincerely,


Robert J. Hysong ^{for}
Health Physics Team Leader
Radiological Site Assessment Program

RJH:mec

Enclosure

cc: G. Sjoblom, NRC/I&E
D. Corley, NRC/I&E

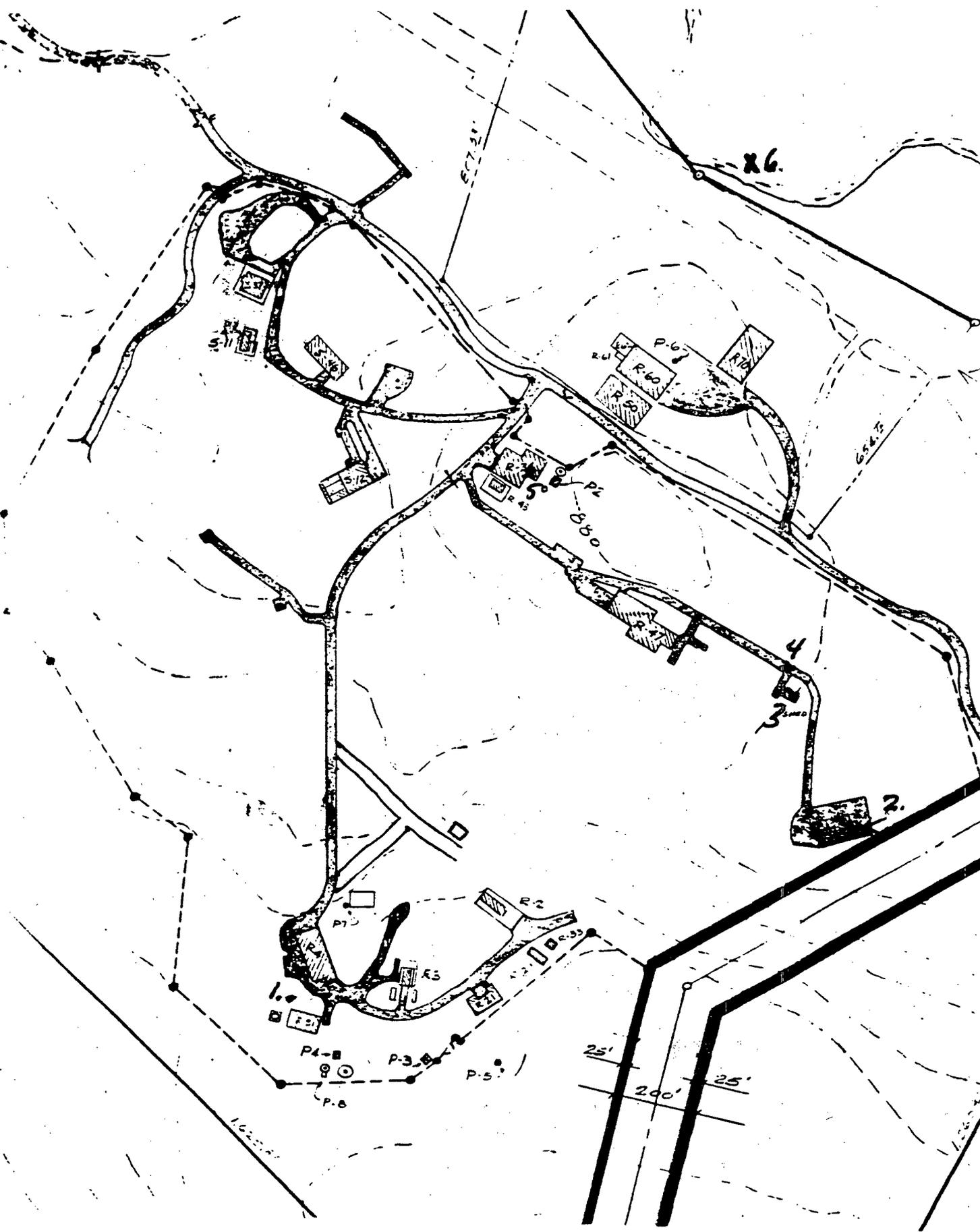


FIGURE 1: Locations of Areas and Objects with Elevated Gamma Radiation Levels, Radiation Technology, Incorporated, Rockaway, New Jersey. Regions outlined in green indicate the area surveyed.



STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF HAZARDOUS SITE MITIGATION

Public Meeting
to discuss
Initiation of the Remedial Investigation/Feasibility Study
for the
Radiation Technology Incorporated Site

Thursday, May 14, 1987
7:00 PM

Rockaway Township Municipal Building
65 Mt. Hope Road
Rockaway, New Jersey

AGENDA

1. Opening Remarks and Introductions
Mr. David Kindig, Section Chief
Bureau of Site Management
NJDEP
2. Site History and Project Overview
Mr. Craig Wallace, Site Manager
Bureau of Site Management
NJDEP
3. Presentation of Remedial Investigation/Feasibility Study.
Mr. Lawrence D. Zamojski
Project Manager
Acres International Corporation
4. Questions and Comments
The floor will be open for questions
and discussion at this time.



STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

FACT SHEET

on the
Remedial Investigation/Feasibility Study Initiation
for the
Radiation Technology Incorporated Site
Rockaway Township
Morris County

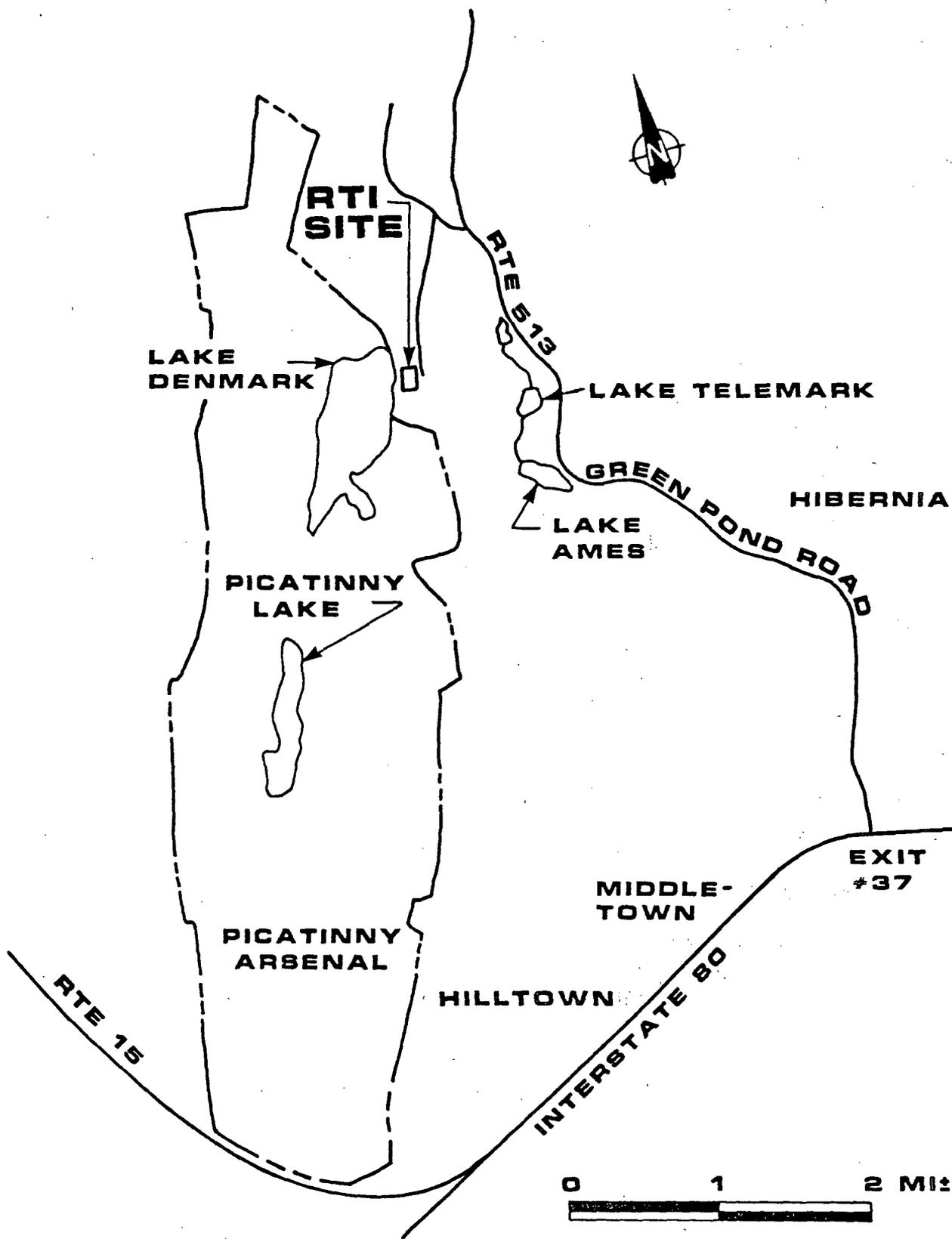
Radiation Technology Incorporated (RTI) owns 263 acres of generally wooded property in Rockaway Township. This property is located south of Lake Denmark and east of the U.S. Military Picatinny Arsenal facilities. RTI's industrial facility is concentrated on a 15-acre parcel of land in the north central portion of the 263 acres. RTI first leased the 15-acre parcel in 1970 and began operating facilities which use radioactive materials and organic chemicals in the manufacture of architectural products and hardwood flooring, and in the sterilization of food, medical and industrial products.

Improper storage and disposal of hazardous substances, either through direct dumping or by burial of drums containing waste products, have caused ground water contamination. The presence of hazardous constituents in the two aquifer systems beneath the site poses a threat to nearby potable wells and streams and to Lake Denmark.

In 1981, two production wells servicing the plant were found to contain volatile organic compounds and were taken out of service as potable water sources. Further investigations in 1981 through 1983 confirmed contamination of the site ground water with methylene chloride, trichloroethylene, and chloroform. Based on these findings, the NJDEP concluded that improper disposal and storage of hazardous substances, either through direct dumping or burial of drums containing waste products, has caused ground water contamination. The presence of these hazardous constituents in the two aquifer systems beneath the site poses a threat to nearby potable wells, streams, and Lake Denmark.

Of 100 New Jersey sites on the National Priorities List (NPL) (Superfund), the RTI site is ranked 51st in priority. The Remedial Investigation/Feasibility Study (RI/FS) is one step in the remedial response process as provided under the federal Superfund legislation. The objectives of the RI/FS are to determine the nature and extent of contamination and to develop and evaluate remedial alternatives to effectively remedy and protect public health and the environment. The engineering firm Acres International Corporation has been awarded a contract of approximately \$700,000 for the project, which is expected to take 18 months to complete. Upon completion of the study, a public meeting will be held to discuss the various remedial alternatives, and the New Jersey Department of Environmental Protection (NJDEP) recommendation.

Community participation is welcomed throughout all phases of this project. For additional information, contact Susan Gall, NJDEP Bureau of Community Relations, at (609) 984-3081.



RADIATION TECHNOLOGY SITE (RTI)

Radiation Technology Incorporated Site
Rockaway Township, New Jersey
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

Following is a brief outline of the activities entailed in the Remedial Investigation and Feasibility Study.

Remedial Investigation Activities

- Preinvestigation Activities: Include preparation of the project schedule; performance of background investigation, initial site inspection, and hazardous substances inventory; preparation of site health and safety program and quality assurance management plan; and aerial photography and the development of site maps.
- Field Sampling/Work Plan: Development of a comprehensive site work plan to be followed during the implementation of the study.
- Geophysical Investigation: Surface survey methods and borehole geophysical surveys.
- Ambient Air Monitoring: This will be done in conjunction with the field activities at the site.
- Soil and Rock Borings, Monitoring Wells, and Soil Sampling: This includes soil and rock drilling and sampling, the installation of monitoring wells in most borings, and the collection of soil samples from the near-surface soils at the site.
- Surface Water and Sediment Sampling: This activity includes the collection of surface water and sediment samples from the stream adjacent to the site.
- Ground Water Sampling: Water samples will be taken and analyzed from on-site monitoring wells.

Feasibility Study Activities

- Remedial Objectives: Site cleanup objectives will be established.
- Potential Remedial Action Alternatives: Applicable alternatives for site remediation will be identified.
- Screening of Remedial Action Alternatives: Using established NJDEP criteria, all alternatives will be evaluated in order to develop a final list of cleanup alternatives for consideration.
- Recommended Remedial Action Alternatives: NJDEP will recommend the alternative which is determined to best meet the evaluation criteria and remedial action objectives.
- Conceptual Design: Preparation of a conceptual design for the remedial alternatives selected by the NJDEP.