

Let's protect our earth



State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
CN 027, TRENTON, N.J. 08625-0027

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January 24, 1990

Mr. John B. Falconbridge, Principal
Lake Nelson
Seventh-Day Adventist School
555 South Randolphville Road
Piscataway, New Jersey 08854-5092

Dear Mr. Falconbridge:

This is in response to your letter dated December 7, 1989 concerning the radioactive device found at the Lake Nelson Seventh-Day Adventist School, and potential health effects to students who may have been exposed to it.

The attached report "The Piscataway Radium Incident" dated December 29, 1989 summarizes the Department's findings. The information contained in this report was forwarded to the New Jersey Department of Health and the New Jersey Attorney General's Office. The New Jersey Department of Health is responsible for evaluating the potential health effects from this incident. The individual in the Department of Health to be contacted for this information is:

Judith Klotz, Dr. P.H.
Program Manager, Air and Radiation
State of New Jersey
Department of Health
CN360, Room 706
Trenton, New Jersey 08625-0360

The Attorney General's Office is responsible for evaluating possible criminal activities in the state. We were advised January 10, 1990 that the Attorney General's Office has evaluated the incident and has found no criminal intent.

We appreciate the cooperation we've received from you and the Seventh Day Adventist Conference and hope we've been able to adequately address your questions within our purview.

Should you wish to have a representative of our program meet with your staff or members of your school community, please contact me to make arrangements.

Sincerely,



Gerald P. Nicholls, Ph.D.
Deputy Director

Enclosure: (1)

The Piscataway Radium Incident

December 29, 1989

**Radiation Protection Programs
Division of Environmental Quality
New Jersey Department of Environmental Protection**

Acknowledgements

From the very beginning of this incident the Department of Environmental Protection (DEP) has been fortunate to have enjoyed the active cooperation of many individuals and agencies. The young man who found the radium source and his family have provided detailed information on the discovery of the source and the security they provided for it until DEP staff arrived. Mr. John Falconbridge, Principal of the Lake Nelson School, and his staff have worked closely with DEP personnel in reconstructing the events surrounding the discovery of the source and in identifying past and present members of the Lake Nelson School community who may have knowledge of how and when the source arrived at the school. They also played a critical role in keeping parents and concerned citizens advised of what had occurred at the school and what steps were taken to protect public health. Reverend Gary Sudds, Director of the New Jersey Conference of Seventh Day Adventists, and Reverend Gerald A. Chapman, Chairman of the Lake Nelson School Board, assisted with the informational outreach. They have strongly supported efforts to locate individuals, formerly associated with the Lake Nelson School, who may have knowledge of the origin of the source.

Mr. Louis Serrano, Health Officer for the Piscataway Township Health Department, and Ms. Bonnie Green of his staff met with members of the Lake Nelson School community and responded to numerous calls from concerned area residents.

The New York Department of Labor and the United States Environmental Protection Agency (EPA) Region II Office continue to support efforts to trace the source by searching records of the manufacturer of the source, the Radium Chemical Company, now defunct, and for whose former manufacturing facility EPA now has responsibility under the Comprehensive Environmental Response, Compensation and Liability Act (i.e., Superfund). Mr. Donald Kauffman, a former employee of the Radium Chemical Company, has provided much valuable historical information as to how and when sources such as the one found at the Lake Nelson School were sold.

The New Jersey State Department of Health has provided and continues to provide valuable expertise, staff support and counsel.

To these and many others who have assisted us, we express our appreciation.

Narrative

At approximately 10:15 AM on Friday, February 3, 1989, the Radioactive Materials Section within the Bureau of Environmental Radiation of the New Jersey Department of Environmental Protection received a call from a Piscataway resident who reported that his 13 year old son had found a radioactive source the day before in the Lake Nelson School operated by the Seventh Day Adventist Church in Piscataway Township. In response to this call a Radioactive Materials Section staff member who was performing a routine inspection in a nearby hospital was dispatched to investigate the incident beginning with a visit to the young man's home.

The father reported that his son, who is not currently a student at the Lake Nelson School, had been in the school the previous week looking for a friend to show him a geiger counter which he was using as part of a project for his science class at the school where he is enrolled. In the course of looking for his friend he had turned on the geiger counter and discovered higher than background gamma radiation levels (approximately 1 milliroentgen per hour; normal background readings being about 1/100 of this) in one of the corridors of the school. Unable to locate his friend and unable to gain access to the locked classrooms along the corridor, the young man left the school but discussed his findings with his friend during the week.

Subsequent discussions with the Lake Nelson School staff established that, the friend, in turn, discussed the geiger counter readings with the school science teacher and arranged for the young man to return to the school on Thursday, February 2, 1989, to meet with the science teacher and attempt to determine the reason for the higher than background gamma radiation readings. Guided by the readings from the geiger counter, the young man and the science teacher eventually located a radioactive source in a locked and seldom used storage room in the school building. Because the geiger counter was behaving in an apparently erratic manner and because the source was not labelled as radioactive or hazardous, neither the young man nor the science teacher recognized the potential hazard posed by the source. Thus, when the young man requested that he be allowed to take the source home for further study, he was permitted to do so. The young man packaged the source so that it would not come in contact with his skin and so that he could hold it away from his body while taking the source home.

Once home, the young man explained what he had found to his father. Working together, they used a second, higher range radiation detector, also borrowed from the young man's school to evaluate the source and found disturbingly high gamma radiation readings (up to 45 roentgens per hour). Recognizing that they might have a significant hazard on their hands the father and son placed the source in a

makeshift shield which the boy had constructed as part of a science project. As it was now late, in the evening they decided to wait until the next day to contact the authorities.

On Friday, February 3, 1989 the father contacted Rutgers University seeking assistance. Rutgers personnel referred him to the DEP's Radioactive Materials Section. When the Radioactive Materials Section inspector arrived at the home at approximately 11:45 AM he verified the presence of the source and surveyed the area for possible contamination arising from the source. Finding no contamination but noting high radiation readings from the source, he contacted his supervisors and was instructed to proceed to the Lake Nelson School and determine whether any additional sources or any contamination existed at the school. While the inspector was on his way to the school, three additional Radiation Protection Programs staff were dispatched to the school to assist with operations at the school and the young man's home.

Upon arrival at the Lake Nelson School the Radioactive Materials inspector identified himself to the principal. He asked the principal to call a supervisor in the Radiation Protection Programs to discuss what had occurred. The principal placed the call and was briefed. The principal stated that he had no knowledge of the existence of the source and noted that the storage room where the source had been found was kept locked. He also indicated that only he and the science teacher had keys to the storage room. The inspector and the principal subsequently went to the storage room where the source had been found and surveyed the area. No additional sources or any residual contamination from the original source were found. Shortly thereafter the additional DEP staff arrived at the school. With the cooperation of the principal, they surveyed other storage areas in the school, verifying that no other sources or any contamination was present. The DEP team then went to the young man's home to assist in disposing of the source and to interview the family to establish how the source was transported and handled.

Arriving at the home at about 3:40 PM, the team conducted interviews with the young man and his parents, made radiation measurements to estimate the activity present in the source, prepared the source for transfer to a contractor licensed to receive such materials and performed additional radiation surveys to verify that no person or area in the home had been contaminated. Virtually constant communication was maintained with supervisory staff located at the Radiation Protection Programs offices.

Based on the results of a detailed interview with the young man and an estimated activity level in the source of

50 millicuries of radium-226, it was estimated that the young man received a radiation exposure of approximately 275 milliroentgens during the discovery, transportation and evaluation of the source, a time period of approximately 20 minutes. This is approximately twice the radiation exposure one receives from natural sources by living for one year in New Jersey.

During the afternoon the DEP opened the Spill Fund to provide funding for the disposal of the source. A contractor licensed to receive and dispose of such materials, Teledyne Isotopes of Westwood, New Jersey was contacted and agreed to transport and dispose of the source. DEP specialists in Spill Fund procedures were dispatched to the home to assist with the disposal. Representatives of the contractor arrived at the home at approximately 5:45 PM, packaged the source appropriately for transportation and removed the source from the home at approximately 7:00 PM. After the source was removed the DEP team resurveyed the garage area of the home to verify that no residual contamination was present.

Also during that afternoon, DEP staff had briefed a representative of the federal Nuclear Regulatory Commission on the incident. The Piscataway Police Department was contacted in the afternoon and again in the evening. With the assistance of the Police Department, the Head Sanitarian for the Piscataway Health Department was contacted and briefed when the incident was terminated.

On Monday, February 6th, DEP staff visited the Lake Nelson school to obtain information relevant to estimating radiation exposure patterns from the source, interview staff members and obtain information regarding past members of the Lake Nelson School community who may have information regarding the origin of the source.

On Tuesday, February 7th, a DEP representative was present at the Lake Nelson School all day to assist with press inquiries. From 2:00 PM to 9:00 PM representatives of the DEP, the New Jersey State Department of Health, and the Piscataway Health Department met with concerned parents of students at the school to brief them on what had occurred and to answer any questions they might have.

Since February 6th much of DEP's efforts have focused on obtaining information regarding the origin of the source, when it entered the school and for what purposes it might have been used. Approximately 200 telephone calls resulting in 82 interviews have been conducted with various individuals who might have knowledge of the origin of the source. The Lake Nelson School officials and the Seventh Day Adventist Conference have provided lists of teachers and students covering the period from the early 1960's, when the school was opened, to the present.

The New York Department of Labor, which ordered Radium Chemical Company to cease operations, and the Region II Office of the United States Environmental Protection Agency which has responsibility for the Radium Chemical Company facility under Superfund, continue to assist the DEP in locating records of sources sold or rented for use in New Jersey. Mr. Donald Kauffman, formerly a sales representative for Radium Chemical Company serving the New Jersey area was located and has provided historical information. A review was conducted of all current and past New Jersey licensees who possessed radium for human use. None of these efforts has been successful thus far.

Discussion

Based on currently available information, the source is believed to be a nasopharyngeal applicator manufactured and sold by the Radium Chemical Company from 1942 to 1965 (see Figure 1). Mr. Kauffman indicated that approximately 100 of these devices were sold or rented for use in New Jersey. The device does bear the name of the Radium Chemical Company but does not bear a serial number. Mr. Kauffman noted that the lack of a serial number probably indicates that the device was sold rather than rented. The earlier devices were sold and most of the later devices were rented. He is unaware of any of these devices being manufactured containing greater than the stated nominal content of 50 ($\pm 5\%$) millicuries of radium-226. Registration of such devices began in New Jersey in 1960 while licensure began in 1965. A review of the Bureau's approximately 1071 active and cancelled licenses and registrations for the possession of radioactive materials revealed that there were 5 individuals that owned or rented nasopharyngeal applicators. The device found at the school cannot be traced to any of the five individuals. Based upon the interviews of the school's previous teachers and administrators, the school started in the early 1960's. Thus, if the source was originally used by a New Jersey physician, it is likely that the source was purchased prior to 1960 and was probably both transferred to the school and accepted by individuals at the school who were unaware of the potential hazards posed by the source. The lead shield which would have contained the source when it was sold was not found at the school. It is not known when the source arrived at the school. The earliest recollection placing the source at the school is that of the science teacher who recalls seeing it in the storage room in August of 1988 when he assumed his position at the school. At the time, he mistook it for a common laboratory tool whose outward appearance is similar.

Several measurements have been made by the DEP and the contractor employed by the DEP to determine the activity of the source. Precise measurements of the activity of the source were not obtainable because of its high activity and the necessity to dispose of it properly and as rapidly as possible. The best estimate by the DEP of the source's activity is 59 millicuries

with an uncertainty of approximately $\pm 10\%$. The contractor's best estimate is 69.8 millicuries with an uncertainty of approximately $\pm 20\%$. Utilizing an assumed source activity of 70 millicuries and measurements made at the Lake Nelson School, radiation exposure estimates were made for the areas around the source's position in the storage closet. These estimates include shielding effects of the walls and are shown in Figures 2a & 2b. The outermost isopleth indicates the maximum exposure level to which members of the general population are permitted to be exposed under applicable State and federal regulations.

Conclusions

Based on currently available information the following conclusions may be drawn:

1. The source has been removed from the Lake Nelson School and poses no further threat to the public. There is no residual contamination present.
2. With the exception of removing the source from the school, the young man who discovered the source displayed an unusually high level of understanding and care in handling the source. His evident knowledge and care prevented potentially serious radiation exposure to himself and those around him.
3. Gamma radiation exposure rates in excess of those permitted by State and federal regulations did exist in the Lake Nelson School in the areas delineated in Figures 2a & 2b.
4. The Lake Nelson School community and the Piscataway municipal officials have fully cooperated with DEP efforts to assess the potential hazards posed by the presence of the source.

Figure 1

Nasopharyngeal Applicator

Illustration Adapted from Radium Chemical Company
Product Literature. Device Shown Approximately
Full Scale

MONEL METAL NASOPHARYNGEAL APPLICATOR



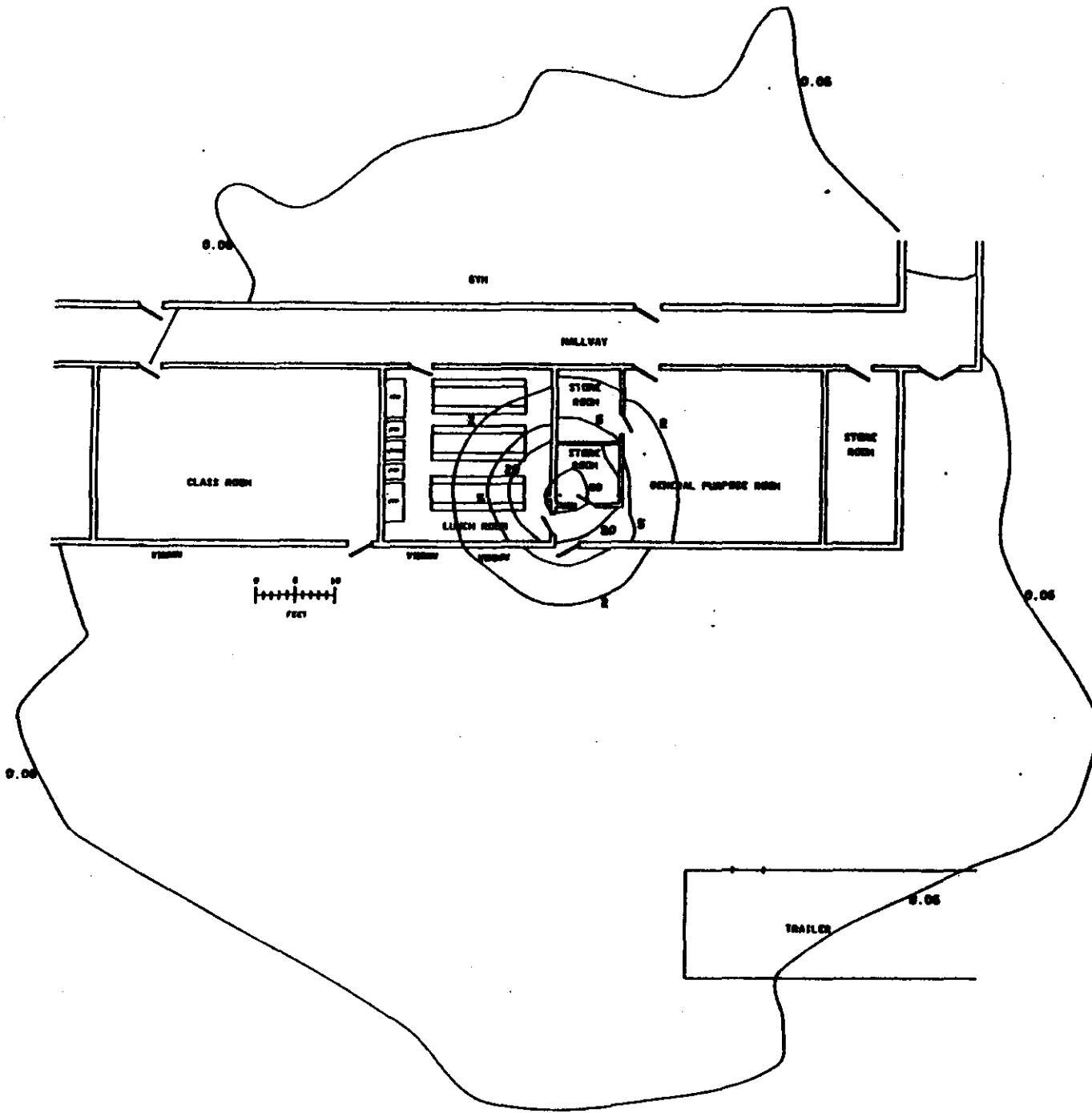
50 Milligrams of radium element in a 21.5 mm. x 2.3 mm. x 0.3 mm. capsule
on a 6" handle.

LEAK TEST Leasing customers are offered Leak Test plans 860, 861 at
a special low cost.

Figure 2a

Gamma Radiation Exposure Levels in Vicinity of Ra-226 Source Found in Storage Room at Lake Nelson School

Exposure Rates Given in Milliroentgens Per Hour



0.06

Gamma Radiation Exposure Levels in Vicinity of No. 220
Source Found in Storage Room at Lake Nelson School (enlarged view)

Exposure Rates Given in Milliroentgens Per Hour

