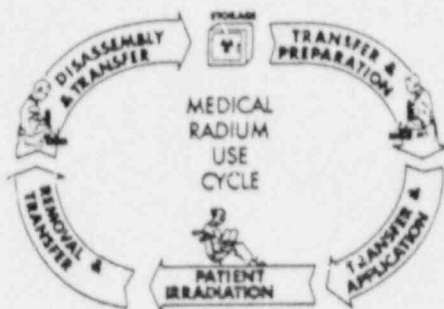


Ref 5
RECEIVED AUG 10 1987

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service



RADIUM INCIDENT REPORT

Reported during
7-01-1968 - 12-31-1969

Compiled by
Frank B. Conlon

Incidents involving radium are a major and continuing problem. The Radioactive Materials Branch of the Division of Medical Radiation Exposure is collecting information on radium incidents from State health departments, a news clipping service, and various other sources. Since 1963, reports on 442 radium incidents have been collected. These incidents range in time from 1905 to the present.

Since the results of this activity should be of continuing use and benefit to State and Federal personnel engaged in the control of radium hazards, the Radioactive Materials Branch issues periodic reports on the radium incidents which have come to attention during the period covered by the report.

In order for the Radium Incident Report to reflect the true magnitude of the problem, all available information must be collected. Therefore, State health departments are urged to submit to the Radioactive Materials Branch information on the known occurrence of radium incidents* in their respective States. In addition, suggestions for the prevention of each reported incident would be especially appreciated and will be embodied in the Radium Incident Report.

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PDR NUREG
1310 R PDR

*A radium incident is any loss, theft, source rupture, contamination event, overexposure, source or contamination find or other unusual occurrences involving radium or radon.

ENVIRONMENTAL HEALTH SERVICE
BUREAU OF RADIOLOGICAL HEALTH
DIVISION OF MEDICAL RADIATION EXPOSURE
12720 TWINBROOK PARKWAY, ROCKVILLE, MARYLAND 20852

RADIUM INCIDENT REPORT

CIRCUMSTANCES INVOLVED IN CERTAIN INCIDENTS

Radium Processing, Occurring Prior to 1952, Required Extensive Decontamination of Government Building in 1968 (Incident #0645)

One of the government owned buildings, occupied by a national agency for many years, was found to have significant radium contamination. Alpha contamination, both fixed and removable, exceeded 100K cpm per 55 cm² in many locations. These locations involved floor areas, air-ducts, doors and door frames, window frames and wall moulding. Radiation levels in some areas were found as high as 20 mR/hr at a distance of one foot.

The contamination occurred prior to 1952 while these areas of the building were being used as laboratories to manufacture and work with radium sources. After 1952 health physicist personnel were unaware of the contaminated areas because these areas had become offices, non-radiation labs and store rooms and there was no justification for normal monitoring or survey.

Once identified, the decontamination was performed in 1968 and involved removal of up to three inches of terrazzo flooring in some areas. It caused removal of about 23 doors and windows, all made of wood. The total debris (radioactive waste) removed, beside the wooden structures, filled 100 fifty-five gallon drums. A work force of up to 9 men for a total of four weeks was used.

Lost 1.5 mg Radium Needle found in Hospital Incinerator (Incident #0688)

On July 30, 1968 at approximately 9:50 p.m. the Radiology Resident at a University Medical Center removed radium sources from the perineal area of a patient suffering from active carcinoma and found that one source was missing. When the patient noted that the doctor was upset, she asked, "Are you looking for one of those little metal objects? I found one in the bed and tossed it into the waste basket last night."

The hospital requested assistance from the State Health Department and while surveying the area surrounding the hospital it was noted that the background level increased near the incinerator stack. The highest readings were isolated in one of the 3 ft x 8 ft x 8 ft containers that hold residue from the incinerator. The contents of the container were removed by shovelful after shovelful until the one containing the source was located. Repeated halving of this shovelful permitted locating of the source at approximately 11:50 p.m.

Considering the time the patient had thrown the needle into the waste basket, this is probably the fastest recovery of a lost radium source.

Radioactive Finger Ring Causes Lesions Requiring Amputation (Incident #0690)

On August 19, 1968 a report was made of an amputation of a ring finger as a result of lesions caused by a radioactive finger ring. The individual involved advised that he had purchased a cameo ring in 1935 and had worn it on his left ring finger for a period of 21 years. During 1946 the ring was rebuilt by a local jeweler, and he continued to wear it on his left ring finger until 1956. At that time because of certain discomfort in his left hand he transferred the ring and wore it on his right ring finger for about eight years. Because of the lesions his left ring finger had to be amputated; the right ring finger required no treatment.

An investigation showed that the ring contained a gold insert capable of emitting a maximum of 700 millirads per hour at the center of the insert. This radiation source was apparently gold from radon seeds which were mixed with other gold and were unrefined before processing. Information on disposal of spent radon seeds is contained in a report entitled "Radiological Aspects of Spent Radon Seeds: by R. F. Boggs, G. D. Schmidt and K. D. Williams contained in Radiological Health Data and Reports, Volume 10 - No. 5 of May 1969.

Extraordinary Disposal of a 5 mg Contaminated Radium Plaque (Incident #0694)

During May of 1965 a Radiological Health Division of a city recommended that a practicing physician dispose of his 5 mg contaminated plaque and that assistance could be given to assure safe disposal of the source.

As a result of a follow-up survey in August 1968 it was revealed that the physician had disposed of the source in June of 1965 by giving it to an unnamed individual who transported it to a nearby bay area and dropped the leaking source into a deep water area.

Preplanning permits isolation and prompt recovery of a damaged meter containing a 4.5 mCi Ra Be Source (Incident #0706)

During 1967 when a State Highway Department initiated purchase of a relatively large number of Density Moisture Asphalt Meters each containing a 4.5 mCi Ra Be source, the Chief of the State's Occupational and Radiological Health Section recommended that the Radiation Safety Committee be appointed and a Radiation Safety Officer be assigned.

Approximately one year later one of the Highway Department vehicles inadvertently backed onto one of the meters. As a result of preplanning, the operator of the vehicle immediately arranged to block off the road and notify the Highway Department Radiation Safety Officer.

Upon receiving notification of the incident and a request for assistance, a Health Department representative and the Radiation Safety Officer were dispatched to the scene of the incident. The meter had not been crushed out was lying on its side with the cover open. Examination with radiation detection instruments did not reveal excessive levels indicating that the source was intact and located in a shielded position permitting prompt removal from the highway

Radiation Shield and 14.9 mCi of Radon Seeds Lost during Air Transport (Incident #0728)

At approximately 4:30 p.m. on February 11, 1968, a Radium Processing concern delivered a 9 in x 9 in x 18 in fibreboard box containing 15 Radon Seeds, (14.9 mCi activity) for air express shipment to a private hospital.

The box had a hinged cover, with two suitcase type catches and a hasp for a security seal. Three interior compartments were provided to accept source application instruments and a 2 in by 6 in lead shield whose plug was secured by two wing nuts.

After a delay of approximately 24 hours due to a heavy snow storm, the shipment was forwarded on a flight having three intermediate stops before the end of its flight.

Upon receipt the shipment was placed under protective signature service and was delivered to the hospital and signed for by a hospital employee who delivered it to the therapy department where it remained unopened until the following day.

The physician who planned to use the seeds in an operation on February 14 opened the shipping container and found the application instruments; however, the lead shield and radon seeds were not in the shipping container.

An investigation by the State Department of Health indicated that the container was received in a slightly damaged condition, the hinge having been sprung and the suitcase type catches did not lock and the lead seal was missing from the hasps. Surveys conducted at the hospital, the REA facilities at the receiving and delivery locations, and the REA truck used for final delivery to the hospital were unsuccessful in locating the shield or the radon seeds.

Lost 40 milligrams of Radium Needles Retrieved from Sewer Line
Incident # 0729)

During the afternoon of April 14, 1969 a technician at a private sanatorium and hospital inadvertently flushed four 5 milligram and two 10 milligram needles from a toilet into the hospital sewer system.

Investigation by the State Health Department indicated that all of the needles were in a plastic tube which was attached to a 4 inch by 4 inch gauze pad by a silk thread approximately 12 inches long.

Utilizing the hospital's building plans a survey was conducted of exposed sewer lines, basement floors, ground areas and manholes along the sewer routes shown on the hospital plans. A follow-up survey the following day located a spot on the furnace room floor approximately 10 feet off the course of the lines shown on the plans.

Utilizing an improvised grappling hook arrangement attached to a drain cleaning snake the radium needles were recovered intact inside the plastic container.

50 Year old 10 milligram Radium Plaque Delivered for Disposal
(Incident #0812)

On June 19, 1969, a Radiological Health Representative was contacted by a woman in a nearby State concerning her possession of a radiation source and her desire for its disposal.

Investigation by the State Radiological Health Representative brought to light an interesting history of the source. The woman, who was about 70 years of age, advised that her father had purchased the source in 1908 from a physician who was treating his 2-year old son for skin cancer. The physician is stated to not only have ordered the radium treatments but requested that her father purchase the source at a cost of \$1000.

The young son died of other causes approximately one year later and the father kept the source, storing it in various homes in which he lived, until his death in 1960 at the age of 87. For the past 9 years the source had been in the possession of the woman who had it stored in her dresser drawer one yard from her bed. She requested assistance in its disposal as it had been stored in several locations in her farm home. During this period several contacts were made with physicians to obtain information regarding disposal of the source, all of which were unsuccessful.

The radium source was contained in a bakelite or ceramic material 1 1/2" in diameter and 1/2 inch in height. Radiation levels at one meter from the source were measured at 1 mR/hr indicating a current activity of a 1 or 2 milligram source. Although it was reported to be a 10 mg source, this reduction in activity might be expected in view of the type of source and poor encapsulation methods used when it was produced.

Radiation surveys at the several storage locations at the woman's farm house and the trunk of the auto in which the source was transported for disposal showed little contamination outside of the storage container.

Two missing 25 milligram radium capsules recovered from sewer trap
(Incident #0813)

On May 8, 1969, a team from the Office of Radiation Control during a routine inspection at a University Hospital learned that two 25 milligram capsules used for the treatment of cancer were missing.

A search for the missing sources was successful in locating the sources in the tran of the main sewer outlet from the hospital.

Prompt arrangements were made to construct and install two special screens to catch the sources should they become dislodged from the trap. During

the early morning hours when the use of water at the hospital was at a low point, water service was shut off for a brief period, during which the trap was opened and the sources recovered.

Two Missing 10 milligram Radium Sulfate Needles Recovered from Laundry Room and Mop Storage (Incident # 0814)

During the afternoon of April 25, 1969 a physician removed a radium applicator from a patient. Four of the radium containers in the tandem portion of the applicator were observed; however, the two 10 milligram containers in the colpostats were not observed but were presumed to be present. The colpostats were discovered to be empty the following morning when the sources were transferred from the mobile safety container to the radium safe.

The patient's bedroom, and part of the laundry room was immediately monitored with a portable geiger counter with no radioactivity discovered. Upon recommendation of a health physicist the probe and scaler from a Thyroid Uptake Unit were mounted on a mobile cart with a long extension cord and the Therapy and Isotope Departments, connecting hallways and the laundry were monitored. A reading was obtained in the laundry room and one source was located under a washing unit.

Further monitoring of the wash water sunps, the incinerator and garbage areas produced no activity readings. However, monitoring of the room where mops were cleaned and stored did show some radioactivity. By further monitoring and selective removal of the mops the second source was retrieved from the bottom of a steel drum used to store soiled mops.

A 10 milligram Radium Needle Lost as a Result of Disassembling an Applicator in an Operating Room (Incident # 0815)

On April 16, 1969 a gynecologist at a private hospital on attempting to insert a loaded Ernst applicator determined the vagina would not receive the applicator due to its size. The gynecologist then decided to remove portions of the applicator to reduce its size. In addition to removing some of the ovoids, he also removed a portion of the tandem without noticing that a 10 mg Radium needle was not enclosed. The sources removed from the ovoids were promptly returned to the radiology department.

Three days later the applicator was removed from the patient and returned to the Department of Radiology where it was discovered that the end of the tandem was not connected and a 10 milligram source was missing.

Using a Geiger type survey meter an extensive search of the patient's environs, the entire nursing station, the operating room, drains, cleaning materials, the laundry area, the refuse trucks and the sanitary land fill area failed to locate the missing source.

A 5 milligram Radium Needle Lost when Cart Carrying Shielded Carrier
Overturms (Incident # 0819)

On August 8, 1969 the Chief Resident of the gynecologist services at a private hospital removed a Fletcher after loading applicator containing 110 milligrams of radium from a patient under treatment of carcinoma of the cervix. The resident removed the radium and placed it in a lead carrier on a portable cart. Later in the day the carrier which still contained the original 110 milligrams of radium was used as a receptacle for a tandem containing a 10 milligram needle removed from another patient.

While leaving the second patient's room the cart tipped over, spilling the contents of the lead carrier. The resident righted the cart, placed the lead carrier on it and reloaded the carrier.

During the morning of August 10 as the needles were being checked before loading them into the storage vault it was found that one 5 milligram radium needle was missing.

A private Health Physics organization was called in to assist in locating the missing source. On August 11 this concern conducted surveys of rooms and hallways, elevators, vacuum cleaning systems, mop carts, waste depositories, incinerators, and laundry facilities with no success. On August 15 this concern, using a scintillation detector, resurveyed the above areas with no satisfactory results. A final survey, using the scintillation detector, was conducted in the same areas on August 21 was unsuccessful in locating the source.

As a result of the above searches it was hypothesized that the needle had fallen to the floor, was picked up in the vacuum cleaning system, penetrated the filter bag and entered the dust container from where it was picked up by a Sanitation Department truck. It was then decided that due to the time lag between the loss and its discovery and the enormous volume of trash generated daily by the city that nothing would be gained in further attempts to trace the needle outside of the hospital.

Eight 3.3 milligram Missing Radium Needles Found in a Melt of Glass
at City Dump (Incident # 0830)

On February 25, 1969 a physician noticed that a carrying case containing eight 3.3 milligram radium needles was missing from his inventory. As the last date of utilization of the sources was on January 29, it appeared that a technician had inadvertently thrown the case in the trash receptacle from which it subsequently wound up in the city dump.

The physician was successful in locating the needles at the city dump on March 9. The needles were contained in a melt of glass that appeared to be Coca Cola bottles. Since he was unable to determine if all lost needles were contained in the melt, he requested assistance from cognizant authorities.

Investigation of the burning area at the city dump indicated that all the needles had been removed and the melt containing the needles was forwarded to the State Health Department for further study and investigation.

During efforts to strip away the glass from the case it was determined that at least one of the needles was ruptured. The physician was thereupon advised to refer the matter to the radium processing company, as owners of the sources.

Missing Applicator Containing Two 25 milligram Radium Needles Found
Intact in Incinerator (Incident # 0845)

On November 15, 1969 a resident physician at a private hospital removed an applicator containing two 25 milligram radium needles from a patient. Instead of placing the applicator in a lead carrier, which was at hand, the physician placed it in a brown paper bag and handed it to a practice nurse who deposited the bag in a nearby plastic trash container.

During the afternoon the supervising nurse, noting that radiation therapy had been completed and finding the carrier in the examining room, requested the maintenance superintendent to return the carrier to the supplier of the radium who was located at another hospital in the area.

Upon reporting for duty the following day the supervising nurse noted that the radium carrier had not been moved from the examining room and again notified the maintenance superintendent who promptly dispatched a messenger to return the carrier.

Shortly after the above action a physician at the hospital to which the carrier was returned telephoned to advise he found no radium in the carrier and advised shutting down the incinerator pending his arrival with a survey meter to search for the missing radium.

A preliminary search promptly indicated that the radium was in the incinerator. After wetting down, each shovelful of the contents of the incinerator was surveyed for evidence of rupture of the sources. After removal of practically all of the incinerator residue the applicator was found, apparently intact. As an added precaution the two radium needles were returned to the radium processor for reencapsulation.

Two Missing 10 Milligram Radium Needles and Two Heyman Applicators Stolen (Incident #0847)

On October 21, 1969, the Chief Radiologist at a city hospital reported that two 10 milligram radium needles, two Heyman applicators and two lead bricks weighing 25 lbs. each were missing.

These items were normally kept in a radium storage room which is locked at all times. In addition to some 32 master keys that will unlock the storage room the Chief Radiologist kept a key in his unlocked desk.

During his entry into the storage room on October 16, the Chief Radiologist noted that the lead bricks were missing; however, no inventory was made to determine presence of the needles or applicators.

The State Health Department was notified and surveys were conducted of all pertinent hospital areas, the hospital grounds and parking areas, the waste disposal areas and trucks utilized to transport waste to the sanitary fill area were unsuccessful in recovering the missing items.

Three days later the Chief Radiologist advised that the two lead bricks had been found at the side of a country road outside the city limits. A survey of the entire area adjacent to the spot where the lead bricks were found conducted on the following day was unsuccessful in locating the radium needles or the applicators.

Resumes of additional radium incidents

A four inch long steel container containing 25 milligrams of radium used for well logging was lost from a truck transporting it from the oil well site. The container was found at a railroad crossing and returned to the owners (Incident # 0677)

A Manchester ovoid containing four 10 milligram radium needles was shipped to hospital for patient irradiation. After removal from the patient and return to the lessor two 10 mg needles were missing. All recovery attempts were unsuccessful in recovery of the missing sources (Incident # 0681)

One 0.45-millicurie radon seed was missing from a shipment of 10 radon seeds upon arrival at a hospital. Upon examination, the lead shield was found intact and sealed within the shipping container which was undamaged. (Incident #0698)

A brass case found on a city street approximately 15 years earlier was delivered to a museum to determine if it was of any value. The case, apparently a container for radium sources, was found to be highly contaminated and was turned over to a waste disposal service company for disposition. (Incident #0699)

Two ovoids containing 40 milligram of radium were inserted in the vagina of a 70 year old patient. The following day a nurse noted that the patient had removed the packing and placed it in a bed pan which was subsequently dumped in a hopper and flushed down the drain. The following day the attending physician noted on removal of the ovoids that one ovoid containing 20 milligrams of radium was missing. All attempts to recover the missing sources were unsuccessful. (Incident #0705)

A private physician in possession of some radium which had been offered to him, decided to have the material checked for leakage. Upon investigation it was found the sources were leaking and the storage safe containing the sources was contaminated. The entire safe and its contents were disposed of by a radium processing company. (Incident #0707)

A hydrodensimeter containing a 10 millicurie radium beryllium source was stolen from a laboratory truck which was parked while an employee was attending a movie over a week-end. A press release made in an effort to have the material returned was ineffectual and the source was not recovered. (Incident #0708)

An investigation of a clinic's inquiries regarding disposal of radium sources found that the radium sources had been unlicensed and had been stored in a safe for over 10 years. A considerable amount of contamination found in the safe was cleaned up and the leaking sources were disposed of in a proper manner. (Incident #0709)

Three 0.1 milligram radium sources were lost during a recent move of a company's shop facilities to a new location. (Incident #0710)

An inspection of a deceased physician's home uncovered a quantity of unlicensed radium. Approximately 60 milligrams, unshielded, was removed from a second floor bedroom, the remainder was discovered in a third floor bedroom stored in a wooden box. Measurable activity of the latter quantity indicated material in excess of 100 milligrams.

The radium is in protective custody awaiting disposition. (Incident #0717)

One 10 mg radium plaque and one 5 mg radium plaque received by a doctor was found leaking and the storage container was contaminated. The doctor's office was decontaminated by a licensed decontamination service company. (Incident #0721)

State Health agency impounds an unlicensed radium beryllium source.
(Incident #0722)

A 1.0 milligram source removed from a hospital patient was found missing during a routine leak test procedure. It had apparently been placed in normal waste containers and buried under 6 to 8 feet of sanitary land fill.
(Incident #0723)

One 5 milligram radium tube and one 2 milligram needle found missing during routine check of the hospital's inventory of sources. It was determined that the sources were buried under 3 to 5 feet of sanitary land fill.
(Incident #0724)

A 216 millicurie radium source lost in a well after unsuccessful attempts to recover the sources were cemented in the well. (Incident #0725)

A doctor lost a 1.33 milligram radium needle which he had used in treatment of a patient. A search of the patient's residence located the source in a burning trash barrel. The source was isolated and found to be intact after which it was returned to the doctor. (Incident #0726)

A doctor in treating a 66 year old male patient inserted four 2 mg needles in a tumor on his neck. About a week later upon removal of the needles one was missing. A thorough search of the hospital failed to locate the missing source. (Incident #0730)

A 5 milligram radium tube was lost at a hospital after use in ovoids. It is assumed that it had been misplaced and eventually overlooked through inadequate record keeping regarding radium usage. The source was never recovered. (Incident #0731)

A moisture density gauge containing a three millicurie radium beryllium source was lost during shipment. State health agencies cognizant of the terminal cities through which the shipment was routed were notified. The gauge and radioactive source were subsequently located and returned to the owner. (Incident #0733)

A hospital after notification that radium had become a licensable radioactive material was visited by a representative of the State Health Department and found that a 30 milligram radium source was missing. A search of the hospital area failed to locate the missing source. (Incident #0751)

A medical clinic physician and the medical physicist both received approximately 7 rem during one quarter, attributed in part to transfer of radium sources. (Incident #0781)

Inadequate accountability procedures were responsible for the loss of a 5 milligram radium needle from a radium storage vault at a hospital. (Incident #0787)

One (10 mg) radium needle lost. Loss was not discovered for approximately seven days due to failure to inventory sources on removal from a medical applicator. A search of the hospital and sanitary land fill was made but the source could not be found. (Incident #0790)

Contamination due to leakage of 7 radium sources stored in a clinic safe for 10 years was removed and the sources were properly disposed. (Incident #0791)

A 10 milligram radium needle apparently dropped to the floor of a hospital during the unloading of an applicator. Assistance rendered by State Health Department was successful in locating the source at the city dump. (Incident #0816)

Poor accountability procedures were responsible for the loss of a 10 milligram radium needle from a medical clinic. An investigation of the loss failed to recover the lost source. (Incident #0817)

During loading of a Fletcher after loading ovoid a 10 milligram radium tube apparently dropped to the floor. The loss was noted three days later when the ovoid was removed after treatment. A thorough search of the hospital areas and local trash dumps failed to recover the sources. (Incident #0818)

A 0.16 millicurie radon seed was missing from an implant approximately a week after application at a University Medical Center. Due to low activity of the source, recovery actions were discontinued after routine investigations of all probable areas where the loss might have occurred. (Incident #0829)

A pill bar containing 240 microcuries of radium was abandoned and cemented at a depth of approximately 5700 feet when efforts for retrieval were unsuccessful. (Incident #0830)

A 50 milligram radium source previously stored in the basement of a pharmacy was found stored in a city hall during a Civil Defense exercise. The source was not labelled and the container provided inadequate shielding. (Incident #0842)

During a routine leak testing survey two 10 milligram radium needles were found missing from a hospital radium storage container. Upon investigation it was determined that non compliance with regulations for handling radium was the possible cause. A thorough search of the hospital area and its environs failed to locate the missing sources. (Incident #0846)

c

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Ref 7

STATE OF COLORADO

COLORADO DEPARTMENT OF HEALTH

4210 East 11th Avenue
Denver, Colorado 80220
Phone (303) 320-8333

RECEIVED OCT 28 1987



Roy Romer
Governor

Thomas M. Vernon, M.D.
Executive Director

October 21, 1987

Charles M. Hardin *Chuck*
Executive Secretary
Conference of Radiation Control
Program Directors, Inc.
71 Fountain Place
Frankfort, Kentucky 40601

Dear Mr. Hardin:

In regard to your request for information concerning identified problems resulting from the lack of control over NARM, Colorado has recently been involved with a "newly discovered" radium guage.

On August 19, 1987 this Division received a call from the Transportation Test Center, (Center) a division of the Department of Transportation in Pueblo, Colorado. They stated that the Center had a 4.5 mCi Ra-226:Be Soil Test guage in a storage building and wanted to know how to dispose of it.

The guage had been purchased in 1974 or 1975 by the Federal Railroad Administration. The exposure rate at the surface of the guage was between 150 and 200 mR/hr. (Note the enclosed Registry Notice which states surface readings can be 400mR/hr.) The guage had a D.O.T. III label.

The individual who contacted the Division did not know:

- * who personally had used the guage;
- * whether anyone had ever been trained to use the guage;
- * whether it had ever been leak tested;
- * how it had been transported;
- * who had come in contact with it while it was in storage; or
- * from whom the guage was purchased.

Charles M. Hardin

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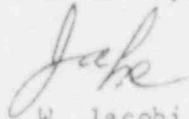
October 21, 1987

Because the State of Colorado is not authorized to regulate federal agencies, we were not notified prior to the purchase of this device. Had the individual who contacted us not been smart enough to know he should seek advice on the disposal of this radium gauge, it could easily have been transferred to another unauthorized user, or disposed of in a landfill and possibly "salvaged" like the cesium source in Brazil.

We are not aware of other NARM sources in Colorado which are not licensed by us, but neither can we state that they do not exist.

If you require any further information, please feel free to contact me at (303) 331-8480.

Sincerely,



W. Jacobi, Section Chief
Radiation Control Division

WJ/cf

Enclosure

Ref 8

STATE OF COLORADO

COLORADO DEPARTMENT OF HEALTH

4210 East 11th Avenue
Denver, Colorado 80220
Phone (303) 320-8333



Roy Romo
Governor

Thomas M. Vernon, M.D.
Executive Director

October 30, 1987

Conference of Radiation Control Program Directors, Inc.
71 Fountain Place
Frankfort, Kentucky 40601

Attention: Charles Hardin

Gentlemen:

This letter is in response to your request of October 22, 1987 for a listing of incidents involving NARM sources and devices.

This Department licenses and regulates NARM with the same regulations and effort as for Agreement materials. We have seen in our licensing and enforcement activities, uses of radioactive materials which, if they had not been closely regulated, could have caused serious property contamination and exposure to workers and the public.

On August 19, 1987, the Division was notified of a "newly discovered" radium gauge by the Transportation Test Center, a division of the U.S. Department of Transportation, in Pueblo, Colorado. The gauge contained 4.5 mCi of Radium-226 and had a surface exposure rate of 150 to 200 MR/HR. It had been purchased in 1974 or 1975 by the Federal Railroad Administration, it had been in storage, and now the facility wishes to dispose of it. Had an individual not been smart enough to seek advice on the disposal of this Radium-226 gauge, it could have been transferred to another unauthorized user, or disposed of in a landfill and possibly "salvaged" like the cesium source in Brazil.

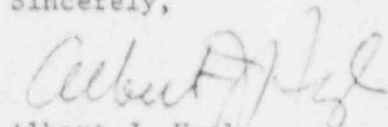
In addition to this incident, we can relate about a licensee, a manufacturer of radium watch dials, who had serious contamination in his facility and some measurable uptake by a dial painter. Through strong regulatory control and timely action, exposures were kept to a minimum and the facility was completely decontaminated. This license has since been terminated. Without regulatory control it is certain that exposures to workers would have been greater and a building at some date in the future, would be "discovered" to be contaminated.

A very important aspect of NRC regulating NARM is for national uniformity in the control of these materials. It has been a great burden on persons outside of Colorado who are not regulated and wish to use radioactive materials in Colorado. There is no quick and convenient way to approve their use and they must then go through a necessarily costly and time consuming licensing process.

Information on sources, devices, incidents, and regulatory concerns would be made more readily available to use if the NRC regulated NARM as it does other radioactive materials.

This Department supports the idea of NRC regulating NARM and will cooperate with the Conference in its efforts. If we can be of any service regarding this matter, please contact this Division.

Sincerely,



Albert J. Hazle
Division Director

CM/hm

Ref 9

James G. Ledbetter, Ph.D./Commissioner



Radiological Health Section, Suite 600
Office of Regulatory Services

878 PEACHTREE STREET, N.E. / ATLANTA, GEORGIA 30309

November 9, 1987

Charles Hardin
Conference of Radiation Control,
Program Directors
71 Fountain Place
Frankfort, Kentucky 40601

Dear Mr. Hardin:

This replies to your memorandum of October 22, 1987 concerning incidents involving NARM devices and sources. The following is a brief summary of such incidents in Georgia within the past five years.

1. Removal and clean-up of Ra 226 contamination at the Luminous Processes, Inc. site, Athens, Georgia was completed during the summer of 1982 at a cost of about \$754,000.00. The Company had utilized Ra 226 and H3 to paint watch and clock dials. The license authorizing the use of H3 was transferred to Georgia from the A.E.C.
2. On two separate occasions our office has recovered from private citizens U.S. Army type marker buttons painted with Ra 226, (about a dozens buttons in each case).
3. In December 1986 Radium 226/228 contamination was discovered on stainless steel filters used in processing Kaolin clay. The contamination was fixed and indicated levels of 1800 pCi/cm² for Ra 226 and 900 pCi/cm² for Ra 228. It is believed the use of sulfuric acid for bleaching and pH control may contribute to a slow accumulation of contamination over a period of 15-20 years. The investigation is still in progress.

In regards to the above we do not have any reports of exposure to personnel, however, there was some minor contamination to one individual during one incident described in item #2.

Sincerely,

Thomas Hill, Acting Director
Radiological Health Section
Radioactive Materials Unit

TH/wlr

Ref 6

RECEIVED - NOV 2 1987

Memorandum

To : Charles Hardin
Secretary-CRCPD

Date : October 29, 1987

Subject: NARM Incidents in CA
Five Year Summary History

Kim S. Wong

From : Department of Industrial Relations

Kim S. Wong
CA Industrial Relations
Radiation Unit

In response to request for input to help identify NARM sources and devices to provide basis for USNRC position to regulate NARM sources and devices are summarized below:

1. Accelerator activated material produced in concrete walls that required extensive decontamination. The accelerator facility has yet to be given radiation clearance as a uncontrolled area since the decon effort was unsuccessful.
2. Radioactive material produced in gems by accelerators that require radiation safety protocol and standards before release to customers.
3. Radium discovered unexpectedly that required considerable cost for disposal to an unsuspecting company.
4. RaBe soil gauges (devices) where exposure although not exceedingly quarterly dose limits to operators but resulted in approximately doses 5-10 x higher than soil gauges containing Am241/CS137 paired sources.
5. Ra luminous material in aircraft instruments that over the years have contaminated repair shops or that are purchased and inventoried with small likely hood of resale and long term problems for disposal.
6. Natural gas process plants that have certain equipment and storage vessels that are contaminated with Radium daughters and will require radiation safety measures for dismantle and disposal.
7. Accelerator activated parts such as targets, turning magnet, etc. when operated greater than 8 MEV and dramatically over 14 MEV. These accelerators require licensing by CA in addition to registration.
8. NARM exempt devices that require a license before distribution as exempt product.

These are just some of the incidents caused by NARM sources and devices.



DIVISION OF INDUSTRIAL HYGIENE
AND RADIOLOGICAL HEALTH
INDIANA STATE BOARD OF HEALTH
1330 WEST MICHIGAN STREET
INDIANAPOLIS, IN 46206

It is a pleasure to enclose the material you requested.
If we can be of further assistance, please let us know.

Andy Melchior

STATE BOARD OF HEALTH

INDIANAPOLIS

OFFICE MEMORANDUM

DATE: September 16, 1987

TO: Hal S. Stocks, Section Chief
Radiological Health Section

FROM: Andrew G. Welding, Health Physicist
Radiological Health Section

SUBJECT: Boonville, Indiana, Incident

THRU:

On Thursday, September 10, 1987, at 10:35 a.m., I received a call from Darrell Weideman of the Nuclear Regulatory Commission Region III office in Glen Ellyn, Illinois. He had received a report from Ken Miller of the Missouri Health Department that a truck entering the Marnor Aluminum Processing Plant in Sikeston, Missouri, had set off the radiation alarms. The truck was stopped and surveyed; high energy gamma radiation was detected. The area was evacuated, and the NRC notified.

A preliminary investigation found that the scrap metal on the truck was loaded from Paul's Recycling in Sikeston. This facility had received the shipment from United Technology in Boonville, Indiana, by way of rail car. No dates or times were made available.

Weideman had already contacted Henry Briggs in Bloomington, Indiana, but then decided that he should talk to someone closer to the situation. I suggested Arnold Sorensen in Evansville, Indiana. Both Briggs and Sorensen are members of the Indiana Area Radiation Emergency Response Committee. At 10:45 a.m., I called Sorensen and related the situation to him.

He said that he would call Weideman. Sorensen called back at 11:05 a.m., to say that he had spoken to Weideman. He would go to the site with Saiyid Shah, Indiana State Board of Health Approved Health Physicist, and John O'Donahue, a radiation therapy technologist and an associate of Sorensen. They would be equipped with three survey meters, one of which would have a sodium iodide crystal. They would also do wipe surveys at the scene. They would leave Evansville within one-half hour and arrive in Boonville between 12:00 p.m. and 12:30 p.m. At 11:10 a.m., Weideman called to say that he had spoken to Jerry Snider, Plant Manager of United Technology, who had agreed to shut down the operation. He would be meeting with his Board of Directors at 1:00 p.m.

At 11:50 a.m., after attempting to contact Dr. David Cundiff, Bureau Director, I apprised Bob McGlasson, Acting Division Director, of the situation.

At 2:45 p.m., Doctor Cundiff called me. I apprised him of the situation and received further instruction, including a request to report to David McCarty, Office of External Affairs. McCarty was apprised of the situation at 2:55 p.m.

At 3:45 p.m., I contacted Snider at United Technology. He told me that the Response Team had left his facility after finding no radiation other than a small amount from the thorium and uranium in the fire brick. I asked in what form the scrap metal was shipped. He said that the dross, or scum, was sometimes powdery, other times in hunks.

At 4:10 p.m., Sorensen called to report his findings. He confirmed what Snider had said about detecting no radiation above uniform background levels (with the exception of the fire brick). According to Sorensen, they surveyed the entire area with two Ludlum Counters (one with a sodium iodide crystal), and an Eberline. This was done with the beta window both opened and closed. He stated that Weideman had given a verbal OK for United Technology to resume normal operations. A written report would be sent to the ISBH, the NRC, and the United Technology.

At 4:35 p.m., Weideman called to confirm that he had permitted United Technology to resume operations. He had sent a representative to obtain a sample of the dross for the NRC's multi-channel analyzer. According to Weideman, three mR/HR was detected at the surface of the dross. This was the only shipment from United Technology in at least two months. Because of the characteristics of the elements and products involved, all of the radioactivity would have had to have gotten into the dross; not into the actual product.

Doctor Cundiff was apprised of this at 6:00 p.m.

FIJW

9-16-87

Steeles mem

Fr. 13

STATE BOARD OF HEALTH

INDIANAPOLIS

OFFICE MEMORANDUM

DATE: September 17, 1987

TO: David R. Cundiff, M.D., M.P.H.

THRU:

FROM: 
Andrew Welding, Radiological
Health Section

SUBJECT: Boonville, Indiana, Incident

At 2:50 p.m., September 17, I spoke to Jerry Snider, plant manager of United Technology in Boonville, Indiana. According to Snider, Pat Parelli, Manager of Industrial Health and Safety for United Technology's Components Division, was enroute to Sikeston, Missouri, with physicists from Stan Huber and Associate, Health Physicists. The Huber people had already surveyed United Technology facilities in Jeffersonville, Indiana, and Coldwater, Michigan, as well as the Boonville plant. All facilities were free of radiation contamination.

Snider stated that Parelli believes that it will be at least a week until the disposition of the contaminated cargo is determined.