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

REGION III

Report No. 50-255/79-16

Docket No. 50-255 License No. DPR-20

Licensee: Consumers Power Company

Facility Name: Palisades

Inspection At: Palisades Site; Covert, Michigan
Burial Site; Beatty, Nevada
Contractor's Facility; Prosser, Washington

Inspection Conducted: July 6, 9, 23, and 24, 1979
August 13 and 14, 1979
September 18, 29, and 30, 1979
October 1, 1979

Inspectors: for W. J. Cooley (RV) 11-5-79

A. B. Davis 11-5-79

for N. E. DuBry 11-5-79

for L. R. Greger 11-5-79

L. J. Hueter 11-5-79

B. L. Jorgensen 11-5-79

C. C. Peck 11/5/79

for B. A. Riedlinger (RV) 11-5-79

7912190 799

Approved By: W. L. Fisher, Chief
Fuel Facility Projects and
Radiation Support Section

11-5-79

Inspection Summary:

Inspection on July 6, 9, 23, and 24, August 13, 14, September 18, 29, and 30, and October 1, 1979 (Report No. 50-255/79-16)
Areas Inspected: Nonroutine, announced inspection of solid radioactive waste activities in response to two incidents involving shipment of free liquid in radwaste packages. The inspection involved approximately 95 inspector-hours on site by eight NRC inspectors.
Results: In the area of solid radioactive waste, two apparent items of noncompliance were identified. One item was an infraction involving shipment of licensed material to a licensed burial facility in an unauthorized form (liquid). (Section I, Paragraph 3). The other item was a deficiency involving failure to maintain records specified in a radwaste procedure. (Section III, Paragraph 3).

DETAILS

SECTION 1

Prepared By: L. J. Hueter
N. E. DuBry

1. Persons Contacted

J. Lewis, Plant Manager
G. Petitjean, Technical Engineer
T. Meek, Plant Health Physicist
T. Neal, Radioactive Material Control Supervisor

2. General

This inspection, which began at 12:45 p.m. on August 13, 1979, was conducted to examine the licensee's solid radwaste management program and related activities for compliance with regulatory requirements. In particular, events leading to two shipments containing free liquid and corrective actions to preclude recurrence were examined.

3. Types of Solid Radwaste

The licensee generates three types of solid radioactive waste: spent demineralizer resins (bead and powdered), evaporator bottoms, and compactible and noncompactible trash (filters, paper, plastic, piping, etc.).

a. Resins

Bead type resins are sluiced into shipping containers and "dewatered" by removing the water through a filter mechanism placed on or very near the bottom of the container. Packages containing steam generator blowdown spent resin beads typically exhibit radiation levels of about three mR/hr at the container surface, while primary system cleanup spent resin beads typically exhibit radiation levels of about 20 R/hr at contact with the container. Shielding for the latter is provided by a certified shipping cask. A 195 cubic foot liner of dewatered spent bead resin was at the facility awaiting shipment at the time of this inspection. Licensee surveys showed radiation levels of about 20 R/hr at contact with liner without benefit of the shielding provided by the shipping cask. The shipment was being held onsite pending verification that free liquid was not present in the container. Such action was in response to an Immediate Action Letter, dated August 10, 1979, issued by RIII. (The dewatered resin liner was shipped to a burial site on September 6, 1979, after the licensee completed tests designed to demonstrate that the dewatering method was capable of removing essentially all free water in the liners after the liner was dewatered a second time.)

Powdered type resins (Powdex) are used in the condensate demineralizer system (secondary system). These spent resins are placed in a shipping container in an essentially dry form (no free-standing liquid). The condensate demineralizer system became operational in late 1978. This spent resin, some of which had detectable concentrations of radioactivity slightly above background levels, is presently handled as radioactive waste and is disposed of accordingly. Earlier batches of this spent resin were disposed of in a local landfill. The licensee and the State of Michigan have been pursuing this matter since early June. No off-site contamination has been detected to date. This matter will be reviewed further during a future inspection.

b. Evaporator Bottoms

Evaporator bottoms are mixed with urea formaldehyde (and a catalyst) in 50 cubic foot containers (DOT Specification 7A). The urea formaldehyde (UF) mixture results in a solid matrix of UF with the water physically entrapped in the matrix. Free liquid is commonly encountered in UF solidified waste packages. These waste packages typically have radiation levels of 25-30 mR/hr at contact with the container.

Licensee representatives at the site stated that use of the UF system would terminate when current inventories run out (approximately 3-4 weeks). A mobile cement process (Delaware solidification process) is to be used for an interim period of approximately two years at which time the licensee plans to have an asphalt solidification system installed and operational for processing evaporator bottoms and spent resins.

No urea formaldehyde solidified waste has been shipped from the licensee's facility since a June 27, 1979, shipment to NECO at Beatty, Nevada. Three containers in this shipment exhibited signs of leakage upon arrival at the burial site. The licensee is periodically draining and measuring the drained volume of liquid from UF containers still onsite. This information will be used in developing a method of assuring the absence of free liquid in future shipments.

c. Compactible and Non-Compactible Waste

Compacted radioactive wastes are shipped in 55-gallon drums. Noncompactible radioactive wastes are packaged in 55-gallon drums or plastic lined wooden boxes (7 1/2 ft. x 4 ft. x 4 ft.). These boxes, in addition to being secured with nails, are banded with metal bands if certain weight limits are exceeded as specified by plant procedures. Activities and radiation levels associated with compactible and noncompactible waste shipments are normally quite low.

On Tuesday, August 7, 1979, the licensee notified the NRC that a 55-gallon drum shipped from Palisades to a burial facility was examined at the burial facility and found to be two-thirds full of free liquid. An examination of the licensee's records revealed the following information about Shipment No. 79-025-S:

a. The shipment consisted of 136 55-gallon drums.

b. The individual drums were recorded as containing compacted trash, noncompactible trash, and powdex resin mixed with sand and miscellaneous trash.

c. The drums were shipped as Solid, Type A quantity, LSA, Normal Form material, Transport Group 3, on August 2, 1979.

d. The highest activity and radiation levels were associated with drum No. 2 which contained 130 millicuries and read 200 mR/hr at contact and 15 mR/hr at three feet.

e. The total shipment activity was 1085 millicuries in approximately 1000 cubic feet. Each drum smeared at less than the 400 dpm/100 cm^2 administrative limit.

f. General isotopic content consisted of 59% Co-58, 15% Co-60, 15% Cr-51, and 9% Mn-54, based on analysis of a floor smear of a contaminated area.

g. The truck survey revealed no problems.

h. One drum (No. 125) was removed because liquid was detected during loading.

Information from the burial facility is as follows. Drum No. 136, designated as containing powdex, was found to be leaking water. The drum measured 3 mR/hr at contact. Upon opening the drum, a piece of wet plastic was found floating on about 35 gallons of water. Analysis of the water by the State of South Carolina indicated about 0.3 MPC combined fraction of the 10 CFR 20 concentration limits of water for release to an unrestricted area.

The licensee also obtained a sample of the water for both isotopic and chemical analysis, the latter in an effort to determine the source of the liquid. However, neither of these analyses were available on August 14, 1979. In late August the licensee relayed the following analytical results: 7.3 E-6 μCi/ml Cs-137; 3.5 E-6 μCi/ml Co-58 nondetectable tritium; less than 0.2 ppm boron; 2.0 ppm calcium; 0.8 ppm magnesium; and 180 ppm sodium. The licensee concluded that the source of liquid was indeterminate from these data.

The license of the burial facility at Barnwell, South Carolina does not authorize receipt of liquid. 10 CFR 30.41(c) requires the transferor to verify that the transferee's license authorizes receipt of the type, form, and quantity of the byproduct material to be transferred. 10 CFR 30.41(d) specifies requirements for verifying authorization. Failure of the licensee to verify the transferee's authorization to receive the liquid is an item of noncompliance. Further, this shipment violates the licensee's Radiological Control Procedure H.P.6.16 Revision 0 dated October 4, 1978. This procedure states in Paragraph 4.2 under "Precautions and Limitations," "No liquids to be shipped for radwaste burial."

In an effort to preclude recurrence of liquid in radwaste packages, the licensee is drafting a new radwaste procedure. In addition to the prohibition against shipping liquid for radwaste burial contained in the current procedure, the draft procedure requirements include: direct health physics coverage of compactible and non-compactible trash packaging; placement of 5 gallons of absorbent material in each 55-gallon drum or 10 gallons in the standard wooden box; and a checksheet to be affixed to each container before use which will stay with the container through shipping. The checksheet serves to verify presence of absorbent material, type(s) of material in the package, a check to ensure that no liquid is present at time of package closure and/or at time of shipment, and survey data. This matter will be reviewed further during a future inspection.

DETAILS

SECTION II

Prepared By: W. J. Cooley
B. A. Riedlinger

1. Persons Contacted

Russell P. Moore, Acting Site Manager, Nuclear Engineering Company
Brian D. Thayer, Acting Assistant Site Manager, NECO
Steve M. Lehman, Radiation Safety Officer, NECO
Darwin D. Garvin, Officer in Charge, Federal Highway Administration, Department of Transportation
Stephen L. Bump, Radiation Control Specialist, Nevada State Health Division
Milton J. Jury, Radiological Training and Coordination Supervisor, Consumers Power Company

2. Background

On June 27, 1979, a shipment of low-level radioactive waste was made from Consumers Power Company to the Nuclear Engineering Company (NECO), Beatty, Nevada burial site. The carrier was Tri-State Motor Transit. The shipment arrived at Beatty on the afternoon of July 2, 1979. (See Bill of Lading, Annex E.) The shipment consisted of 12 metallic cylinders, purportedly containing solid evaporator concentrates, and one wooden box of solid, noncompactible trash. (See Radioactive Shipment Record, Annex B and Radioactive Materials Shipment Record, Annex C.)

Upon arrival at the site, Nuclear Engineering was informed by the driver that he had observed liquid dripping from the bottom of the trailer at a stop in Las Vegas and a stop at Lathrop Wells.

NECO, thereupon, made a survey of moisture and sediment which had dripped to the metal understructure of the trailer. The survey made by a cloth wipe indicated greater than 9000 counts per minute per 100 cm^2. The surface where the wipe was taken was damp at the time of the contamination check. See Beatty site survey sheet, Annex F, dated July 2, 1979.

On July 3, 1979, the trailer was moved to a point adjacent to an available trench and resurveyed by NECO. See Beatty Site Survey Sheet Annex G, dated July 3, 1979. The location of the trailer relative to the trench is shown on the attached Annex A and photograph 5 of Annex M.

NECO removed the 12 cylinders and the box to the trench on July 3, 1979, as illustrated in Annex A.

On July 5, 1979, NECO completed a contamination survey of the interior floor of the trailer by direct readings. The results ranged from 1,000 - 12,000 counts per minute. See Annex H. Attached as Annex D is a copy of a radiation survey made by Consumers Power Company on June 26, 1979. Those radiation levels agree reasonably well with those found by NECO in their surveys on July 2 and 3, 1979. (Annex F and G).

Attached as Annex I is a Consumers Power Company certification that they have read and understand the requirements of the NECO license number 13-11-0043-02 issued by the Nevada Department of Human Resources.

3. Inspection Findings

Region V inspectors arrived at the Beatty site at 8:00 a.m. on July 6, 1979.

NECO representatives stated that at least two containers had leaked at some time during the shipment. They said those leaks were still evidenced by a whitish sediment on the interior floor of the trailer and parts of the metallic understructure of the trailer.

They also stated that the truck driver, his wife, and the cab had been surveyed for contamination and released from the site. The driver and his wife left in the truck cab soon after the survey.

NECO representatives stated that their Nevada State license had been suspended and that they were no longer receiving shipments of radioactive waste. They indicated that one such shipment had already been diverted from Beatty to an alternate site.

NECO representatives also stated that they had been ordered by Governor List of Nevada to repackage the 12 cylinders and to remove the shipment from the State of Nevada. NECO indicated that they would probably repackage the shipment and send it back to Consumers Power, although the method of repackaging and final destination of the shipment were still uncertain. They further indicated that they were reluctant to certify the safety of the proposed reshipment, due to the doubtful condition of the 12 cylinders.

A NECO representative presented Region V with copies of information attached to this report as Annex B through H and the information shown on Annex A.

At that time, NECO employees were researching possibilities for repacking the shipment. The size of overpacks available to them from their Sheffield site were of some concern, as their inner diameters would barely accommodate the cylinders.

The inspectors proceeded to the trench where the containers were located, as shown in Annex A. That Annex also provides the locations of the containers as they had been placed in the trailer during the shipment and indicates the order of removal from the trailer. The inspectors conducted radiation surveys as illustrated in Annex J. Radiation levels ranged from 26 mR per hour to 97 mR per hour, comparable to the levels indicated on the Radioactive Shipment Record, Annex B.

The inspectors then obtained at least one swipe of the outer surface of each cylindrical container. The smeared location, area, and results obtained using Region V counting equipment are given in the attached Annex L. Some removable contamination was found on the top surface of four containers.

The inspectors then viewed the interior of the trailer, where a white sediment was evident, indicating that one or more of the containers leaked onto the floor. The general location of the sediment is indicated by the dark lines in the attached Annex K and Photograph No. 1, Annex M. A swipe obtained in the contaminated area indicated 488 disintegrations per minute per 100 square centimeters. Additional swipes obtained outside the obviously contaminated area indicated a maximum of 54 disintegrations per minute per 100 square centimeters. The locations of those wipes identified as (A), (B), and (C) are superimposed on the diagram of Annex K. The general radiation field inside the trailer ranged from 250 to 600 counts per minute, due primarily to the proximity of the burial trench.

Region V inspectors were unable to find contamination levels on the order of 9,000 counts per minute as was found by NECO in its initial truck survey on July 2, 1979 as shown in Annex F and in Annex G. NECO had taken this sample by using a dry cloth over the wet understructure of the trailer.

The 300 counts per minute measurement taken by an NRC inspector at the center of the trailer approximately 3 feet over the contaminated area is indicated on Annex K. No other surveys closer to the contamination were made by the inspector. NECO, however, surveyed this area and other locations on the trailer floor on July 5, 1979, as shown in Annex H. NECO's surveys were made with a pancake GM probe almost in contact with the trailer floor. Their results ranged from 300 to 12,000 counts per minute. The inspectors have no reason to disagree with those results.

Picture No. 2, Annex M, shows the white sediment deposits on the metal understructure of the trailer located approximately beneath cylinder B of Annex A. It was at that point that NECO measured the 9,000 counts per minute recorded in their surveys, Annex F and Annex G.

Photograph Nos. 3 and 4 show the trailer and its license plate and serial numbers. They also show the placards on the front and on one side of the truck. "Radioactive" placards, as shown on photograph 4, were placed on all four sides of the trailer (See also picture No. 5.)

Photograph No. 5 shows the relative locations of the trailer and the trench containing the box and the 12 cylinders.

Photograph No. 6 shows several containers and an example of the cylinder labeling, which read, "NUPAC, USA DOT-7A Type A, Radioactive Material." Most of the word "NUPAC" was painted over on the cylinder shown in this picture.

Photograph No. 7 shows a leak near the weld on the bottom of cylinder K as indicated on Annex A of the report. The white globular stalactite formation to the right of the larger rock near the container rim is some of the leaked material.

Photograph No. 8 shows a leak near the weld on the bottom of Cylinder B as indicated on Annex A of the report The globular material is in the shade of the adjacent container.

Photograph No. 9 shows the cloth-like "patch" at the base of Cylinder B. To the right of the "patch" at the container rim is the solidified sediment at the point of leakage as is also shown in Photograph No. 8. Photograph No. 9 was taken while cylinder B was lifted several feet above the ground by the crane shown in Photograph No. 5, which was operated by NECO personnel.

Photograph No. 10 again shows the elevated cylinder B. A freshly impacted area to the right of the sediment formation is shown.

Photograph No. 11 is another view of the area shown in Photograph No. 10.

Photograph No. 12 shows fill plugs and fixtures on the top of Cylinder A. Note that the fill plug was screwed down tightly at an angle.

Photograph No. 13 shows an open fill plug. That fill plug was hand-tight and was removed by hand by inspectors. That container is identified as Cylinder G in Annex A. Because the container was so easy to open, it was chosen by the representative of the State of Nevada as the one to be core sampled. That sample was submitted to Idaho National Engineering Laboratory. The results are attached to this report as Annex H-R.

Photograph No. 14 shows the fill plug and some fixtures on the top of Cylinder L. The fill plug was hand-tight. The material within the guard ring appeared to have leaked from that port. However, a swipe of this area indicated only eight disintegrations per minute per 100 square centimeters. See Annex L for swipe results. There was no sediment visible outside the guard ring.

4. Comments on Attachments B Through R

Annex B is a Radioactive Shipment Record executed by Consumers Power Company, personnel at the Palisades plant. The item numbers on that record should not be confused with the Region V notation on Annex A, which indicates the order of removal of the cylinders from the trailer.

Annex C is a Radioactive Shipment Record executed by Consumers Power Plant personnel at the Palisades facilities.

Both Annex B and C indicate that the shipped material is in solid form.

Annex D is the vehicle survey performed on June 26, 1979 by Palisades personnel.

Annex E is the Bill of Lading. It is noted that a minimum of descriptive information on the shipment appears on the form. A NECO representative stated that NECO refused to sign the Bill of Lading as the consignee because they did not want to accept a leaking shipment.

Annex F is a Beatty site survey sheet showing the NECO survey performed on July 2, 1979, at the time the shipment arrived. It was the first written indication of radioactive contamination outside the trailer. That survey has been discussed previously.

Annex G is a Beatty site survey sheet indicating the results of the survey on July 3, 1979, after the trailer had been relocated to the trench. It shows similar results to those in the survey of Annex F.

Annex H is a Beatty site survey sheet showing the results of a survey taken on July 5, 1979. That survey was made by taking direct readings on the interior floor of the trailer with the probe approximately 2 inches from the floor. NECO routinely corrects its survey instrument readings with a 50% geometry correction and a 10% mixed fission-product energy correction. The survey readings shown would therefore be multiplied by approximately 20 to convert them to disintegrations per minute.

Annex I is signed by a representative of Consumers Power Company. Inspectors have no assurance that Palisades possessed a complete and current copy of the NECO license. Mr. John Vaden of the State of Nevada, in a telephone conversation on July 11, 1979, indicated to Region V that the phraseology of the paragraphs 5.4.6.1 and 5.4.6.2 referenced in Annex I, taken along with other written communications to NECO from the State of Nevada, prohibited NECO from receiving any liquid radioactive waste.

Annex J is the Region V record of the radiation survey made of the Consumers Power Company shipment as it was located in the trench at Beatty on July 6, 1979. The surveys were made with NRC instrument number 004280, which was calibrated in June of 1979 and was not due for recalibration until September 9, 1979.

Annex K is a Region V radiation level and contamination survey of areas inside the trailer. This annex was discussed previously.

Annex L indicates the results of a Region V swipe survey made of the exterior surfaces of the 12 containers shipped by Consumers Power Company. These results were discussed earlier.

Annex M consists of 14 photographs at Beatty, Nevada of the liners and the transport trailers.

Annexes N-R are the results of Idaho National Engineering Laboratory's analysis of core samples from cylinder G.

5. Summary - Conclusions

The purpose of this inspection was to gather first hand information at the Nuclear Engineering Company (NECO), Beatty, Nevada, low-level radioactive waste disposal site regarding a shipment of radioactive waste from Consumers Power Company, Covert, Michigan to the Beatty site. The inspection included acquiring copies of pertinent records which had accompanied the shipment and others which had been generated by Nuclear Engineering Company at Beatty. Those records included radiation and contamination surveys; radioactive material shipment records; and certain available shipping papers. The inspection also included independent measurements by NRC Region V personnel of radiation levels and contamination levels to verify that type of information already available from the records listed above. A number of photographs were obtained showing the containers and the shipments. A representative of the State of Nevada Health Division obtained two core samples of the contents of one of the shipping containers and presented one of those samples to the Region V representatives. Region V sent that sample to the Idaho National Engineering Laboratory, Chemistry Division, to be analyzed for gross beta-gamma activities and Sr-90 content.

The measurements made by Region V personnel are in substantial agreement with those obtained by Consumers Power Company and Nuclear Engineering Company both with regard to radiation and contamination levels. Substantial agreement also appears to exist with similar data obtained by the State of Nevada Health Division. Those measurements indicate about 40-60 dpm 300 square centimeters removable activity from certain contaminated areas of three containers and 400-500 dpm/100 square centimeters on the interior floor of the trailer. Observations by Region V were that three of the twelve cylinders in

the shipment showed evidence of leakage; two at the cylinder base weld and one at a cylinder drain plug. A fourth cylinder appeared to have leaked at a fill port at the top of the cylinder but swipe results did not show appreciable contamination. See Annex A and Annex L of this report for cylinder and swipe identification.

The contamination found on the floor of the trailer and its undercarriage was caused by at least one of the leaking cylinders.

DETAILS

SECTION III

Prepared By: B. L. Jorgensen

1. Persons Contacted .

T. Meek, Plant Health Physicist
T. Neal, Radioactive Material Control Supervisor

2. General

The licensee was notified in early July 1979 that a routine shipment of solidified bottoms had arrived at the Nuclear Engineering Company's (NECO) Beatty, Nevada waste burial facility with two (later determined to be three) of twelve containers leaking liquid. Pursuant to a request by the NRC Region III Office of Inspection and Enforcement, the resident inspector reviewed procedures and data relating to "liner" packaging and shipment, focusing on the shipment in question, which was dispatched from the Palisades site on June 27, 1979. The inspector also accompanied Messrs. F. Tupper and W. Hill of the Office of Motor Carrier Safety, Federal Highway Administration, during their review of this matter at the Palisades site on July 9, 1979.

3. Solidification Process

The solidification system packages a catalysed mixture of urea-formaldehyde and water, primarily evaporator "bottoms," into steel containers of about 50 cubic foot capacity. These containers, right circular cylinders approximately 48 inches in height and diameter, are designed for compatability with solidification system hardware. Since the catalysed mixture is acidic, the interiors of the containers are coated with a corrosion resistant, heavy paint. The inspector physically examined eight containers awaiting filling, including a check of the quality of the interior coating. These containers were all found to be in good condition.

After the containers are filled, the mixture "sets up" within about 15 minutes, and "cures" over a period of hours. According to licensee personnel, this curing process includes a physical volume shrinkage of about 10 percent and is accompanied by an equivalent release of free liquid. The licensee's procedure is to place each filled container on a drain stand, removing top vent plugs and a small drain plug very near the bottom on the side of the container. The drain stand is designed so the container is tilted toward the drain plug. The free liquid drained is recycled through the system. The licensee estimated typical liquid drainage volume at about 30 gallons. In some cases, this information is written on the side of the container.

The draining containers are usually on a drain stand at least 24 hours. The controlling procedure (H.P. 6.16 Radwaste Procedure - Low Level) then requires a check of each container with the drain plug open, to verify the absence of "drainable" (5ml/min) water. The licensee stated this verification has been performed for all containers, including those in the shipment of June 27.

Procedure H.P. 6.16 also requires data from the free liquid leakage check to be logged. This was not done for any containers in the thirteen shipments made since the effective date of the procedure (October 4, 1978) including those on the shipment of June 27, 1979. Since adherence to Procedure H.P. 6.16 is a requirement of Technical Specifications 6.8.1.a, failure to log the required data is an item of noncompliance.

When draining is complete, the containers are sealed by replacement of the vent and drain plugs. Contamination smears and direct surveys are taken, data tags are affixed to the containers,and the containers are stored until shipment. The storage period may vary from days to weeks or months. The licensee indicated that small amounts of liquid may accumulate while the sealed containers are stored, estimating a one or two percent accumulation by volume.

4. Free Water Content of Onsite UF Solidified Containers

At the request of the inspector, the licensee opened and drained thirteen 50 cubic foot containers which were in storage on the site. The containers had been processed at various times over the preceeding several months and had been drained shortly after they were filled. The inspector observed this draining for nine containers; the volume drained averaged about 3 1/2 gallons with a minimum of less than a gallon and a maximum of eight gallons. Although the time in storage ranged from days to over three months, the amount of drainage did not have any apparent relationship to the storage duration. Two containers were marked to indicate that 20 and 70 gallons had been drained in the day or two after solidification.

DETAILS

SECTION IV

Prepared By: C. C. Peck

1. Persons Contacted

J. Harvey, President, Southwest Nuclear Co.
F. Beierle, Southwest Nuclear Co.
T. Neal, Radioactive Material Control Supervisor, Consumers Power Co.
H. Curry, Quality Assurance Analyst, Consumers Power Co.
T. Frazee, Radiation Control Specialist, Washington State Department of Social and Health
W. Wilcox, Health Physicist, Southwest Nuclear Co.

2. General

Southwest Nuclear Co. was engaged by Consumers Power Co. to receive the liners (initially sent to burial site at Beatty, Nevada), remove any remaining liquid, and repackage the containers in packages acceptable for burial at a licensed commercial burial site.

3. Draining of Waste Containers

An NRC inspector from Region III observed the draining of residual liquid from the twelve Palisades liners on September 29-30, 1979, at a facility near Prosser, Washington, acquired for the purpose by Southwest Nuclear Company. The procedure for draining the containers was prepared and performed by Southwest Nuclear Co. and approved by Consumers Power Company. Two representatives of Consumers Power Co. and a radiation control specialist from the Washington State Department of Social and Health Services observed the draining in addition to the NRC inspector.

Liquid from each liner was collected in a 10-gallon container which was measured to permit determination of the liquid volume drained. The liners were tilted during draining to permit flow toward the vessel drain hole. The liners were allowed to drain for a minimum of twelve hours to a maximum of about 28 hours, after which the observers concluded that draining had either ceased or had decreased to an insignificant rate. The difference in drainage times results from the fact that about 16 hours were required to prepare, position, and begin the draining process, one liner at a time. When draining of the final liner had begun, all were allowed to drain overnight and drain plugs were reinserted the following day.

Pertinent observations and conclusions of the inspector are listed below:

a. Three of the twelve liners were apparently dry. No liquid was collected despite efforts to promote draining by rodding through the drain hole. One of the three was identified as a liner that had shown evidence of leakage at the Beatty, Nevada burial site. The other two were not known leakers. In all three instances, there was evidence of vessel corrosion, particularly at the bottom seam. There was also some indication of leakage into the Bentonite clay in the Argonne bins associated with the three liners.

b. A total of about 57 gallons of liquid was collected from the nine remaining liners, ranging from a low of 3.4 gallons to a high of 8.6 gallons. Two of the original leakers were in the group. There were indications of liner corrosion and probable minor leakage into the Bentonite clay from the two original leakers and three other liners. The volume of liquid drained from the two leakers was about the same as the average for all nine liners (six gallons).

4. Disposal of Liners and Drained Liquid

The liners were repackaged in their Argonne bins and the collected liquid was absorbed in diatomaceous earth in three 55-gallon drums on September 30. The twelve bins and three drums were shipped to Nuclear Engineering Company's waste burial site at Richland the following day (October 1), where the inspector witnessed their interment.

DETAILS

SECTION V

Prepared By: L. R. Greger
A. B. Davis
L. J. Hueter

1. Persons Contacted

R. DeWitt, General Manager of Consumers Power Company
J. Lewis, Plant Manager
H. Keiser, Superintendent of Operations and Maintenance
T. Meek, Plant Health Physicist
T. Neal, Radioactive Material Control Supervisor

2. General

A meeting was held with the licensee management representatives identified in Paragraph 1 on September 18, 1979, to discuss NRC inspection activities regarding Palisades radwaste performance in light of the two recent incidents involving the discovery of free liquid in supposedly dry solid radwaste containers and to discuss the licensee's general performance in the radwaste and radiation protection areas, including past problems and the prospects for future improvements. A subsequent telephone conversation was held with Mr. Lewis on October 26, 1979.

3. Urea Formaldehyde Shipment to Beatty, Nevada

As previously noted in this report, three of twelve urea formaldehyde solidified radwaste containers exhibited signs of leakage upon arrival at a burial facility near Beatty, Nevada on July 2, 1979. The containers were overpacked and held in storage at a contractor facility near Pleasanton, California until late September, at which time the containers were drained at a contractor facility near Prosser, Washington and subsequently buried at a licensed burial ground near Richland, Washington. Several locations at which the shipment stopped between the Palisades plant and Beatty, Nevada were surveyed for signs of leakage. No radiation levels in excess of background were detected. Causative and corrective actions regarding this incident were discussed.

As a result of previous problems with free water in urea formaldehyde solidified radwaste,[1/] Palisades had commenced a program of draining

1/ IE Inspection Report No. 50-255/76-20

all urea formaldehyde solidified radwaste containers shortly after processing. This draining commonly yielded free water in quantities up to 5-10% of the container's volume.[2/] Recent studies at Brookhaven National Laboratory also recognize that free water is routinely present in urea formaldehyde solidified waste.[3/] NRC (NRR) is currently evaluating the continued acceptability of urea formaldehyde as a radwaste solidification mechanism.

Although, as noted previously, no record existed to document the initial draining of the twelve urea formaldehyde solidified containers which arrived at the Beatty, Nevada burial site on July 2, 1979, it is felt, on the basis of the subsequent draining of these containers in Prosser, Washington, that the containers had been drained shortly after processing as claimed by the licensee. The quantities of water drained from the containers at Prosser, Washington were not excessive when compared to the expected free water content resulting from a properly utilized urea formaldehyde solidification system. In light of these findings, no enforcement action is planned regarding the transfer of small amounts of free water in the twelve urea formaldehyde solidified liners. The license was, however, notified that future such shipments must meet the transferee's effective license requirements in all regards, including free water. [4/]

Based upon licensee records of the radioactive contents of the twelve liners and selective verification by the NRC (analysis of a sample from one of the containers), the shipment contained less than Type B quantities of radioactive material and, therefore, was exempt from NRC packaging regulations contained in 10 CFR 71. Department of Transportation shipping regulations apply in such situations. As noted in this report, DOT representatives were present to examine activities associated with the shipment at various times.

At the September 18, 1979, management meeting, the licensee committed to drain the twelve containers and to provide the NRC with ample notification to allow NRC the opportunity to observe the draining. As noted previously, the containers were drained on September 29 and 30, 1979, in the presence of an NRC inspector.

2/ Ibid
3/ Development of Free Standing Water Criteria, Neilsen and Colombo, dated June 19, 1979.
4/ Letter from Keppler to Youngdahl dated 8/10/79.

The licensee further stated during the September 18, 1979, meeting that use of the urea formaldehyde solidification system had been discontinued and that present plans were to use a contract cement solidification service until installation of a bitumen solidification system is completed in two to three years.

The licensee was informed that one item of noncompliance for failure to follow plant procedures for recording quantities of liquid drained from urea formaldehyde solidified containers was found as a result of this portion of the inspection.

4. Liquid Shipped to Barnwell, South Carolina

As previously noted in this report, a 55-gallon drum, supposedly containing dry radioactive waste, was two-thirds full of liquid when opened at the Barnwell, South Carolina burial facility on August 7, 1979. The liquid was subsequently solidified at the burial facility before being buried. Causative and corrective actions regarding this incident were discussed.

According to licensee personnel, analysis results showed that the liquid was water containing small amounts of several radionuclides. Although the water's origin was not positively identified, licensee personnel suspect it was rain water which entered the drum at the licensee's site. The licensee stated that a procedure (Procedure H.P.2.44) designed to preclude future such shipments had been implemented and would be utilized for all future dry radioactive waste shipments.

The licensee was informed that one item of noncompliance for failing to ensure that the radioactive material transferee was authorized to receive the transferred radioactive material (free liquid) was found as a result of this portion of the inspection.

5. Secondary System Demineralizer Resin

The licensee agreed to keep the Region III Office informed of developments regarding the location and analysis of possibly contaminated powdered resin (condensate demineralizers) which had been disposed of in a local landfill. The licensee was informed that this matter would be reviewed further during a future inspection.

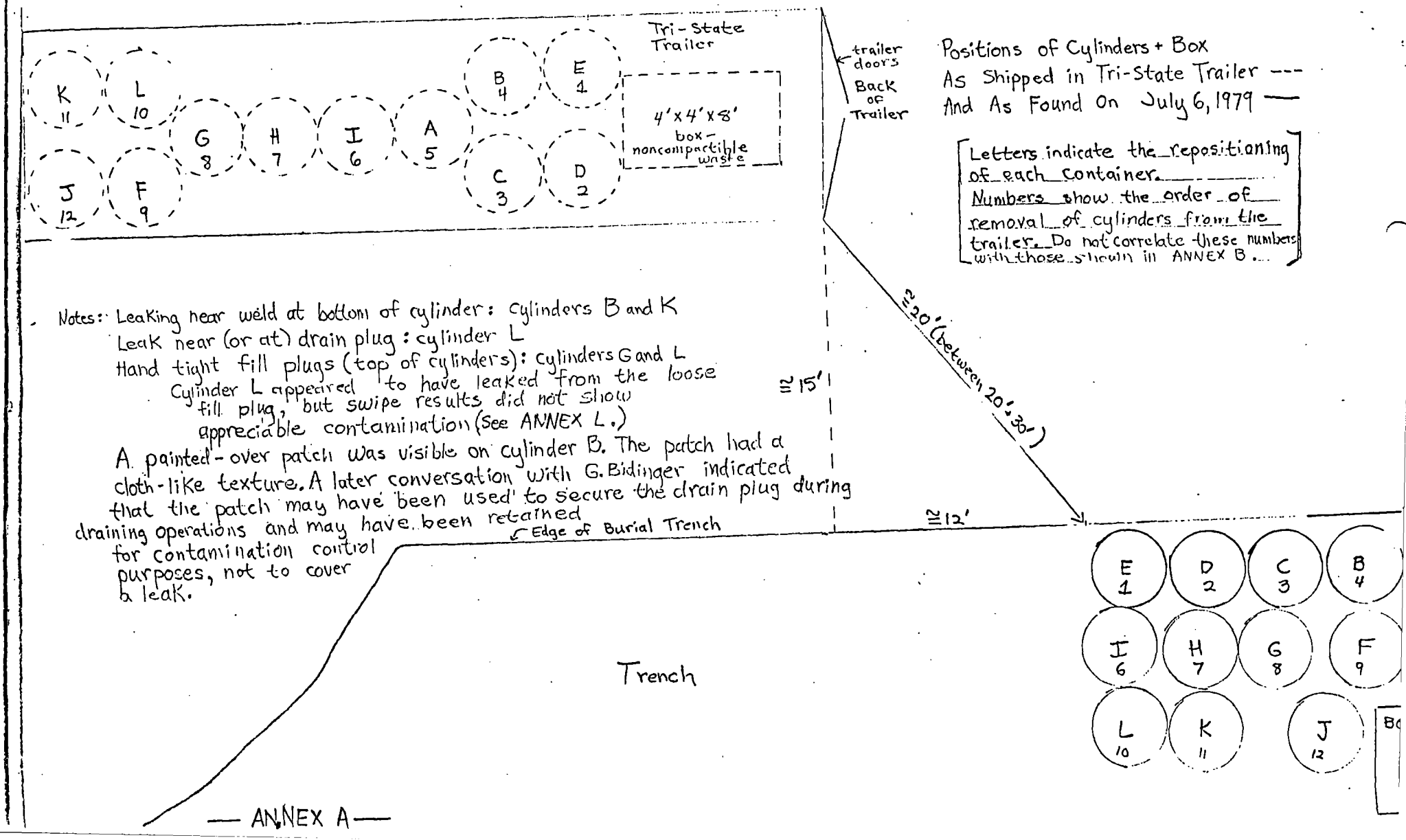
6. Licensee Performance

The inspectors noted that licensee performance in the radiation protection and radwaste areas over the past several years has generally been below average in comparison with other Region III licensees. This observation is based upon several factors, including station personnel exposures, noncompliance items, and subjective evaluations by the regional inspection staff.

Licensee personnel acknowledged the inspectors' comments. General corrective needs were discussed, including implementation of licensee commitments for strengthening and improving management control over the radiation safety program as stated in a letter to the NRC dated October 27, 1978.[5/] The inspectors noted that the recent personnel change in the Plant Health Physicist position provided an excellent opportunity to upgrade the radiation protection and radwaste programs. Licensee personnel indicated that efforts to upgrade these programs would continue.

Attachments: Annexs A-R

5/ Letter from Hoffman to Keppler dated October 27, 1978.



Notes: Leaking near weld at bottom of cylinder: cylinders B and K
Leak near (or at) drain plug: cylinder L
Hand tight fill plugs (top of cylinders): cylinders G and L
Cylinder L appeared to have leaked from the loose fill plug, but swipe results did not show appreciable contamination (See ANNEX L.)
A painted-over patch was visible on cylinder B. The patch had a cloth-like texture. A later conversation with G. Bidinger indicated that the patch may have been used to secure the drain plug during draining operations and may have been retained for contamination control purposes, not to cover a leak.

— ANNEX A —

P.O. Box 1 [redacted]
Morehead, [redacted]ky 40351
(606) 784-6[redacted]

P.O. Box 158
Sheffield, Illinois 61361
(815) 454-2624

NUCLEAR ENGINEERING COMPANY, INC.
P.O. Box 7249 [redacted] Louisville, Kentucky 40207
(502) 426-71[redacted]

Western Operations Headquarters
P.O. Box 156
San Ramon, California 94583
(415) 837-1561

P.O. Box 578
Beatty, Nevada 89003
San Ramon (415) 837-1561

[redacted] x 638
[redacted]d, Washington 99352
San Ramon (415) 837-1561

25704

RADIOACTIVE SHIPMENT RECORD

Please complete this form for each shipment and distribute as marked.

CUSTOMER CONSUMERS POWER COMPANY - PALISADES DATE 6/27/79 Page 1 of 1 Pa

ADDRESS COVERT MICHIGAN CARRIER TRI-STATE

MATERIAL DESCRIPTION EVAP. CONCENTRATES, NON-COMPACTED TRASH CONTAINER DESCRIPTION 12-LINERS, 1-CRATED BOX

Item No.	Cubic Feet	Gallons Liquid	Physical State	Chemical Form	mRem/hr @ surface	mRem/hr @ 3 ft.	Isotopes	Transport Groups	By-Product (milliCuries)	Source Lbs.	SNM grams	Label Used
L-1	50	0	SOLID	INORGANIC	30	13	Co 58-60 Cs 134-137	III	48.3	N/A	N/A	N/A
2				SALT	70	25			112.7			
3					25	10			40.2			
4					25	10			40.2			
5					15	6			24.2			
6					~~450~~ 50	42			~~[illegible]~~ 80.5			
7					70	25			112.7			
8					25	14			56.3			
9					80	29			128.8			
10					~~450~~ 50	23			~~[illegible]~~ [illegible]			
11					30	13			48.3			
12	—	—	—	—	35	15	—	—	56.3	—	—	—
L-TOTAL	600	0	—	—	585	—	—	—	829 ~~442~~	—	—	—
C-1	128	0	SOLID	NON-COMPACTED TRASH	6	2.5	Co 58+60 Cs 134-137	III	3	N/A	N/A	N/A
	728	0	TOTALS					TOTALS	832 ~~442~~	—	—	—

This is to certify that the above named articles are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulati of the Department of Transportation. It is also certified that the articles are in compliance with all regulations applicable at the designated disposal site.

DRIVER'S COPY

Terms and Conditions

Date _____ Authorized Signature _____ Title _____

HP 6 20.1 —ANNEX C —

CONSUMERS POWER COMPANY
PALISADES NUCLEAR PLANT

RADIOACTIVE MATERIAL SHIPMENT RECORD

ORIGINATOR

(1) TO: NECO
Beatty, Nev.

License No. 13-11-0043-02 Expiration Date 6/30/80

FROM Consumers Power Company
Palisades Nuclear
Covert, Michigan

License No. DPR-20 Expiration Date [illegible]

(3) Reason For Transfer BURIAL

(4) Material EVAPORATED CONCENTRATES, NON-COMPACTABLE TRASH

(5) Physical Form: Solid ☑ Liquid ☐ Gas ☐

(6) DOT Quantity: Small ☐ Type A ☑ Type B ☐ * Large ☐ * LSA ☑

(7) Form: Special ☐ Normal ☑

(8) Transport Group: I ☐ II ☐ III ☑ IV ☐ V ☐ VI ☐ VII ☐

(9) Fissile Class: I ☐ II ☐ III ☐ Exempt ☑ SNM Grams N/A

(10) *Required Quality Assurance Checklist completed N/A

(11) Principal Radionuclides Co 58-60 Cs 134-137 Curies [illegible]

(12) Container Description 12-LINERS, 1-CRATED BOX (13) Cubic Feet 728

Approximate Weight 41,000

(14) Cask: Type N/A Serial No.

(15) Number of Packages 13

(16) Remarks N/A

(17) Originator G L ELLIS Date 6/27/79

RMC TECHNICIAN

(18) Radiation (Container) Truck

Surface 30 MREM/Hr-βγ N/A MREM/Hr-N

3 Ft. From Surface 6 MREM/Hr-βγ

Contamination (Container)

α — D/M/100cm²

β-γ — D/M/100cm²

(19) DOT Label: None Required ☑ White I ☐ Yellow II ☐ Yellow III ☐ Empty ☐

(20) Surveys Attached: Vehicle ☑ Container ☐ (21) Vehicle Placarded ☑

(22) Remarks N/A

(23) Surveyed By [illegible signature] Date 6-26-79

RMC SUPERVISOR

(24) State Police Notification: Carrier TRI-STATE Color WHITE [illegible]

Date 6-26-79 Time of Departure [illegible] Leaving State NEW BUFFALO

Officer Contacted [illegible] Post SOUTH HAVEN

(25) This is to certify that the above named articles are properly classified, described, packaged, marked, and labeled, and in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Date 6/27/79 Authorized Signature [illegible signature] Title [illegible]

VEHICLE SURVEY FORM

SHIPPER TRI-STATE

TRACTOR NO. 4202	COLOR WHITE
TRAILER NO. 544132	COLOR SILVER

INSTRUMENT TYPE E-520

INSTRUMENT S/N 8428-00349

INSTRUMENT CALIBRATION DATE 4-20-79

CAB
1.0 mr/hr

@ 6 ft.	NEAR CONTACT		NEAR CONTACT	@ 6 ft.
5 mr/hr	15 mr/hr		20 mr/hr	6 mr/hr
5 mr/hr	17 mr/hr		14 mr/hr	5 mr/hr
3 mr/hr	17 mr/hr		8 mr/hr	3 mr/hr

TOP		BOTTOM
12 mr/hr @ CONTACT	1.0 mr/hr @ CONTACT	30 mr/hr @ CONTACT
5 mr/hr @ 6 ft.	.5 mr/hr @ 6 ft.	6 mr/hr @ 6 ft.

LIMITS - FOR AN "EXCLUSIVE USE" VEHICLE DOSE RATE SHALL NOT EXCEED:

1. 2 mr/hr in any position of the vehicle which is occupied by a person.
2. 200 mr/hr NEAR CONTACT any accessible area of trailer or container.
3. 10 mr/hr @ 6 ft. from any accessible area of trailer or container.
4. 1000 mr/hr @ 3 ft. from external package surface.

TECHNICIAN J. C. Lindsay

DATE 6-26-79

ANNEX D

CONTROLLED COPY

ANNEX E - 1

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading.

The property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official, Southern, Western and Illinois Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the motor carrier classification or tariffs if this is a motor carrier shipment.

Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the movement on this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

FREIGHT BILL NUMBER
24636.5
SHIPPER'S NUMBER
77-025

From [redacted] Consumers Power Co.

DATE SHIPPED 6-27-77

At South Haven Mich.

ORIGINATING CARRIER Tri State Motor Transit

EXECUTIVE OFFICES
P.O. BOX 113, JOPLIN, MO 64801

CONSIGNED TO NECO

(Mail or street address of consignee – For purposes of notification only)

DESTINATION Beatty STATE Nevada COUNTY

DELIVERY ADDRESS Beatty Nevada

(To be filled in only when shipper desires and governing tariffs provide for delivery thereat)

CONNECTING CARRIER(S) T.S.M.T. DELIVERING CARRIER TRACTOR NO. 4208 TRAILER NO. 54431

Subject to Section 7 of conditions, of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement.
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

NUMBER PACKAGES	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*WEIGHT (Subject to Correction)	CLASS OR RATE	CK. COL.
12	Liners	71,650		
1	Crated Box			

(Signature of consignor)

If charges are to be prepaid write or stamp here, "To be Prepaid"

Rec'd $ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per

(The signature here acknowledges only the amount prepaid)

Charges advanced

$

LARGEST SINGLE ARTICLE	LENGTH	WIDTH	HEIGHT	TOTAL TRAILER SPACE OCCUPIED
[redacted]				

UNLESS A GREATER VALUE IS DECLARED, THE SHIPPER HEREBY RELEASES THE VALUE TO $5000.00 PER TON OF 2000 POUNDS FOR EACH ARTICLE.

ARRIVED AT SHIPPER	DATE 6-27-77	TIME 7:00 A.M. P.M.	PREARRANGED SCHEDULE ☒ YES ☐ NO	DATE 6-27-77	TIME 7:00 A.M. P.M.	LOADING STARTED	DATE 6-27-77	TIME 5:00 A.M. P.M.	
LOADING COMPLETED	DATE 6-27-77	TIME 10:30 A.M. P.M.	VEHICLE RELEASED	DATE 6-27-77	TIME 10:30 A.M. P.M.	SHIPPER'S SIGNATURE			
PERMANENT POST OFFICE ADDRESS OF SHIPPER			SHIPPER, PER			AGENT, PER			

SIGNATURE TALLY RECEIPT

Must be filled out and signed at origin and each time the shipment changes custody.

DATE SHIPMENT RECEIVED FROM CONSIGNOR
6-27-77 DATE
TIME AM/PM
TRACTOR NO. 4208
[redacted] DRIVERS SIGNATURE
HOME TERMINAL

DRIVERS SIGNATURE HOME TERMINAL

1ST TIME CARGO CHANGED CUSTODY
DATE TIME AM/PM TRACTOR NO.
DRIVERS SIGNATURE HOME TERMINAL
DRIVERS SIGNATURE HOME TERMINAL

2ND TIME CARGO CHANGED CUSTODY
DATE TIME AM/PM TRACTOR NO.
DRIVERS SIGNATURE HOME TERMINAL
DRIVERS SIGNATURE HOME TERMINAL

3RD TIME CARGO CHANGED CUSTODY
DATE TIME AM/PM TRACTOR NO.
DRIVERS SIGNATURE HOME TERMINAL
DRIVERS SIGNATURE HOME TERMINAL

4TH TIME CARGO CHANGED CUSTODY
DATE TIME AM/PM TRACTOR NO.
DRIVERS SIGNATURE HOME TERMINAL
DRIVERS SIGNATURE HOME TERMINAL

5TH TIME CARGO CHANGED CUSTODY
DATE TIME AM/PM TRACTOR NO.
DRIVERS SIGNATURE HOME TERMINAL
DRIVERS SIGNATURE HOME TERMINAL

6TH TIME CARGO CHANGED CUSTODY
DATE TIME AM/PM TRACTOR NO.
DRIVERS SIGNATURE HOME TERMINAL
DRIVERS SIGNATURE HOME TERMINAL

7TH TIME CARGO CHANGED CUSTODY
DATE TIME AM/PM TRACTOR NO.
DRIVERS SIGNATURE HOME TERMINAL
DRIVERS SIGNATURE HOME TERMINAL

8TH TIME CARGO CHANGED CUSTODY
DATE TIME AM/PM TRACTOR NO.
DRIVERS SIGNATURE HOME TERMINAL
DRIVERS SIGNATURE HOME TERMINAL

ARRIVED AT CONSIGNEE	DATE	TIME A.M. P.M.	PREARRANGED SCHEDULE ☐ YES ☐ NO	DATE	TIME A.M. P.M.	UNLOADING STARTED	DATE	TIME A.M. P.M.
						CONSIGNEE'S SIGNATURE		

— ANNEX F —

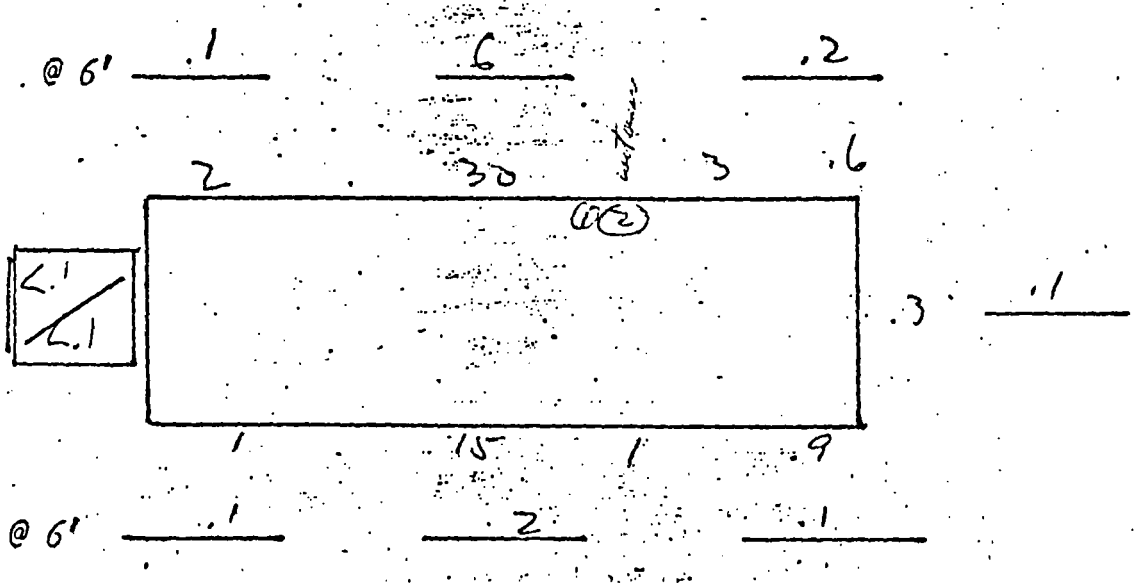
Beatty Site Survey Sheet

No. _____

Type of Survey: Transportation Vehicle Date: 7/2/79 Time: 1330

Customer: CONSUMER POWER Vehicle I.D. 4202 -

Carrier: TRI STATE Driver (s) ROBERT VENABLE



Max. Contact Side of Trailer (mR/hr) 30

Max. Contact of Containers (mR/hr) ?

Dose Rate Inside Cab/Sleeper (mR/hr) <.1 / <.1

Scan of Trailer Empty (cpm/bkg)

Additional Information:

TRAILER HELD / CONTAMINATED

Remarks: Activities greater than the "Action Levels" require the immediate notification of the RC & SO. Circle in red ink Unless otherwise

Action Levels

Beta 2200 DPM/100 cm²

Alpha - 220 DPM/100 cm²

Smear Survey Results

Arrival DPM/100cm² Departure

No.	Beta	Alpha	No.	Beta	Alpha
1	>9000	N/D			
2	>9000	N/D			

Air Activity

Activity in uCi/ml

No.	Time	Volume	Beta	Alpha
		N/A		

Instruments Used

	Contamination	Radiation
Type	RM14	E520
Serial No.	2017	323
Response Check	SAT	SAT

Surveyor: [signature]

Reviewed by: _____

ANNEX

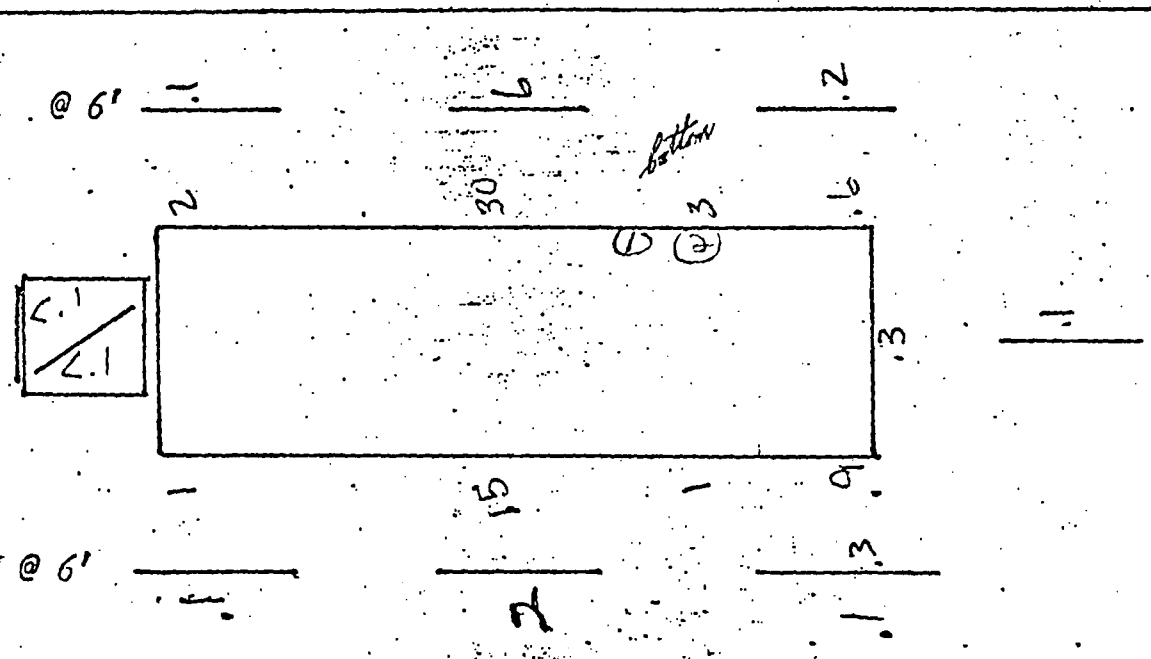
Beatty Site Survey Sheet

No. _____

Type of Survey: Transportation Vehicle Date: 7/3/79 Time: 6:30A

Action Levels*
Beta 2200 DPM/100 cm²
Alpha 220 DPM/100 cm²

Customer: CONSUMERS POWER Vehicle I.D. 4202 - 544132
Carrier: TRI STATE Driver (s) ROBERT VENABLE



Smear Survey Results
Arrival DPM/100cm² Departure

No.	Beta	Alpha	No.	Beta	Alpha
1	7900	ND			
2	7900	ND			

Air Activity
Activity in uCi/ml

No.	Time	Volume	Beta	Alpha
		N	A	

Max. Contact Side of Trailer (mR/hr)	30
Max. Contact of Containers (mR/hr)	?
Dose Rate Inside Cab/Sleeper (mR/hr)	<.1 | <.1
Scan of Trailer Empty (cpm/bkg)	
Additional Information:	TRAILER HELD / CONTAMINATED

Instruments Used

	Contamination	Radiation
Type	RM14	E520
Serial No.	2017	323
Response Check	SAT	SAT

Surveyor: Brian K. Hayes

Reviewed by: _____

Remarks: Activities greater than the "Action Levels" require the immediate [illegible] of the R & SO. Circle in red ink. Unless otherwise [illegible]

ANNEX H

Beatty Site Survey Sheet

No. _____

Type of Survey: Transportation Vehicle Date: 7-5-79 Time: 8:30AM

Customer: CONSUMERS POWER Vehicle I.D. 54132

Carrier: TRI-STATE Driver (s) _____

Action Levels *

Beta 2200 DPM/100 cm²

Alpha - 220 DPM/100 cm²

Smear Survey Results

Arrival DPM/100cm² Departure

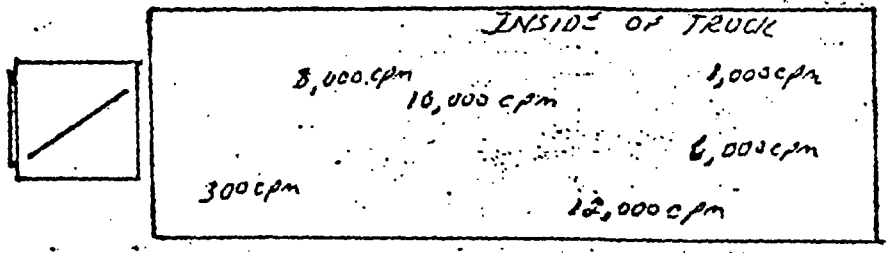
No.	Beta	Alpha	No.	Beta	Alpha

Air Activity

Activity in uCi/ml

No.	Time	Volume	Beta	Alpha

@ 6' _____ _____ _____



@ 6' _____ _____ _____

TRUCK WITH LEAKING LINER

Max. Contact Side of Trailer (mR/hr)

Max. Contact of Containers (mR/hr)

Dose Rate Inside Cab/Sleeper (mR/hr)

Scan of Trailer Empty (cpm/bkg)

Additional Information:

Instruments Used

	Contamination	Radiation
Type	RM-14	
Serial No.	424	
Response Check	SAT	

Surveyor: J M Lehman

Reviewed by: _____

Remarks: Activities greater than the "Action Levels" require the immediate notification of the RC & SO. Circle in red ink. Unless otherwise noted, radiation levels are in m'em/hour, and smear locations are

CERTIFICATION

THIS IS TO CERTIFY THAT I HAVE READ AND UNDERSTAND THE REQUIREMENTS OF LICENSE #13-11-0043-02 ISSUED TO NUCLEAR ENGINEERING COMPANY (NECO) BY THE NEVADA DEPARTMENT OF HUMAN RESOURCES FOR THE RECEIPT AND DISPOSAL OF RADIOACTIVE MATERIALS AT BEATTY, NEVADA, AS DESCRIBED IN PARAGRAPHS 5.1.1.3; 5.1.1.4; 5.1.1.5; 5.1.1.6; 5.4.6.1; and 5.4.6.2 OF THE NECO SITE OPERATIONS MANUAL, AND I FURTHER CERTIFY THAT THE MATERIALS IN THIS SHIPMENT ARE IN COMFORMITY WITH THOSE REQUIREMENTS:

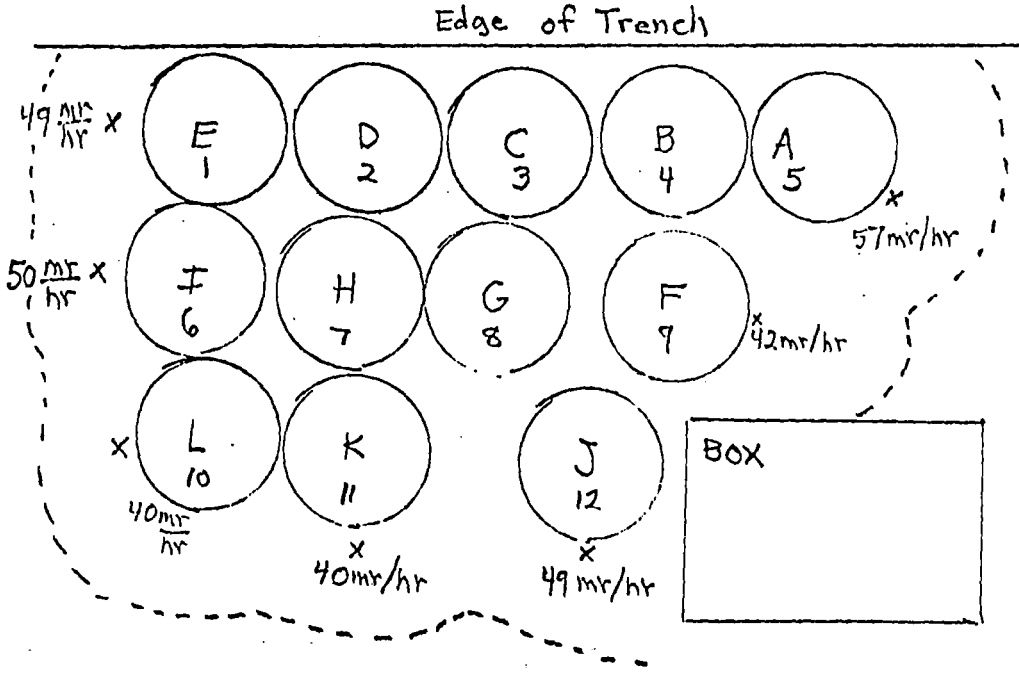
Consumers Power Co.
COMPANY

AUTHORIZED SIGNATURE

Elec. Supervisor
TITLE

6/27/79
DATE

ANNEX I



Trench

x Levels at 2" from surfaces of cylinder sides

--- ≅ 3' from containers 17mr/hr line (60K counts per minute)

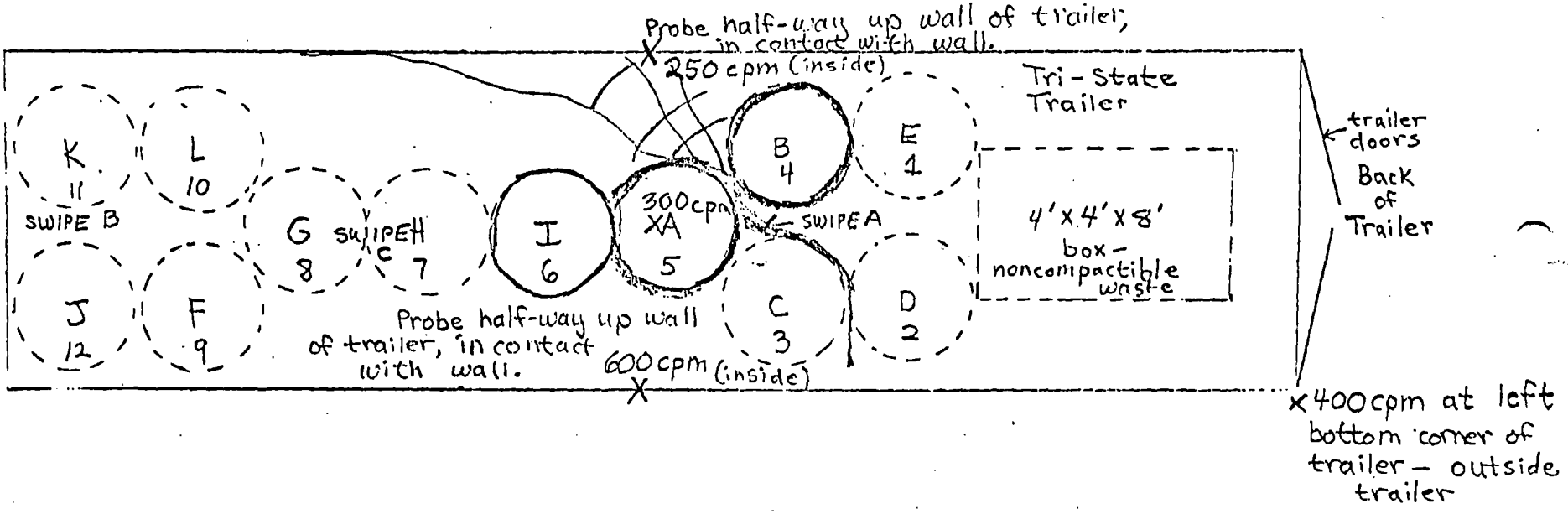
Radiation Levels approximately 6 inches from top surfaces of cylinders

A — 37mr/hr	G — 60mr/hr
B — 23mr/hr	H — 97mr/hr
C — 43mr/hr	I — 40mr/hr
D — 34mr/hr	J — 29mr/hr
E — 46mr/hr	K — 34mr/hr
F — 40mr/hr	L — 26mr/hr

Surveys made of radiation levels around cylinders on July 6, 1979.

Surveys performed with T.A. PUG-1AB survey meter with P-7 probe. NRC # 004280. Due for recalibration on 9/9/79.

Radiation Levels and Swipe Results in (or near) the Tri-State Trailer



X Radiation level surveys taken with T.A. PUG-1AB survey meter with P-7 probe. NRC #004280. Due for recalibration on 9/9/79.

— Dark areas indicate locations of container seepage.

Notes: 300 cpm reading was taken with the meter probe about 3' over the sediment ring created by cylinder A. No background was subtracted. The high background was due to the proximity of the burial trench (See ANNEX A)

Results of Swipes: Swipe A, contaminated area: 488 disintegrations per minute (dpm)
Swipe B, "clean" area: 10 dpm
Swipe C, damp area [oil had evidently spilled in this area (G, H) during some prior shipment]: 54 dpm

} swipes were taken over approximately 100 cm^2.

Results of Wipe Tests of Cylinders

(Results in disintegrations per minute. Wipes taken over approximately 300 cm^2 areas, unless otherwise indicated.)

Wipes showing no removable contamination above background:

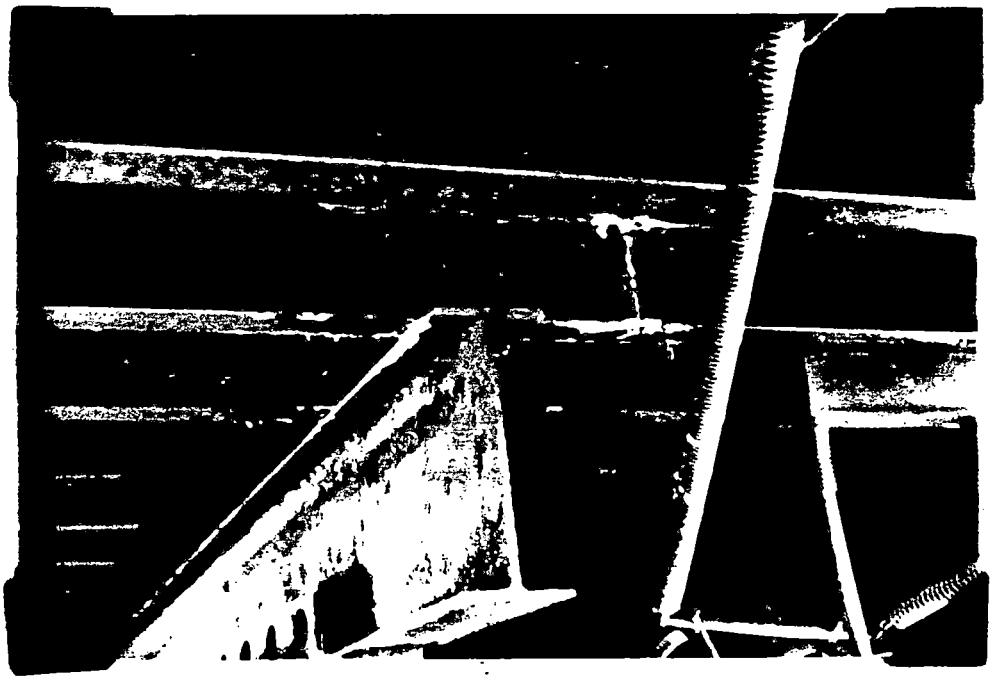
Cylinder A, side
Cylinder B, top surface
Cylinder B, near leak + patch
Cylinder E, side
Cylinder F, side
Cylinder G, side
Cylinder I, side
Cylinder J, side
Cylinder K, curved surface near weld
Box: top surface

Wipes showing some removable β, γ contamination. No removable alpha contamination was detected.

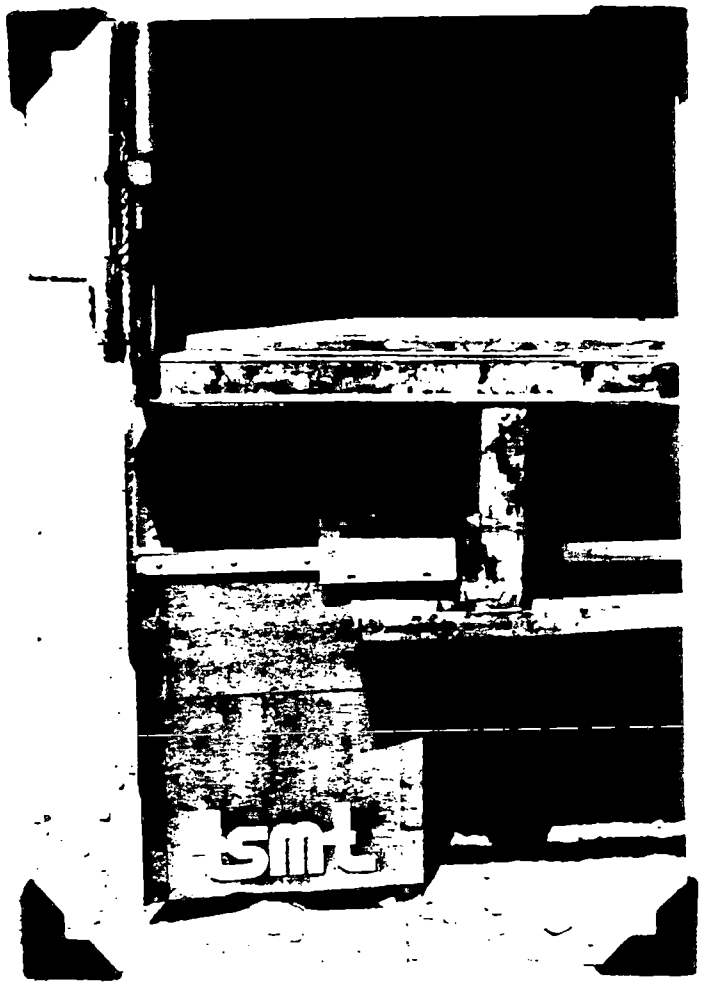
Cylinder C, top surface : 53 dpm
Cylinder C, top surface (2nd wipe) : 58 dpm
Cylinder D, top surface : 41 dpm
Cylinder H, top surface : 44 dpm.
Cylinder L, top surface: 8 dpm } This wipe over approximately 100 cm^2.

Wipes taken July 6, 1979 and counted on July 9, 1979. NRC #000383, PC-55 gas flow proportional counter used for analysis. Counter efficiency: 59%. Background: 47 counts per minute.

Photograph #1: Interior of Tri-State Trailer showing whitish residue



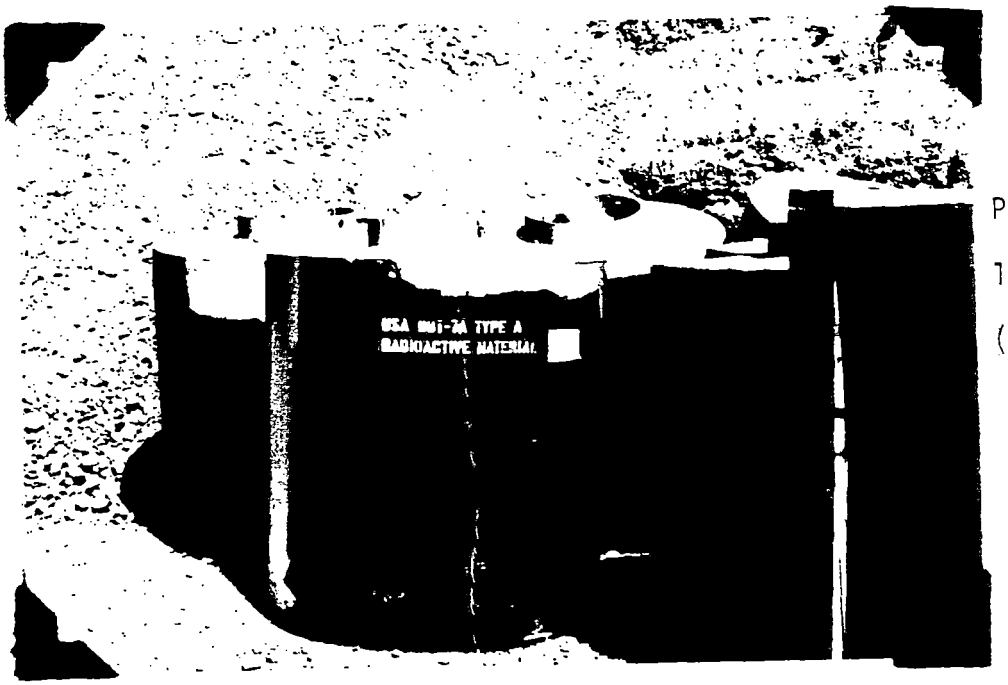
Photograph #2: Under-carriage of Tri-States trailer showing more of the white residue



Photograph #3: Shows the license plate of the Tri-States Trailer

Photograph #4: The front and one side of the Tri-States Trailer, its identification number, and placards

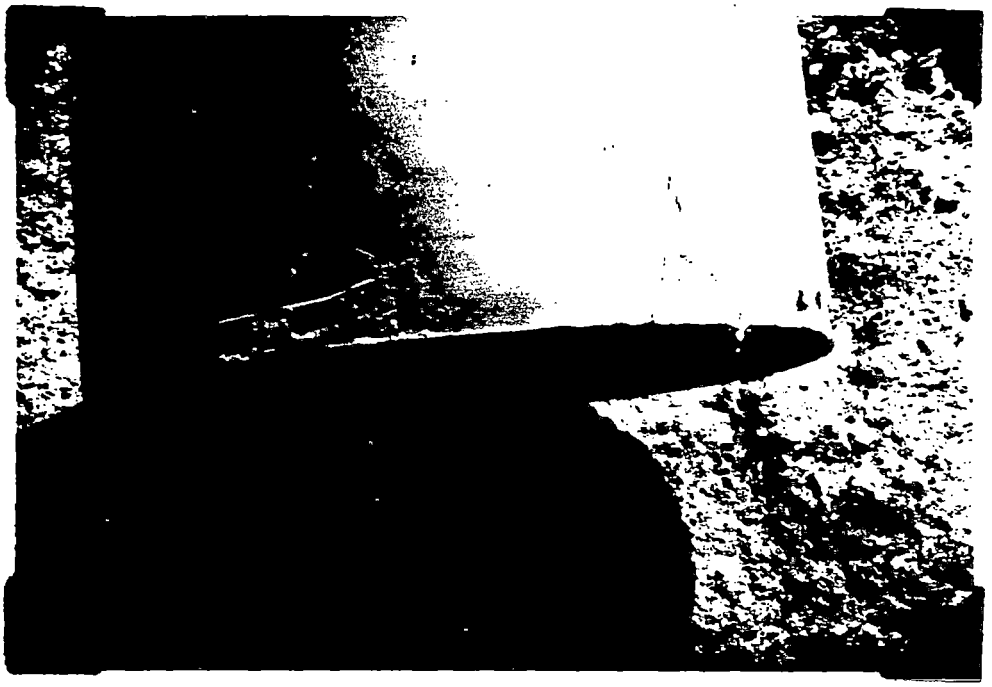
Photograph #5: The relative locations of the Tri-States Trailer and the containers in the trench



Photograph #6: The labeling on container K (see ANNEX A)

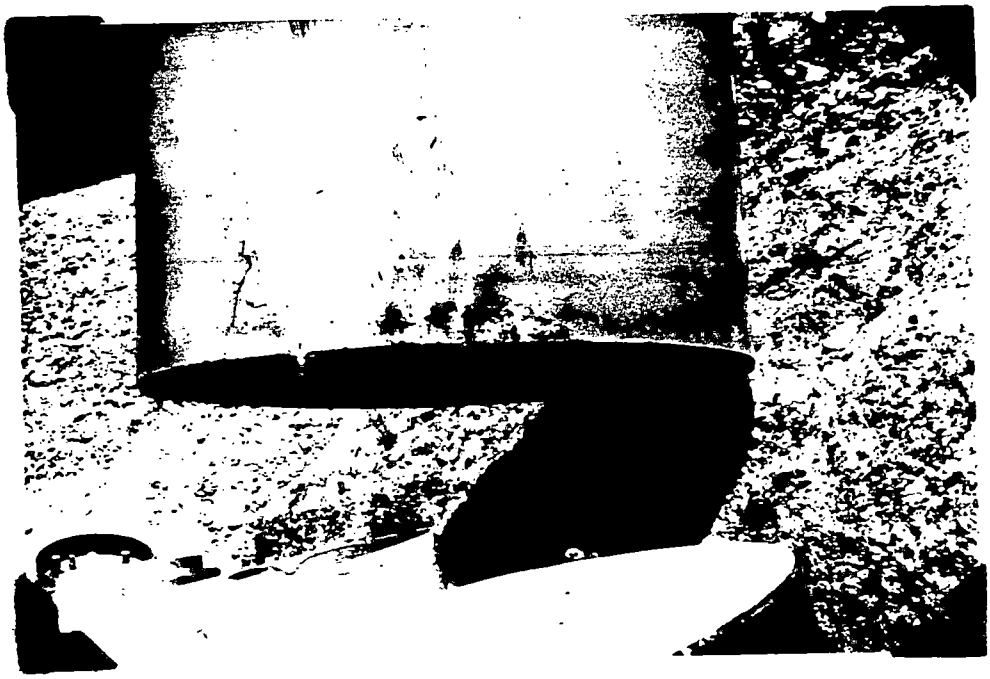
Photograph #7: The whitish sediment is visible to the right of the rock near the base of container K (in center of photo)

Photograph #8: A stalactite of whitish residue is visible near the base weld of the yellow cylinder B (in the shade of cylinder A)

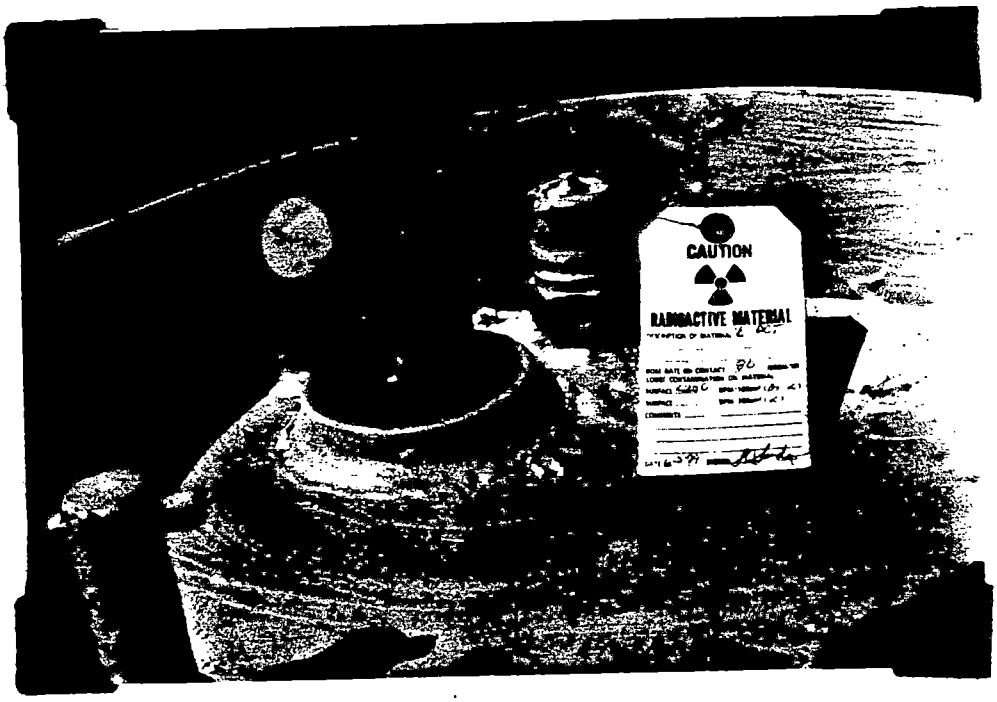


Photograph #9: The crane-lifted cylinder B. The cloth-like "patch" (see ANNEX A) is visible on the left, and the stalactite of whitish residue (also shown in photo #8) appears on the right of the cylinder base

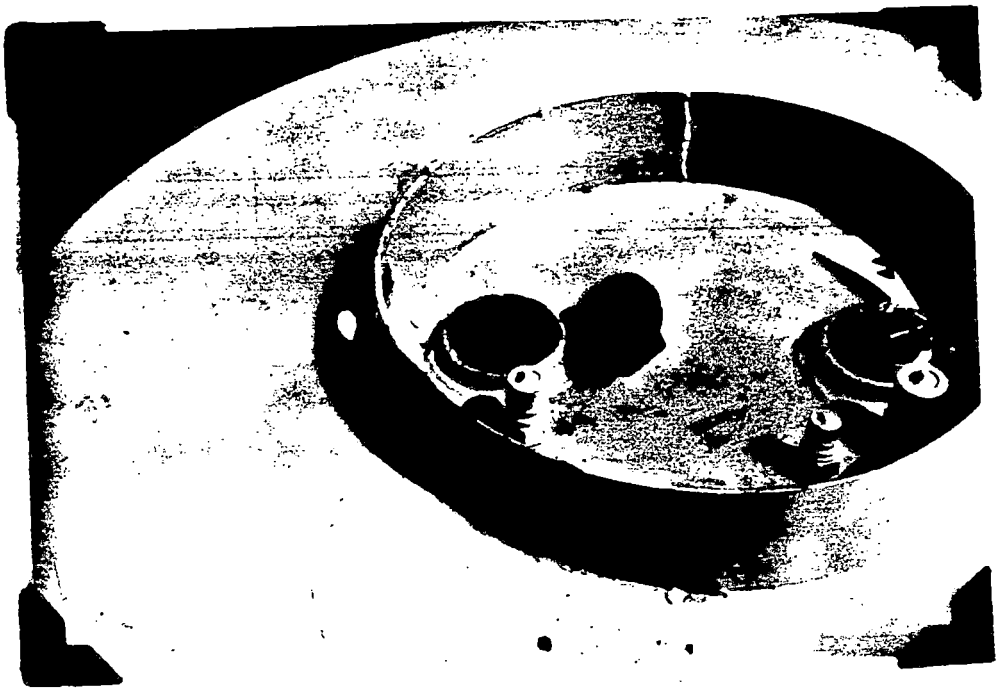
Photograph #10: An impacted area to the right of the residue on cylinder B.



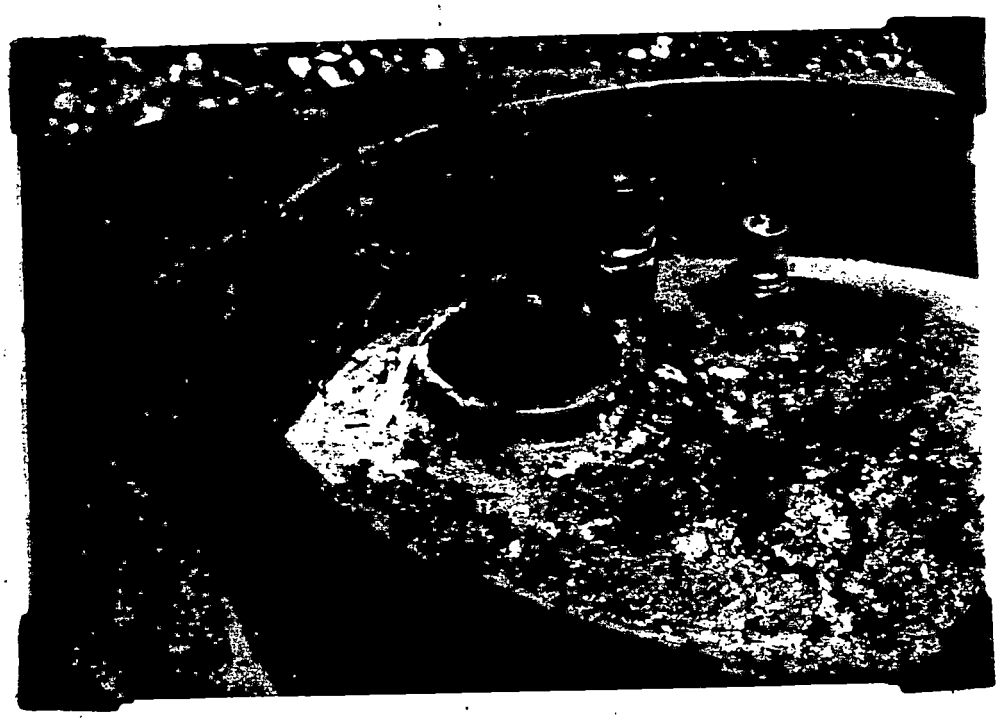
Photograph #11: A different view of the situation described in photo #10. Cylinder B.



Photograph #12: A fill plug on the top of cylinder A was screwed down at an angle.



Photograph #13: A hand-tight fill port on cylinder G, which was opened by inspectors. A core sample was removed from this cylinder and is being analyzed by INEL.



Photograph #14: The top surface of cylinder L. See body of report for details.

PD—104
(Rev. 11-77)

UNITED STATES DEPARTMENT OF ENERGY
IDAHO OPERATIONS OFFICE
ANALYTICAL CHEMISTRY BRANCH
SAMPLE RECORD SHEET

REFERENCE: HEALTH SERVICE LABORATORY

Call Bidinger 8-49-28158 to determine priority

Routine _____ URGENT X

SERIAL NO. 11193

SAMPLE FROM: U.S.N.R.C., Region V

COLLECTED BY Stephen Bump, Nevada State Health Div.

DATE SUBMITTED: July 10, 1979

SAMPLES RECEIVED: 7/13/79

ANALYSIS COMPLETED: 7/30/79

NOTIFIED: Bidinger 1120 DATE: 7/30/79

ANALYZED BY: DBW

APPROVED BY: KW Kunkel
SECTION CHIEF

SAMPLE NO	SAMPLE DATE	SAMPLE HOUR	SAMPLE DESCRIPTION	ANAL. FOR	INST. USED	QUANT. USED g	DATE CNTD.	COUNT TIME min	GROSS COUNT	BKGD.	NET COUNT		RESULT ±1 σ* μCi/g
1	7/6/79	≅1:00 PM	PVC pipe 1" diameter and ≅14" long filled with a powdery substance obtained from a container at NECO. That container was filled with evaporator bottoms from Palisades Reactor (PWR) partially solidified by the urea formaldehyde process. Original material was probably high in boric acid.	Xscan									
"				Sr-90	0.5	7/25	20	675	80	595			(8.7±0.5) E-5

* RANDOM UNCERTAINTIES REPORTED ARE 1 STANDARD DEVIATION, 1σ. SMALL NEGATIVE AND OTHER RESULTS ≤ 2σ ARE INTERPRETED BY HSL AS INCLUDING "ZERO" OR AS NOT DETECTED. IF APPROPRIATE, ESTIMATES OF POSSIBLE SYSTEMATIC ERRORS ARE REPORTED IN PARENTHESES.

— ANNEX N —

UNITED STATES DEPARTMENT OF ENERGY
IDAHO OPERATIONS OFFICE
ANALYTICAL CHEMISTRY BRANCH

SERIAL NO. 117008A

ANALYZED BY JSM, CR

APPROVED BY Original Signed
Dale G. Olson

COLLECTION DATE: 187.5417 DETECTOR: 2 DESCRIPTION: 1.05E+01 G WATER
HALF-LIFE AND RESULT ARE FOR NEAREST LONG LIVED PARENT.
NEVADA STATE HEALTH S.BUMP MATERIAL FROM PVC PIPE

ANALYSIS DATE	DECAY TIME DAYS	COUNT TIME MIN	TOTAL COUNT	GROSS COUNT CT/S	BKGD COUNT CT/S	MINOR COUNT CT/S	NET COUNT CT/S	ISOTOPE	RESULTS UCI/G	UNCERTAINT
194.59	7.	16.								
			1461.	1.480			1.480	58 CE 144 284.3D3	3.22E-04	5.6E-0
			3310.	3.354			3.354	24 CR 51 27.704D2	2.05E-03	1.7E-0
			18792.	19.041			19.041	55 CS 134 2.062Y3	1.99E-03	6.3E-0
			60810.	61.617	0.013		61.604	55 CSD137 30.17Y3	8.06E-03	2.3E-0
			215603.	218.465			218.465	27 CO 58 70.8D1	3.31E-02	9.4E-0
			32680.	33.113			33.113	25 MN 54 312.5D3	4.89E-03	1.4E-0
			626.	0.634			0.634	26 FE 59 44.6D4	2.43E-04	3.4E-0
			24143.	24.463	0.001		24.463	27 CO 60 5.271Y1	5.75E-03	1.7E-0

— ANNEX O —

57 Co $(1.04 \pm 0.07) E-4$

95 Zr $(1.4 \pm 0.3) E-4$

ON Date counted 95 Nb $(1.9 \pm 0.2) E-4$

Allied Chemical

IDAHO CHEMICAL PROGRAMS — OPERATIONS OFFICE

REQUEST FOR ANALYSIS BY ANALYTICAL CHEMISTRY BRANCH

FORM ACC-5803
(Rev. 9-76)

SAMPLE NAME N.R.C. Residue ANAL. LOG NO. 071707

DESCRIPTION OF SAMPLE, APPROXIMATE CONCENTRATION, ETC.

SUBMITTED BY K. Puphal DATE 7-17-79 ACTIVITY (mR/hr) bkgd (TLL)

REPORT RESULTS TO Ken Puphal ANALYTICAL REPRESENTATIVE

ADDRESS CF 690 PHONE 6-2188 GWA NUMBER 89400-232-006

SAMPLE CODE	(100) ANALYSES DESIRED						
	Qual Spec	X-Ray Diffraction					
	X	X					
	ATTACHED	ATTACHED					

OPP ANALYTICAL
JUL 17 10 59 AM '79

FOR ANLYTICAL USE ONLY	
ROUTE:	
1. SPEC. CHEM.	7-17-79
2. X-RAY	
3. RADIO CHEM.	
4. MASS SPEC.	
5. SHIFT LAB.	

REMARKS:

RESULTS RECORDED BY APPROVED DATE 7/19

— ANNEX P —

Allied Chemical

SPECTROCHEMICAL ANALYSIS

FORM ACC-5904
(Rev. 12-76)

SPECTROCHEMICAL

JUL 19 11 54 AM '79

DATE: RECEIVED

RUN

REPORTED

RECORD NO. P-196

SAMPLE DISPOSAL

RUN BY JH TRL

APPROVED TRL

LOG NO. 071707

CODE NRC Residue

ACTIVITY (mR/hr) —

REQUESTED BY K. Puphal

REPORT RESULTS TO "

CHARGE NO. 89400-232-006

DETERMINATIONS Qual Spec

NUMERALS =

M = MAJOR = ≥ 5% m = MINOR = < 5% > .1% T = TRACE = < .1%

Ag										
Al	t									
B	t - m									
Be										
Ca										
Cd										
Co										
Cr										
Cu										
Fe	t									
Mg	t									
Mn	t									
Mo										
Na	m - t									
Ni										
Pb										
Si	t									
Sn										
Ti										
V										
Zn										
Zr										

— ANNEX Q —

(Rev 6-77)

ALLIED CHEMICAL CORPORATION

IDAHO CHEMICAL PROGRAMS - OPERATIONS OFFICE

Allied Chemical

ANALYTICAL CHEMISTRY BRANCH JUL 19 11 54 AM '79

SPECTROSCOPY SECTION

DATE SUBMITTED	7-17-79	LOG NO.	79-071707
DATE RUN	7-17-79	CODE	N.R.C. Residue
RECORD NO.	P-28	ACTIVITY (mR/hr)	
METHOD	x-ray powder camera	REQUESTED BY	Ken Puphal
RUN BY	ESD	REPORT RESULTS TO	Ken Puphal
CALCULATED BY	ESD/WAR	SAMPLE DESCRIPTION	
APPROVED	TRL	DETERMINATIONS	x-ray
		CHARGE NO.	89400-232-006

Most of this sample appears to be organic in nature. Either H_3BO_3 or B_2O_3 is present.

— ANNEX R —