U.S. NUCLEAR REGULATORY COMMISSION REGION I

INSPECTION REPORT

Report No. 030-06171/95-001

Docket No. 030-06171

License No. 37-07575-01

Licensee: <u>Nuclear Laundry Rental Services, Inc.</u> <u>14th and Gaskill</u> Jeannette, Pennsylvania 15644

Facility Name: Kitchen-N-Appliance Wholesalers

Inspection At: <u>1108 Gaskill Avenue</u> Jeannette, Pennsylvania 15644

Inspection Conducted: November 4-5, 1995

Inspectors:

Mark R. Bouwens, Health Physicist Project Manager

5-23-96 date

Approved By:

Ronald R. Bellamy Decommissioning and Laboratory Branch

May 23,1446

Inspection Summary: Announced radiological survey of the facility for residual radioactive contamination on November 4-5, 1995. (Inspection No. 030-06171/95-001)

<u>Areas Inspected</u>: The facility was surveyed to identify radioactive soil contamination, and fixed and removable radioactive surface contamination.

<u>Results</u>: The radiological survey identified radioactive soil contamination in the sump and trench, and fixed radioactive surface contamination on floor surfaces above NRC criteria for release for unrestricted use.

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DETAILS

1. Persons Contacted

Thomas Backus Karen Backus

2. Background

Nuclear Laundry Rental Services, Inc. (NLRS) operated a laundry for clothing contaminated with radioactive material at 14th and Gaskill, Jeannette, Pennsylvania from 1961 to about 1975 in a building with an independent non-nuclear commercial laundry company. The non-nuclear commercial laundry was the principle owner of the property and building; NLRS operated in an approximately 2500 ft² area of the building.

The name of the non-nuclear commercial laundry operation was Model Laundry. Edward C. Backus, the current property owner, purchased the property in 1975, presumably from the owner of Model Laundry. The property is currently the site of Kitchen-N-Appliance Wholesalers (KNA Wholesalers), manufacturers of kitchen cabinets and formica tops. The facility has not been an authorized location of use on an AEC or NRC specific license since License No. 37-07575-01 was terminated. The street address of the site was changed to 1108 Gaskill Avenue sometime after 1973.

3. Organization and Staffing

Edward C. Backus is the owner of the property and KNA Wholesalers. Thomas Backus has power of attorney of the property. Karen Backus is the Facility Manager of KNA Wholesalers. KNA Wholesalers employs approximately 30 personnel at the facility.

4. Facilities

The famility is a four-story building, including the basement and attic, that is divided into space for offices, manufacturing, and storage. KNA Wholesalers constructed the attic for storage space over approximately half of the original roof surface.

5. Fadiological Survey

The radiological survey was conducted by representatives of Oak Ridge Institute of Science and Technology (ORISE). The radiological survey identified residual radioactive contamination above NRC criteria for release for unrestricted use at the facility. The contamination was identified on floor surfaces, in soil in a trench in the basement, and in the sump under what was previously the laundry room of the facility. The contamination on the floor surfaces is fixed in place. The details of the radiological survey are provided in the Radiological Scoping Survey of the Former Nuclear Laundry Rental Services, Inc., Jeannette, Pennsylvania, dated January 15, 1996.

6. Exit Interview

The results of the inspection were discussed in a telephone conversation with Karen Backus at the end of the inspection.

RADIOLOGICAL SCOPING SURVEY OF THE FORMER NUCLEAR LAUNDRY RENTAL SERVICES, INC. SITE JEANNETTE, PENNSYLVANIA

INTRODUCTION AND SITE HISTORY

Nuclear Laundry Rental Services, Inc. (NLRS) operated a facility in Jeannette, Pennsylvania from 1961 to 1973 which specialized in the cleaning of radioactively contaminated clothing. Located at 14th Street and Gaskill Avenue, NLRS shared a structure with a commercial non-nuclear laundromat, Model Laundry. Under a license (License No. 37-07575 [Docket No. 030-06171]) authorized by the Atomic Energy Commission (AEC), a predecessor of the Nuclear Regulatory Commission (NRC), NLRS operated the laundry until the license's termination in 1973. In 1975, the property was sold to its current owner, Kitchen-N-Appliance Wholesalers (KNA), a kitchen cabinet and countertop manufacturer.

The NRC has initiated a program to ensure that licenses terminated after 1965 meet the current NRC criteria for release for unrestricted use. The former Nuclear Laundry Rental Services, Inc. facility was identified as a site requiring further review. Oak Ridge National Laboratory (ORNL) reviewed the license termination records and identified the site as a facility requiring additional inspections and radiological data in order to determine the current radiological conditions. The docket file does not indicate that verifiable decontamination was performed at closeout of the license, or that final radiological surveys were performed by the licensee or the AEC (NRC 1994).

On August 22, 1994, the NRC conducted an inspection of the property that included interviews with former employees, direct observations, and a radiological survey. The results of this investigation showed that residual radioactive contamination from previously licensed activities was present at the site. Suspected contaminated areas included: pipe access points in the basement and the floor in the northwest section of the first floor (the area of the structure occupied by NLRS) which appeared to have been scabbled and resurfaced with a thin layer of concrete. Areas of elevated direct radiation were identified on the remaining original floor in this area (referred to in this report as the contaminated laundry area), particularly the area of the floor adjacent to the new concrete cap. A

paint chip removed from a location of elevated activity was analyzed and found to be contaminated with cesium-137. Smear samples taken in locations with elevated direct measurements showed no presence of removable contamination (NRC 1994).

Other identified suspect areas included a large floor sump in the former NLRS section of the building and a room in the basement directly beneath the NLRS section which were not surveyed by the NRC. In addition, there is a chimney, a pipe, and ceiling vents that extend through the attic and exit the roof which are no longer in use. The chimney and pipe are capped with concrete.

As a result of these findings, the NRC Region I Office requested that the Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) perform a radiological scoping survey of the building and adjacent grounds at the former Nuclear Laundry Rental Services, Inc. facility in Jeannette, Pennsylvania.

SITE DESCRIPTION

The former NLRS facility is located at 1108 Gaskill Avenue (the address was changed shortly after the license was terminated) in Jeannette, Pennsylvania, approximately 35 kilometers [km (23 miles)] east of downtown Pittsburgh and 5 km west of Greensburg, Pennsylvania (Figure 1). The original structure contained 3 floors; two above-ground levels and a basement. Currently, the above-ground levels are divided into office space, showroom areas, and storage space. The basement consists of manufacturing and storage space. The suspect areas identified during the NRC survey are all located on the first level or in the basement. Each level contains approximately 600 square meters (m²) of floor space. The original building is constructed of mostly concrete and brick with an addition on the east side being concrete block.

The contaminated laundry area of the first level previously occupied by NLRS is located in the westcenter area and contains approximately 170 m² of floor space. The new concrete cap covers approximately 60 m² and was found to be 10 to 15 cm thick after floor coring was performed. A floor scale, an elevator, a side entry room, and the covered access opening to the sump are located at the north end of the area. The ceiling vents are located in the northeast area of the building and were accessed through an attic door, leading to the criginal roof, in the second level office area (Figure 2).

The suspect areas in the basement included in the scoping survey (i.e. the floor pipes, chimney entrance, and the room directly beneath the contaminated laundry area, are shown on Figure 3. The NRC also requested that a basement floor trench (Figure 3) be investigated, during the ESSAP site survey.

PROCEDURES

On November 4 and 5, 1995, ESSAP performed a radiological scoping survey of portions of the building and exterior grounds at the former Nuclear Laundry Rental Services Inc. facility in Jeannette, Pennsylvania. The survey was performed in accordance with a plan dated October 31, 1995, which was submitted to and approved by the NRC Region I Office (ORISE 1995). At the request of the NRC site representative, the scope of the work performed under this survey plan was altered to best fit the needs of the survey. These alterations excluded exterior soil sampling, exposure rate measurements, and survey activities on roof surfaces.

SURVEY PROCEDURES: INTERIOR

The following procedures were applicable to the surveys of the interior areas of the NLRS facility.

Reference System

Measurement and sampling locations were referenced to prominent building features and recorded on appropriate drawings prepared by ESSAP.

Surface Scans

Surface scans for alpha plus beta, and gamma activity were performed over 90% of the floor and lower walls in the contaminated laundry area of the first floor and on all accessible floor space of the remainder of the first floor. In the suspect basement room, all accessible floor and lower wall space (approximately 60%) was scanned. The floor of the sump was inaccessible due to dirt and debris; the walls were randomly scanned for alpha plus beta activity, and the dirt and debris were scanned for gamma activity. All other suspect locations (pipe openings, trenches, vents, and chimney) were also scanned for surface activity. Scans were performed using large area gas proportional detectors, GM detectors, and NaI scintillation detectors coupled to ratemeters or ratemeter-scalers with audible indicators. Locations of elevated direct radiation were marked for further investigation.

Surface Activity Measurements

Direct measurements for total beta activity were performed at a total of 34 locations on floors and lower walls of the first floor and basement and at one location on the west wall of the sump. Smears to determine removable activity were performed at each measurement location. Measurement and sampling locations are shown on Figures 4 through 6.

Exposure Rate Measurements

Background exposure rate measurements were performed at four locations in non-suspect areas. Site exposure rates were performed at four locations on the first floor, three locations in the basement, and in the sump. Exposure rate measurements were performed at 1 m above the surface using a microrem meter. Background and site exposure rate locations are shown on Figures 5 and 6.

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Soil and Miscellaneous Sampling

Two soil samples were collected from beneath the new concrete in the contaminated laundry area. Cores were made through the concrete and soil was hand augured from the core hole. Three soil samples were collected from the floor of the sump. One residue/paint sample was collected from the west wall of the contaminated laundry area and one residue sample was collected from a floor trench in the basement. The paint/concrete surface at four of the highest activity direct measurement locations was chipped up and collected as a sample as requested by the NRC site representative. Figures 7 and 8 show sampling locations.

SURVEY PROCEDURES: EXTERIOR

The following procedures are applicable to the surveys of the exterior grounds of the NLRS facility.

Surface Scans

Gamma surface scans were performed over the exterior grounds directly adjacent to the building using NaI scintillation detectors. Beta-gamma scans, using GM pancake detectors, were performed on cement surfaces outside those doorways that were adjacent to suspect areas. Detectors were coupled to ratemeters or ratemeter-scalers with audible indicators.

SAMPLE ANALYSIS AND DATA INTERPRETATION

Samples and data were returned to ESSAP's Oak Ridge, Tennessee facility for analysis and interpretation. Soil, residue, and paint/concrete samples were analyzed by gamma spectrometry for the radionuclides of interest (U-238, U-235, Cs-137, and Co-60) and any other identifiable photopeaks. Alpha spectrometry was performed on the three soil samples collected from the sump to determine uranium isotopic abundances and plutonium isotopic concentrations. Smears and paint/concrete samples were analyzed for gross alpha and gross beta activity using a low background gas proportional counter. Two residue samples, which showed no gamma activity, were analyzed

for strontium-90 activity. Direct measurements and smears were converted to units of disintegrations per minute per 100 square centimeters (dpm/100 cm²). Gamma spectrometry, alpha spectrometry, and strontium-90 results were reported in units of picocur's per gram (pCi/g). Gross alpha and gross beta results were reported in units of total pCi. Exposure rates were reported in units of microroentgens per hour (μ R/h).

FINDINGS AND RESULTS

INTERIOR AREAS

The survey results for the interior areas surveyed are discussed below.

Surface Scans

Surface scans identified several isolated locations of elevated beta activity on the floor and lower wall in the contaminated laundry area and on the floor in the suspect basement room. Elevated beta activity was also identified at four additional isolated locations on the floor in non-suspect areas of the first floor, on the west wall of the sump, and in the soil in the basement trench. Elevated gamma activity was detected in the sump soil and debris.

Surface Activity Levels

Surface activity measurements and smear results are presented in Table 1. Total beta activity ranged from 1,900 dpm/100 cm² to 100,000 dpm/100 cm². Surface activity, at the four locations where paint and or concrete was scabbled and the radioactive material collected by ESSAP, ranged from < 270 to 3,800 dpm/100 cm² after sampling. Removable activity at all locations was less than the minimum detectable activity of the procedure which is 12 dpm/100 cm² for alpha and 16 dpm/100 cm² for beta.

Exposure Rates

Exposure rates performed at 1 meter above the surface at the four background locations and the 8 site locations are presented in Table 2. Background exposure rates ranged from 5 to 7 μ R/h and averaged 6 μ R/h. Site exposure rates ranged from 5 to 10 μ R/h, with the highest exposure rate being in the sump.

Radionuclide Concentrations in Samples

Radionuclide concentrations in soil samples collected from subfloor corings and the sump are presented in Table 3. Concentration ranges for the radionuclides of interest for this site as well as other radionuclides identified by gamma spectrometry analysis are: Co-60, < 0.1 to 3.9 pCi/g; Cs-137, < 0.1 to 18,000 pCi/g; U-235, < 0.1 to 7.9 pCi/g; U-238, 0.9 to 9.1 pCi/g; total uranium, < 3.9 to 188.7 pCi/g; Eu-154, < 0.3 to 320 pCi/g; and Am-241, < 0.1 to 49.2 pCi/g. The large minimum detectable concentrations for U-235 and U-238 for sump sample 2(B) at < 17.6 pCi/g and < 220 pCi/g, respectively, are a result of a short count time and compton effects due to the high concentration of Cs-137 in the sample. Gamma spectrometry results for the residue samples collected from the west wall of the contaminated laundry area and the basement trench, and paint/concrete samples collected from the four locations of elevated beta activity were all less than the minimum detectable concentrations of the procedure.

Alpha spectrometry analysis of the three sump soil samples indicates the presence of enriched uranium with an average U-234: U-235 ratio of 22 to 1. Analysis of the same three samples shows the presence of Pu-238 and Pu-239 with concentrations ranging from 0.1 to 20.1 pCi/g and 0.1 to 12.0 pCi/g, respectively.

Gross alpha and gross beta results for the four paint/concrete samples collected from locations of elevated direct beta activity range from 47 to 400 pCi for gross alpha and from 14,000 to 63,000 for gross beta. The elevated alpha activity results from "cross-talk" in the counting system due to the high beta count rates.

Concentrations of Sr-90 in the residue samples from the wall in the contaminated laundry area and the basement trench are < 1.0 pCi/g and 1,100 pCi/g, respectively.

COMPARISON OF RESULTS WITH GUIDELINES

The primary contaminants of concern for this site are natural and enriched uranium, mixed fission products (Sr-90 and Cs-137), and Co-60. The most restrictive surface activity guidelines are those for Sr-90. The applicable NRC guidelines for Sr-90 surface activity levels are (NRC 1987):

Total Activity

1,000 dpm/100 cm², averaged over a 1 m² area 3,000 dpm/100 cm², maximum in a 100 cm² area

Removable Activity

200 dpm/100 cm², removable

Surface activity levels at 33 of the 35 direct measurement locations exceeded the maximum allowable residual surface activity guideline for Sr-90, ranging from 3,200 to 100,000 dpm/100 cm². Surface activity levels at the remaining two measurement locations exceeded the 1,000 dpm/100 cm² average surface activity guideline with total beta activity of 1,900 and 2,000 dpm/100 cm². Removable activity levels at all direct measurement locations are less than the guideline.

The NRC guideline for exposure rates at 1 m above the surface for interior areas is 5 μ R/h above background (NRC 1991). All site exposure rates were within the guideline limit.

The soil concentration guideline for enriched uranium is 30 pCi/g (NRC 1981). All three of the soil samples collected from the sump exceed this guideline. Site-specific soil concentration guidelines for the other radionuclides identified (Eu-152, Am-241, Pu-238 and -239, Cs-137, and Sr-90) at this site have not been established; therefore, a comparison could not be made.

SUMMARY

On November 4 and 5, 1995, ESSAP performed a radiological scoping survey of portions of the former Nuclear Laundry Rental Services, Inc. building and adjacent grounds in Jeannette, Pennsylvania. The survey included surface scans; direct measurements of total and removable surface activity; exposure rate measurements; and soil, residue, and paint/concrete sampling.

Survey results showed that numerous locations of residual fixed beta contamination in excess of the NRC guidelines for release to unrestricted use are present on the floor and lower walls in the former contaminated laundry area on the ground floor level, in a basement room directly beneath the contaminated laundry area, and in the sump. Interior exposure rate were all within the NRC guideline of 5 μ R/h above background. Exterior surface scans did not identify any locations of elevated surface activity.

The analytical results of samples collected identified concentrations of enriched uranium exceeding guideline levels in soil samples collected in the sump. Laboratory analyses also identified elevated concentrations of Eu-154, Cs-137, Am-241, Sr-90, and Pu-238 and 239 in soil and residue samples.

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FIGURE 1: Map Showing Location of Jeannette, Pennsylvania



FIGURE 2: Former Nuclear Laundry Rental Services — Main Floor Showing Suspect Areas

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FIGURE 3: Former Nuclear Laundry Rental Services - Basement Showing Suspect Areas





FIGURE 4: Main Floor, Contaminated Laundry Area -Measurement and Sampling Locations





FIGURE 5: Main Floor, Non-Suspect Areas - Measurement and Sampling Locations

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TABLE 1

SUMMARY OF SURFACE ACTIVITY MEASUREMENTS FORMER NUCLEAR LAUNDRY RENTAL SERVICES, INC. SITE JEANNETTE, PENNSYLVANIA

Location	Single-Point Measurements Total Beta Activity	Removable Activity (dpm/100 cm ²)		
	(dpm/100 cm ²)	Alpha	Beta	
First Floor Susp	ect Area*			
Location #1	50,000/<270 ^b	<12	<16	
Location #2	4,500	<12	<16	
Location #3	5,200	<12	<16	
Location #4	66,000	<12	<16	
Location #5	13,000	<12	<16	
Location #6	4,600	<12	<16	
Location #7	13,000	<12	<16	
Location #8	18,000	<12	<16	
Location #9	3,500	<12	<16	
Location #10	5,700	<12	<16	
Location #11	5,700	<12	<16	
Location #12	23,000	<12	<16	
Location #13	26,000	<12	<16	
Location #14	61,000/380 ^b	<12	<16	
Location #15	40,000/3,800 ^b	<12	<16	
Location #16	3,700	<12	<16	
Location #17	20,000	<12	<16	
Location #18	14,000	<12	<16	
Location #19	7,900	<12	<16	
Location #20	5,500	<12	<16	

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TABLE 1 (continued)

SUMMARY OF SURFACE ACTIVITY MEASUREMENTS FORMER NUCLEAR LAUNDRY RENTAL SERVICES, INC. SITE JEANNETTE, PENNSYLVANIA

Location	Single-Point Measurements Total Beta Activity	Removable Activity (dpm/100 cm ²)		
	(dpm/100 cm ²)	Alpha	Beta	
First Floor Susp	ect Area [*] (continued)			
Location #21	21,000	<12	<16	
Location #22	21,000	<12	<16	
Location #23	6,600	<12	<16	
Location #24	3,200	<12	<16	
Location #25	4,800	<12	<16	
First Floor Non-	Suspect Area ^c			
Location #26	17,000	<12	<16	
Location #27	8,600	<12	<16	
Location #28	22,000	<12	<16	
Location #29	100,000/630 ^b	<12	<16	
Basement Suspec	et Room ^d			
Location #30	12,000	<12	<16	
Location #31	6,300	<12	<16	
Location #32	11,000	<12	<16	
Location #33	2,000	<12	<16	
Location #34	1,900	<12	<16	
Sump*				
Location #35	23,000	<12	<16	

*Refer to Figure 4. *Direct measurement activity before and after paint/concrete sampling. *Refer to Figure 5. *Refer to Figure 6.

TABLE 2

INTERIOR BACKGROUND AND SITE EXPOSURE RATES FORMER NUCLEAR LAUNDRY RENTAL SERVICES, INC. SITE JEANNETTE, PENNSYLVANIA

Location [*]	Exposure Rate at 1 m Above Surface (µR/h)			
Background				
Location #1 (Loading Dock Area)	6			
Location #2 (Second Floor)	7			
Location #3 (Second Floor Offices)	5			
Location #4 (East Addition)	6			
Main Floor				
Location #1	8			
Location #2	5			
Location #3	6			
Location #4	7			
Basement Room				
Location #1	7			
Location #2	5			
Location #3	7			
Location #4 (Cump)	10			

*Refer to Figures 5 and 6.

TABLE 3

RADIONUCLIDE CONCENTRATIONS IN SOIL SAMPLES FORMER NUCLEAR LAUNDRY SERVICES, INC. SITE ANNETTE, PENNSYLVANIA

Location*	Radionuclide Concentrations (pCi/g)								
	Co-60	Cs-137	Eu-154	Am-241	Pu-238	Pu-239	U-235	U-238	Total Uranium
Corehole #1	<0.1	<0.1	<0.3	<0.1	N/A ^c	N/A	<0.1	1.6 ± 1.5 ^d	<3.9
Corehole #2	<0.1	0.1 ± 0.1	<0.3	<0.1	* A	N/A	0.4 ± 0.1	0.9 ± 1.2	10.4
Sump #1	1.8 ± 0.2	18.4 ± 0.5	<0.4	0.4 ± 0.2	0.1 ± 0.2	0.1 ± 0.1	7.9 ± 0.3	7.0 ± 1.8	188.7
Sump #2 (A) ^e	3.9 ± 0.4	410 ± 3.0	4.2 ± 1.2	18.8 ± 1.0	20.1 ± 3.4	10.4 ± 1.8	5.8 ± 0.7	9.1 ± 5.0	142.5
Sump #2 (B) ^e	<0.1	18,000 ± 61	320 ± 47	49 ± 14	N/A	N/A	<17.6	<220	f
Sump #3	0.8 ± 0.2	3.2 ± 0.2	<0.5	<0.3	11.7 ± 1.7	12.0 ± 1.7	3.7 ± 0.2	4.6 ± 1.8	89.7

*Refer to Figures 7 and 8.

^bTotal uranium concentrations were calculated based on a 22 to 1 ratio for U-234:U-235 as determined by alpha spectrometry analysis. ^cAnalysis not performed.

^dUncertainties represent the 95% confidence level, based only on counting statistics.

*Sump sample number 2 was split into two samples to better meet the counting systems geometry requirements.

^fCalculation was not performed due to large minimum detectable concentrations for U-235 and U-238.

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REFERENCES

U. S. Nuclear Regulatory Commission. Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Liconses for Byproduct, Source, or Special Nuclear Material. Washington, D.C.: NRC; August 1987.

U.S. Nuclear Regulatory Commission. Policy and Guideli ve Directive FC91-2, Standard Review Plan: Evaluating Decommissioning Plans for Licensees Under 10 CFR Parts 30, 40, and 70. August 1991.

U. S. Nuclear Regulatory Commission. Letter from John D. Kinneman (U. S. Nuclear Regulatory Commission) to Ms. Karen Backus, (Kitchen-N-Appliance Wholesalers), RE: "Inspection Report Number 9999-0001/94-020," November 18, 1994.

Oak Ridge Institute for Science and Education. Final Scoping Survey Plan for the Former Nuclear Laundry Rental Services, Inc., Jeannette, Pennsylvania. Oak Ridge, TN; October 1995.