U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 999-90003/94040(DRSS)

License No. SNM-1461 (terminated)
Docket No. 070-01489 (terminated)

Licensee: Goodyear Aerospace Corporation
Akron, Ohio 44315

Inspection At: Goodyear Tire and Rubber Company
Wingfoot Lake Advanced Technology Center
Blimp Hangar No. 91
Portage County, Ohio
--and--
residential homes, churches and schools located in Portage, Springfield and Summit Counties, Ohio

Inspection Conducted: April 25-July 8, 1994

Inspectors: Gregg M. McCann for
D. G. Wiedeman
Senior Health Physicist
07/15/94
Date

W. G. Snell
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Date

Approved By: Gregg M. McCann
G. M. McCann, Chief
Fuel Facilities and Decommissioning Section
07/15/94
Date

Inspection Summary

Inspection on April 25-July 8, 1994 (Report No. 999-90003/94040(DRSS))
Areas Inspected: This was a special inspection to review the former licensee's activities and to determine if licensed materials were properly transferred to an authorized recipient and buildings used under the former NRC license were properly decontaminated prior to the termination of the license. The inspectors conducted an independent review of transfer records and performed radiation surveys in the licensee's building that was used for research and testing. This inspection also included an assessment of the off-site (unrestricted) areas to determine the potential for radiological environmental contamination.

Results: All licensed materials possessed under NRC License No. SNM-1461 were properly transferred to the U.S. Department of Energy during the period 1975-1985 and all unrecoverable material was transferred to Teledyne Isotopes for disposal. All buildings and facilities formerly covered under the license were free of residual contamination. The results of all off-site water, soil, sediment and fish sample analyses showed that levels of uranium (U-238, U-235, and U-234) were below the NRC unrestricted release criteria.

DETAILS

1. Persons Contacted

* Harry Weaver, Maintenance, Goodyear Tire and Rubber Company (GT&RC)
* Joseph Smerglia, Principal Engineer, GT&RC
* Edward Puhala, Industrial Hygiene Consultant, GT&RC
* Thomas Riley, Manager of Airship Operations, Wingfoot Facility, GT&RC
* ≈25 employees from Loral, Goodyear contractor, Wingfoot Facility, GT&RC
\# Joe Holtshouser, Manager, Industrial Health Management Services
Daniel Laskos, Business Manager, Springfield Local Schools, Akron, Ohio
Tucker Self, Superintendent of Schools, Springfield Local Schools
C. Maurice Oatley, Assistant Superintendent of Schools, Field Local School District
@ Michael Bolas, Project Coordinator, Ohio Environmental Protection Agency (OEPA)
@ Rodney Beals, Environmental Manager, OEPA
@ Louise Fabeniski, U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR)
@ J. Wentz, U.S. Environmental Protection Agency, Region V
@ Janice McCourt, Office of Senator Metzenbaum, Ohio
@ Tammy Proctor, Photojournalist, Hartville News, Hartville, Ohio
@ Concerned citizens from Summit and Portage Counties, Ohio
@ Martha Nelson, M.D., Health Commissioner, Summit County Health District
& Robert Hofer, Industrial Hygienist, Goodyear
& Todd Struttmann, Sharp and Associates, (Goodyear Contractor, Fuel Test Facility)

* Attended the exit meeting conducted on April 26, 1994.
\# Telephone conversation on May 19, 1994, regarding the results of laboratory analysis of samples collected at the time of the inspection.
@ Attended meeting at Summit County Health District Office on April 29, 1994.
& Attended the exit meeting conducted on June 22, 1994.

2. Background

The Atomic Energy Commission (AEC) issued License No. SNM-1461 to Goodyear Aerospace on January 14, 1974, (Part 2 of the application contained DOE "Secret-RD" information) for research and development of uranium enrichment equipment (gas centrifuge). Handling of radioactive materials involved the use of uranium hexafluoride (UF_6) in 50 lb. cylinders, which would be piped into experimental centrifuges used to test different rotor designs. The centrifuges were located in a pit area in a blimp hanger (No. 91). Buildings 85 and 90 were also associated with the operations. The centrifuge process produced both

depleted and enriched uranium (U-235). All licensed material was procured from the U.S. Department of Energy (DOE) and upon completion of the experiment, the enriched and depleted uranium was transferred back to DOE. The licensee monitored air and water effluents from the Wingfoot facility during this research from 1974-1985.

Previous NRC inspections in 1979 and 1982 verified that no effluent or airborne releases of radioactive materials either on-site or off-site exceeded the NRC limits. The licensee performed a close-out survey of the facility and requested termination of the license on January 16, 1985. The NRC requested its contractor, Oak Ridge Associated Universities (ORAU), to perform a confirmatory survey which was conducted from May through August 1986. The first two surveys identified areas within the facility which were contaminated above the NRC release criteria, the third and final survey concluded that all areas of contamination had been identified. ORAU performed final confirmatory surveys in June and August 1986. The areas identified as exceeding the release criteria during the first two surveys were found to have been remediated to below the NRC release limits.

3. Independent Measurements

Independent radiation surveys were performed with a Victoreen Model 190 portable survey instrument with a Model RP-1 pancake probe, NRC Tag No. 040608, and Ludlum Model 19, NRC Tag No. 015522, calibrated on February 14, 1994 and July 28, 1993, respectively. Prior to the surveys all instruments were checked for accuracy and constancy with dedicated and traceable check sources. All instruments responded as expected.

Comparative background radiation measurements were taken in the downtown area of Akron, Ohio with the Victoreen Model 190 and Ludlum Model 19 portable survey instruments. Background measured 45-55 counts per minute (cpm) with the Victoreen and 7-15 microroentgens per hour (μR/h) (1.8-3.8 nanocoulomb per kilogram per hour (nC/kg/h)) with the Ludlum.

The inspectors conducted radiation surveys in and around selected areas in blimp hanger No. 91 which included: Grid blocks B-80 through P-80+. (See Attachment A for grid block locations.) All five floors of the underground shielded structure that once housed the centrifuge unit were also surveyed. The areas surveyed included hallways, offices, former research and storage areas, former research laboratories and areas outside the building. The NRC inspectors' survey of the above referenced rooms, buildings and adjacent property did not identify any radiation levels that exceeded the NRC release criteria. Three areas of fixed contamination were identified in Grid Blocks G-52, H-56 and P-28. All of these areas of contamination were below the NRC unrestricted release criteria of 15,000 disintegrations per minute (dpm), with the highest reading at 400 cpm (1200 dpm). The NRC release criteria is contained in the NRC Guidance Directive FC 83-23, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material", revised August 1987.

Radiation surveys were conducted along the roadways of Waterloo Road to Summit to Sanitarium to Route 224. No radiation levels above natural background were identified. Additional radiation surveys were conducted in a residential home on Hutchison Drive in Suffield, Ohio. The surveys included the basement, living room, bedroom and kitchen. These surveys did not identify any radiation levels above natural background. The inspectors also conducted a radiation survey in the garden of the property owner and did not identify any radiation levels above natural background.

4. Environmental Sampling

Wingfoot Lake Water

A four liter sample of lake water was collected following EPA collection protocols. This sample was analyzed by an NRC contractor, Oak Ridge Institute for Science and Education (ORISE). See Table 1 for laboratory results.

Monitoring Well

A four liter sample of water was collected following EPA and ORISE collection protocols from a 16 foot monitoring well on the south side of Wingfoot Lake Road on the Goodyear Fuel Test Facility site. This sample was analyzed by ORISE. See Table 1 for laboratory results.

Well Water

Ten four-liter samples were collected from deep and shallow wells in and around the Wingfoot Lake Advanced Technology Center following EPA and ORISE collection protocols. One of these samples was from a 160 foot well at the Goodyear facility and the other nine were from residential drinking water wells. These samples were analyzed by ORISE. See Table 1 for laboratory results.

Soil

Six soil samples were collected. Two samples identified as "Outfall" were taken from the discharge point of all storm water from blimp hanger No. 91 where it empties into Wingfoot Lake. Two samples identified as "Leach Field" were taken at the lowest discharge point for all sewerage discharges from blimp hanger No. 91. Two samples identified as "Spillway" were collected at the Wingfoot Lake discharge point near Waterloo Road as it enters the Fox ditch. See Table 2 for laboratory results.

Fish from Wingfoot Lake

On April 26, 1994 a fish was captured in a net in Wingfoot Lake to be used as an indicator of the levels of uranium in the sediment and water in the lake. The fish was split with Goodyear for independent analysis, with the NRC's portion of the fish shipped to ORISE for analysis. However, due to problems during laboratory preparation, the final quality assurance check showed the results to be unacceptable. Therefore, on June 22, 1994, two additional fish were captured in a net in Wingfoot Lake and shipped to ORISE for analysis. The results of the fish analysis indicated uranium levels of 3.84 ± 0.27 picocuries per kilogram (pCi/kg) {142 ± 10 millibecquerels per kilogram (mBq/kg)} U-234, 0.42 ± 0.01 pCi/kg (15.5 ± 0.4 mBq/kg) U-235, and 8.76 ± 0.41 pCi/kg (324 ± 15 mBq/kg) U-238.

Sediment

Five sediment samples were collected from Wingfoot Lake. Three samples were collected offshore from where the soil samples were collected. The other two samples were collected from locations in the middle of the lake. See Table 2 for laboratory results.

5. Laboratory Analysis

Smear Tests

Smear tests for removable activity were taken at one location where direct readings indicated levels of radiation below the NRC release criteria but in excess of background measurements. This smear test was analyzed in the Region III laboratory. The smear test was analyzed for gross alpha and gross beta activity. Results of the laboratory analysis for the smear test indicated that the contamination was not removable.

Conclusion: The contamination identified was below the NRC release levels for fixed contamination.

Water Samples

Twelve (12) water samples were collected during the inspections, which included the following: Wingfoot Lake, a 160 foot well and a 16 foot monitoring well located at the Wingfoot facility, and nine (9) residential drinking water samples from local homes which included both municipal water and private shallow wells. Table 1 below provides the results of the laboratory analysis of those samples.

TABLE 1: Water Analysis

Control No.	Location	Observations	Gross alpha/beta (1) pCi per liter	
			alpha	beta
37078	Wingfoot Lake	cloudy, contained biological material	<1.6	3.1±1.1
37077	Deep well, 160' deep Wingfoot	clear, no odors	<4.2	<3.7
37080	Residential Well, Hutchinson Rd. Suffield	clear, no odors	<6.5	<6.9
37079	Residential Well, Wingfoot Rd., Suffield	35' deep well, clear, sulfur odor	<2.1	<2.4
37081	Residential municipal water, Cuyahoga Falls	municipal water, clear, no odors	<3.4	<2.9
3700	Church Well, State Route 43, Suffield	clear, sulfur odor	<1.7	<1.8
37002	Residential Well, Goodyear Park Blvd., Suffield	clear, sulfur odor, evidence of high iron content	<6.4	<6.8
37003	Residential Well, Mishler Rd., Suffield	≈ 50' deep well, clear, sulfur odor, treated with softener	<4.2	<5.0
37004	Residential Well, Bey Road, Akron	≈ 35' deep well, clear, no odor	<2.4	6.8±1.4

Control No.	Location	Observations	Gross alpha/beta [1] pCi per liter	
			alpha	beta
00001	Residential Well, Glenview Dr., Suffield	clear, no odor	<2.2	19.7±2.0
00002	Residential Well, Glenview Dr., Suffield	clear, no odor	<2.6	5.9±1.8
7734	Monitoring Well MW-3	≈ 16' monitoring well, cloudy, benzene odor	<3.3	<4.0

[1] The U.S. EPA (National Interim Primary Drinking Water Regulations) limit is 15 pCi/liter gross alpha and 50 pCi/liter gross beta and total uranium should not exceed 30 picocuries per liter.

Conclusion: The NRC concludes that because none of the above water samples exceeded the U.S. EPA National Primary Drinking Water Regulations, the shallow and deep aquifers in and around the Goodyear Wingfoot Advanced Technology Center are not contaminated with radioactive material as a result of former NRC licensed activities at the Goodyear Wingfoot facility.

Soil

Six soil samples were collected and analyzed. The results of those analyses are shown in Table 2. The NRC release criteria for soil/sludge is described in the October 23, 1981 Federal Register, Branch Technical Position "Disposal or Onsite Storage of Thorium and Uranium Wastes from Past Operations". These limits are:

- natural uranium (U-238 plus U-234): 10 pCi/g
- depleted uranium: 35 pCi/g
- enriched uranium: 30 pCi/g

Conclusion: The NRC concludes that the soil samples do not exceed the NRC release criteria and the uranium concentrations found in the samples are within the range normally found in environmental soil samples.

Table 2: Soil/Sediment Analysis[1]

Sample No.	Sample Identification	uranium-234 pCi/g	uranium-235 pCi/g	uranium-238 pCi/g
001	Outfall #1	<1.0	<1.0	<1.0
002	Outfall #2	<1.0	<1.0	<1.0
003	Leach Field #1	<1.0	<1.0	<1.0
004	Leach Field #2	<1.0	<1.0	<1.0
005	Spillway #1	<1.0	<1.0	<1.0
006	Spillway #2	<1.0	<1.0	<1.0
007	Sediment #1	<1.0	ND[2]	<1.0
008	Sediment #2	<1.2	ND[2]	<1.2
009	Sediment #3	<1.0	ND[2]	<1.0
010	Sediment #4	<1.0	ND[2]	<1.0
011	Sediment #5	<1.0	ND[2]	<1.0

(1) The average uranium concentration in U.S. soils is approximately 1.0 pCi/g (1.5 parts per million (ppm)). Higher levels of uranium are found in the surface soils of such areas as the Colorado Plateau, lands affected by phosphate tailings in Florida, and the Reading Prong in northeastern Pennsylvania. The world average concentration of uranium ranges from 0.2 to 2.0 pCi/g (0.3-3.0 ppm). (National Council on Radiation Protection, NCRP Report No. 94, 1987)

(2) None Detected

Fish and Sediment Samples

Two fish were prepared and analyzed for uranium. Because of the very low levels of uranium normally found in fish, a three day alpha spectrometry count was conducted. In reviewing the results of the fish sample, two issues were raised. The first was that based on our search of available scientific literature, we were unable to find acceptable data with which to compare our results. This resulted in our inability to reasonably assess the significance of the results. The second issue was when we compared the activities from U-238, U-235, and U-234 with each other, the contribution from U-234 appeared low. Because we could not explain the apparently low level of U-234, and due to the lack of comparable data, it was decided that the fish sample alone provided inconclusive evidence as to the level of uranium in Wingfoot Lake. Therefore, to provide a better assessment of the levels of uranium in the lake, on July 8, 1994, five sediment samples were taken from Wingfoot Lake. The results of the sediment samples are shown in Table 2.

Conclusion: The NRC concludes that the sediment samples do not exceed the NRC release criteria and the uranium concentrations found in the samples are within the range normally found in environmental soil samples.

6. Overall Conclusion

Based on our review of documentation and sample results, it is our conclusion that there is no uranium in excess of NRC release limits in the Goodyear Wingfoot Facility or the nearsite environment from the previously licensed activities conducted at that facility.

7. Exit Meeting

The NRC inspectors conducted exit meetings at the conclusion of the inspections with the individuals identified in Section 1 of this report and summarized the findings of the inspection. The inspectors informed the former licensee that it appeared that all licensed material formerly licensed under NRC Special Nuclear Material License No. SNM-1461 had been properly transferred prior to the termination of the license, and all remaining buildings used for licensed activities had been properly decommissioned. During the exit meetings, none of the participants indicated to the inspectors that any of the inspection findings or documents provided to the inspectors were considered proprietary.