U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 70-687/89-05

Docket No. 70-687

License No. SNM-639 Priority 1 Category UHBR

Licensee: Cintichem, Incorporated
P.O. Box 816
Tuxedo, New York 10987

Facility Name: Reactor and Hot Laboratory

Inspection At: Tuxedo, New York

Inspection Conducted: December 19, 1989

Inspector: Jason C. Jang 1-3-90
Jason C. Jang, Sr. Radiation Specialist date
Effluents Radiation Protection Section

Approved by: Robert J. Bores 1-03-90
Robert J. Bores, Chief, Effluents Radiation Protection Section, Division of Radiation Safety and Safeguards date

Inspection Summary: Inspection on December 19, 1989 (Inspection Report Number 70-687/89-05)

Areas Inspected: Special, announced inspection of the licensee's actions taken to identify the sources of contamination in the storm drain and collect several environmental samples on which to perform independent measurements in the NRC Region I Laboratory.

Result: Analytical results of environmental samples indicate that there were recent radioactive liquid releases into the retention pond, however, there was no evidence of measurable offsite environmental releases.

DETAILS

1.0 Individuals Contacted

1.1 Cintichem, Inc.

*J. McGovern, Plant Manager
*T. Vaughn, Manager, Health, Safety, and Environmental Affairs
*J. Guenther, Staff Health Physicist
*L. Thelin, Staff Health Physicist
*T. Rice, Health Physicist Technician III

1.2 State of New York

*S. Zobel, Environmental Radiation Specialist II, Department of Environmental Conservation, Bureau of Radiation
*W. Varcasio, Environmental Radiation Specialist I, Department of Environmental Conservation, Bureau of Radiation
*J. Zeglen, Environmental Radiation Specialist I, Department of Environmental Conservation, Bureau of Radiation
*R. Pratt, Associate Radiophysicist, Division of Safety and Health, Department of Labor

*Denotes those present at the exit interview on December 19, 1989.

2.0 Purpose

The purpose of this special inspection was (1) to observe actions taken by the licensee to eliminate contamination in storm drain water, (2) to review future plans to identify the sources of contamination in storm drain water (Reference licensee's letter dated December 14, 1989), and (3) to collect ground water and environmental samples for independent measurement in the NRC Region I Laboratory.

3.0 Background

During April 1989 the licensee identified a possible discharge of slightly contaminated water through a storm drain located in the onsite parking lot (See Figure 1 for detail of sampling points). This storm drain is used to catch the runoff from (1) the parking lot, (2) Building 3 (Engineering and Maintenance Warehouse), and (3) possibly from the hot laboratory building (Building 2) area, including the roof of the building. Water collected in the storm drain discharges into a retention pond (sampling point S-5) and then flows to the Indian Kill Reservoir. The licensee identified elevated radioiodine (I-131) levels in water in the same storm drain in the parking lot (sampling point S-4) on November 28, 1989 through the routine monthly environmental surveillance program. The November 28 measurement of I-131

was 3.0E-6 uCi/ml at the storm drain. Normally, the I-131 concentration of the storm drain water is below the minimum detectable level (MDL). The licensee measured I-131 in the storm drain water again on December 6, and December 11, 1989 and the results were 2.5E-7 uCi/ml and less than 1.0E-7 uCi/ml, respectively.

The licensee also measured a wet sediment sample collected from the storm drain discharge point (S-5) on December 12, 1989. The analytical result for I-131 was approximately 1.0E-6 uCi/ml. The licensee determined that the contamination from the storm drain discharge to the retention pond was limited to an area within a 10-foot radius from the end of the discharge pipe.

The licensee also measured water samples collected from the retention pond outfall (002 Outfall, Sampling Point S-1) and the analytical results for I-131 were less than 1.0E-8 uCi/ml. Water samples collected from the storm drain outfall at the visitors parking lot (Sampling Point S-3) indicated background levels for I-131.

Based on the above analytical results, there was no evidence of measurable offsite environmental releases.

4.0 Licensee's Investigation and Corrective Actions

4.1 Leak from the Ventilation Duct

As stated in the licensee's letter dated on December 14, 1989, the licensee believed that a leak had developed in the hot cell exhaust duct between the hot cell filter bank and the main filter bank (containing charcoal beds) for the hot laboratory. This leak allowed contaminated air to flow through a cavity located underneath the T-1 room, the hot cell filter bank, and the duct under the hot laboratory. There was evidence of soil and water contamination in this cavity. The cavity is enclosed by the building floor, walls, foundation, and bed rock. There is no indication of an obvious leak from the cavity to the environment. The cavity became a part of the ventilation duct system because there was no pressure differential between the ventilation duct and the cavity, both negative with respect to atmosphere. The licensee drilled a hole into the cavity to increase the pressure in the cavity to atmospheric on December 8, 1989. This action was expected to assure that air flow was only through the duct and not through the cavity and the duct. This action was also expected to prevent contamination of the cavity, which in turn should reduce the contamination level at the storm drain (Sampling Point S-4), as a result of water intrusion of the cavity. The licensee conducted a smoke test to verify that air flow was from the cavity into the duct and from the surrounding area into the cavity. The licensee further believed that these actions were successful in reducing the contamination level because activity of I-131 in the storm drain water was reduced between December 6 and December 11, 1989.

The inspector was informed that the licensee remotely inspected the inside of the duct, located between the main filter bank and the filter room plenum, using a video camera on December 15, 1989. The licensee could not see any obvious cracks or holes. The licensee plans to inspect the inside of the duct, between the hot cells and the main filter bank, as soon as possible. The licensee stated that the result of this investigation will be forwarded to the NRC.

The inspector discussed the investigation and corrective actions taken with the licensee since the air flow from a wet cavity to the ventilation duct could degrade the integrity of the charcoal beds in the main filter bank. This degradation could occur because the moisture or ground water in the cavity could be pulled into the main filter bank through the ventilation duct and reduce the iodine adsorption capacity of the charcoal beds. The inspector stated that the integrity of the charcoal beds in the main filter bank should be examined to evaluate the effect of moisture intrusion on the main filter bank. This was identified as an inspector followup item (70-687/89-05-01).

4.2 Other Possible Contamination Sources

The inspector discussed other possible ground water contamination sources with the licensee. These included radioactive liquid leaks from pipes and holdup tanks. The licensee stated that there was no evidence of radioactive liquid leaks from pipes. The licensee, however, dug three water wells on the west edge of the parking lot between Buildings 3 and 5 and will analyze any water found in these wells in an attempt to trace the source of the leak. These wells were dry as of the date of this inspection.

5.0 Environmental Samples and Analytical Results

Three environmental samples, one water sample and two wet soil/silt samples, were collected during this inspection to perform an independent measurement in the NRC Region I Laboratory. The water sample collected at the storm drain (sampling point S-4) was split among the licensee, representatives of New York State, and the NRC. The flow rate of the storm drain water at the sampling time was approximately 0.6 gallons per minute. Wet soil/silt samples at the outfall of the storm drain in a retention pond (sampling point S-5), and outfall of the retention pond (sampling point S-1), were collected by the NRC for analysis of iodines and long half-life radionuclides.

The analytical results of these samples are listed in the following table.

The analytical results of the storm water samples for I-131 and I-133 were 3.457E-5 uCi/ml and 7.5E-6 uCi/ml, respectively, as shown in the table. The analytical result of I-131 was about a factor of 10 higher than the previously reported licensee's sample (November 28, 1989).

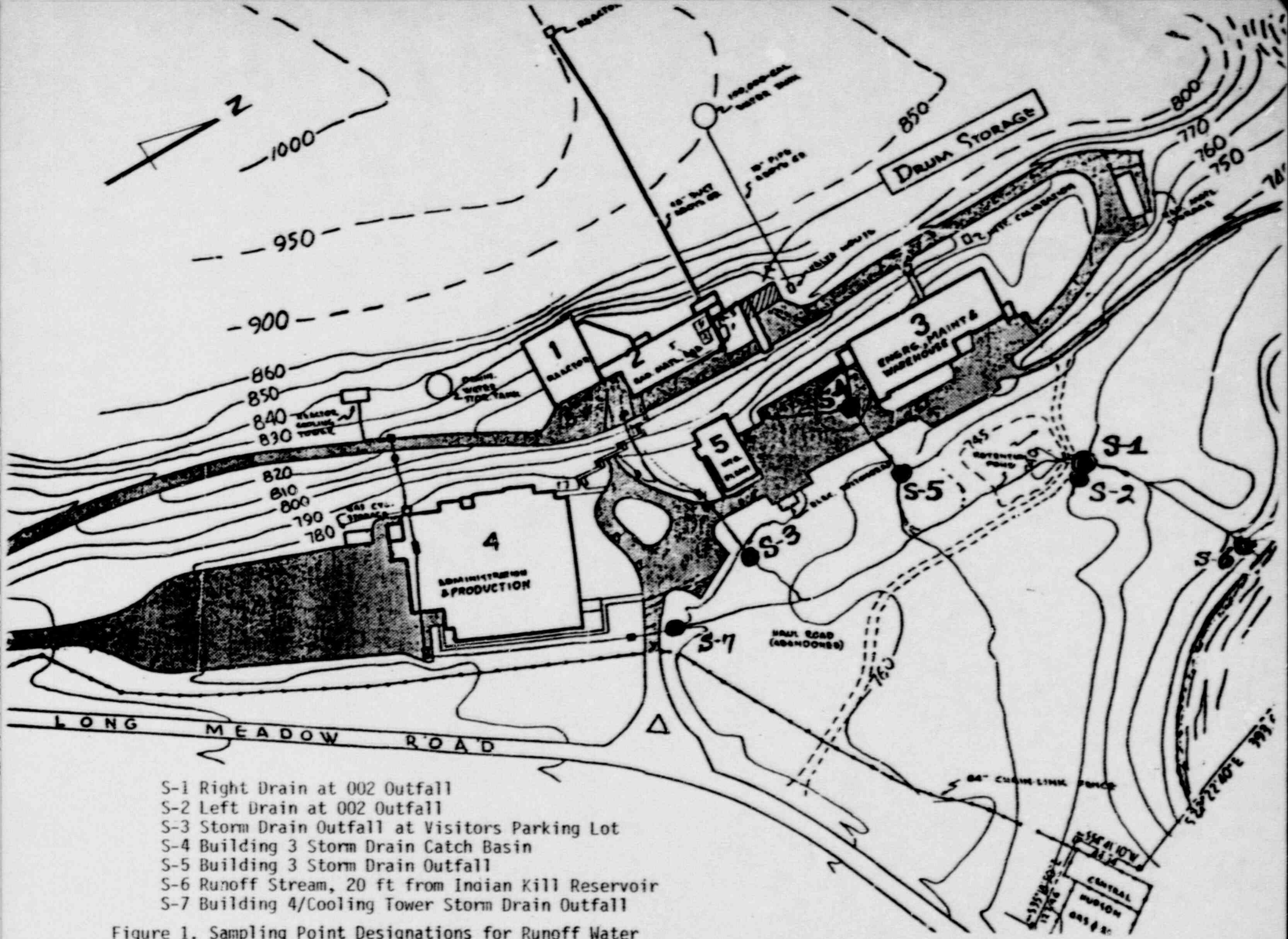
An immediate telephone call was made to discuss those analytical results with the licensee on December 21, 1989. The licensee's analytical results of I-131 and I-133 were about a factor of 2 lower than the NRC's results due to the licensee's gamma counting geometry correction. The licensee is currently developing the counting geometry, therefore, analytical results will be confirmed by the contractor laboratory. The presence of Mo-99/Tc-99m was also confirmed in this storm drain water sample by the licensee and the NRC. This suggests that a leakage pathway other than the ventilation system may be involved. The licensee initiated actions to investigate other possible pathways including leakage from the reactor water, reactor water transfer pool, and liquid radwaste transfer pipes. The licensee also increased sampling frequency to daily at the storm drain (S-4), outfall of the storm drain (S-5), and outfall of the retention pond (S-1).

The analytical results of the storm drain outfall soil sample indicated that there were recent radioactive liquid releases in the retention pond because short half-life activation/fission product radionuclides were identified in the soil sample as shown in the following table. However, there was no evidence of measurable offsite environmental releases since there was no indication of activation/fission product radionuclides associated with facility operations in the retention pond outfall soil sample. The level of Cs-137 in the retention pond outfall soil sample was consistent with the level normally seen as a result of world-wide fallout due to nuclear weapons testing.

Sample ID	Sample Type	Radionuclide	Activity
			Unit = uCi/ml
S-4	Storm Drain Water	I-131	(3.457+/-0.007)E-5
	12/19/89 @1315 hr	I-133	(7.50+/-1.03)E-6
			Unit = uCi/gram wet
S-5	Wet Soil/Silt	I-131	(3.543+/-0.003)E-5
	Storm Drain Outfall	I-133	(1.1+/-0.4)E-6
	12/19/89	Cs-137	(1.98+/-0.11)E-6
		Cs-134	(6.1+/-0.7)E-7
		Zr-95	(1.96+/-0.13)E-6
		Nb-95	(3.96+/-0.12)E-6
		Mo-99/Tc-99m	(6.5+/-1.7)E-5
		Ru-103	(4.3+/-0.8)E-7
		Sb-125	(1.5+/-0.2)E-6
		Ce-144	(7.5+/-0.8)E-6
S-1	Wet Soil/Silt	Cs-137	(8.2+/-0.4)E-7
	Retention Pond Outfall		
	12/19/89		

6.0 Exit Interview

The inspector met the licensee representatives (denoted in Section 1.0) at the conclusion of the inspection on December 19, 1989. The inspector summarized the purpose and findings of the inspection.



S-1 Right Drain at 002 Outfall
S-2 Left Drain at 002 Outfall
S-3 Storm Drain Outfall at Visitors Parking Lot
S-4 Building 3 Storm Drain Catch Basin
S-5 Building 3 Storm Drain Outfall
S-6 Runoff Stream, 20 ft from Indian Kill Reservoir
S-7 Building 4/Cooling Tower Storm Drain Outfall

Figure 1. Sampling Point Designations for Runoff Water