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UNITED NUCLEAR CORPORATION - LAUNDRY AND STACK EFFLUENTS AT
HEMATITE (SNM-33) AND WOOD RIVER JUNCTION (SNM-777)

LAUNDRY EFFLUENTS

A review of the inspection backup notes does not indicate that special samples have been taken of laundry effluent. The laundry effluent is one of several streams that enter the plant lagoon or pond. The effluent from the lagoon or pond is monitored to determine compliance with 10 CFR 20 unrestricted limit of 3×10^{-5} uCi/ml at Wood River Junction and Hematite.

Hematite Laundry Effluent

The last report that records exact discharge concentrations for the pond was in the November 1966 report. Wastes from the sinks, showers, and laundry are sent to a holding pond and discharged to the creek. A proportional (i.e., sample rate changes with flow rate) flow sample is analyzed weekly and a monthly grab sample is taken in the creek above and below the pond discharge. These samples are analyzed by the Mallinckrodt Laboratory in St. Louis, Missouri. The weekly sample results for 1966 ranged from 2.5×10^{-8} to 6.9×10^{-8} uCi/ml with a single sample indicating a 1.5×10^{-7} uCi/ml concentration. Sample results for the creek ranged from $.045 \times 10^{-8}$ to 6.3×10^{-8} uCi/ml. The report did not indicate the total flow but, at an average concentration of 6.3×10^{-8} uCi/ml, each 10,000 gallons would contain .041 grams of uranium at 93% U-235 enrichment.

Wood River Junction Effluent

The March 1966 backup notes indicated that no discharges from the lagoon exceed 2×10^{-7} uCi/ml but no volumes were included. The laundry effluent is sent to the lagoon with other process wastes. The backup notes for the December 1966 inspection indicates that six discharges were made from the lagoon to that date for 1966. The total volume was 12,195 gallons and the concentrations were 1 dpm/ml or less. (1 dpm/ml = 7×10^{-7} uCi/ml). This would indicate a discharge of .04 grams of uranium at 93% U-235 enrichment.

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The data from lagoon or pond effluents does not lead to a direct result of the amount of material placed in the system. Settling of non-soluble material and pH adjustment with precipitation may cause uranium to be removed from the stream between plant discharge and lagoon or pond discharge.

STACK EFFLUENTS

The ventilation systems at both facilities are poorly designed, especially, with respect to sampling capabilities. This short-coming has been receiving more attention from DML on new applications during the last two or three years.

Hematite Stack Effluents

Hematite has 107 process stacks. It has been estimated that approximately 80 of these do not involve any appreciable SRM effluent. A few of the remaining stacks are the more significant with respect to effluents. Continuous air samplers at the four corners of the perimeter fence are utilized to determine compliance with 10 CFR 20 limits. Monthly averages of 50 to 100 samples were indicated to be well below 2×10^{-12} uCi/ml during March 1967, December, 1967 and March 1968 inspections. Sampling of stacks has been minimal some months and served only to indicate problem stacks. The March 1967 backup notes indicate that 57 stack samples were taken from November 1966 thru February 1967. Ten of these samples exceed 4×10^{-12} uCi/ml with the highest being 7.9×10^{-10} uCi/ml which was an unfiltered stack that has since had an absolute filter inserted in the system. The December 1967 backup notes indicated stack sampling to be minimal. The air sampling program was discussed with the licensee and a "592" citation was issued for failure to properly evaluate a high restricted area sample. It was indicated during the March 1968 backup notes that 47 stack samples were taken in January and, due to bad weather, only 10 samples were taken in February. It was stated that only one restricted area sample was above 10 CFR 20 limit for the 800 to 900 samples a month taken for the total air sample program (restricted and unrestricted area samples). The flow rate or volume throughput is not given for the stacks. (A 10,000 CFM blower operating 24 hours at the 10 CFR 20 limit of 2×10^{-12} uCi/ml would discharge 0.01 grams of uranium at 93% U-235 enrichment. Due to the amount of low enriched material processed, it appears that the unrestricted limit was reduced from 4×10^{-12} to 2×10^{-12} uCi/ml between the March 1967 and December 1967 inspections).

Wood River Junction Stack Effluents

The 11 months average for January thru November 1967 was reported in the December 1967 backup notes to be 7.8 dpm/m³. (4×10^{-12} uCi/ml = 8.8 dpm/m³). The March 1966 backup notes indicate that a conservative plant air capacity is 10¹⁵ ml/yr. This volume times the 1967 average concentration indicates the discharge of about 106 grams of uranium at 93% U-235 enrichment. There are 16 stacks. Some stacks are sampled daily, some only when used, and others are sampled just to comply with the Health Physics Manual which states that all stacks will be sampled at least once a quarter after it has been established that excessive concentrations are not released.

None of the air stacks at Hematite or Wood River Junction have constant samplers since the large number would be prohibitive. A considerable amount of sampling is done, but positive assurance of the exact discharge would require constant sampling of all stacks during operation. The licensee has been considering methods of connecting the various stacks in order to place a few constant samplers on their air effluent but no progress has resulted as yet.

Original Signed
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