

undated

# Office Memorandum • UNITED STATES GOVERNMENT

TO : Lyall Johnson, Chief, Licensing Branch  
 Division of Licensing and Regulation

FROM : Lester R. Rogers, Chief, Radiation Safety Branch  
 Division of Licensing and Regulation

SUBJECT: MALLINCKRODT CHEMICAL WORKS, ST. LOUIS, MISSOURI

DATE:

SYMBOL: DLR:RFB

### Conclusion

It appears that the use and subsequent disposal of the ammonium fluoride solutions at the St. Louis Plant would be satisfactory from the radiological health standpoint.

### References

Application dated 7 April 1958 to dispose of waste in the Mississippi River, Mallinckrodt Corporation, St. Louis.

### Material

The ammonium fluoride solution is made at the Hematite Plant and contains an average maximum of 50 ppm soluble uranium with a normal range of some 5-20 ppm.

### Proposal:

Transport by tank trucks 3500 gallons per load (maximum of 2 loads per week)\* to St. Louis from Hematite. At St. Louis the fluorides will be used in the processing of and the waste released through the St. Louis plant sewer directly to the Mississippi River (estimated minimum sewer flow 500 gpm).\* At present the fluoride is treated with lime, calcium fluoride precipitated and the clarified waste discharged into the Hematite River.

### Quantity Calculations

Assumed maximum concentration 50 ppm in water. Unrestricted area MPC in water equals 11.4 ppm for normal uranium and 0.11 ppm for 93% enriched uranium both based on  $7 \times 10^{-6}$  uc/cc.

50 ppm is approximately  $2 \times 10^{-2}$  g of uranium per gallon. Then, 3500 gallons per truckload would be 70 g/truck. The dilution of truckload concentration assuming a 3500 gallons per day and a sewer flow of 500 gpm or  $24 \times 10^4$  g/8 hr. day would result in a release of approximately 0.5 ppm in the sewer. This is well below the permissible concentrations for normal and only five times the enriched value.

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It is stated in the letter that 89% of the effluent comes from material with a maximum enrichment of 5% U-235. Since only 1% comes from a 93% enriched, the concentrations which result from the release of the material based on the calculation above should not exceed the permissible limits in Part 20 for release into an unrestricted area.

License Condition

The license should specifically include this method of disposal.