

ESTABLISHED 1867

MALLINCKRODT CHEMICAL WORKS

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FINE CHEMICALS FOR MEDICINAL, PHOTOGRAPHIC
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FEBRUARY 8, 1960

SECOND AND MALLINCKRODT STS ST. LOUIS, 7. MO.

DOCKET NO. 40-3390

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MR. LYALL JOHNSON, CHIEF
LICENSING BRANCH
DIVISION OF LICENSING AND REGULATION
U. S. ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

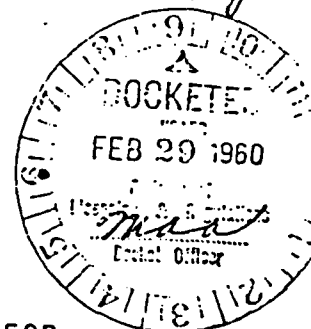
SUBJECT: APPLICATION FOR AMENDMENT OF SOURCE MATERIAL
LICENSE No. R-226

DEAR MR. JOHNSON:

UNDER THE PROVISIONS OF PART 20, "STANDARDS FOR PROTECTION AGAINST RADIATION," PARAGRAPH 20.103, CONCENTRATIONS IN EFFLUENTS TO UNRESTRICTED AREAS, A LICENSEE MAY APPLY FOR AN EXEMPTION FROM THE LIMITS SPECIFIED IN APPENDIX B, TABLE II, FOR THE CONCENTRATIONS OF RADIOACTIVE MATERIALS IN LIQUID WASTE EFFLUENTS TO UNRESTRICTED AREAS IF IT CAN BE DEMONSTRATED THAT IT IS NOT LIKELY THAT ANY INDIVIDUAL WILL BE EXPOSED IN EXCESS OF THE LIMITS ESTABLISHED IN APPENDIX B, TABLE II. MALLINCKRODT CHEMICAL WORKS WISHES TO APPLY FOR AN AMENDMENT TO LICENSE No. R-266 THEREBY ESTABLISHING THE CONCENTRATION LIMIT OF 10^{-5} MICRO-CURIES PER MILLILITER FOR UNIDENTIFIED ALPHA EMITTERS OR UNIDENTIFIED BETA EMITTERS IN LIQUID WASTE EFFLUENTS.

IN THIS RESPECT, THE FOLLOWING IS SUBMITTED FOR YOUR CONSIDERATION:

1. THE LICENSED FACILITY PROCESSES A EUXENITE ORE CONTAINING URANIUM WHICH IS ESSENTIALLY IN EQUILIBRIUM WITH ITS DECAY DAUGHTERS.
2. THE WASTE LIQUID EFFLUENT FROM THE PLANT ENTERS A COMPANY-OWNED SEWER WHICH HAS A



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Mallinckrodt
FINE CHEMICALS
Standard Since 1867

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NORMAL FLOW RATE OF APPROXIMATELY 1,230,000 GALLONS OF WATER PER TWENTY-FOUR HOURS. THE SEWER DISCHARGES CONTINUOUSLY INTO THE MISSISSIPPI RIVER AT A POINT WHERE COMPANY-OWNED PROPERTY ABUTS THE RIVER.

3. THE AVERAGE CONCENTRATION OF UNIDENTIFIED RADIOACTIVE MATERIALS IN THE EFFLUENT DISCHARGED INTO THE MISSISSIPPI RIVER, ASCERTAINED FROM FIFTY-TWO SAMPLES TAKEN OVER A PERIOD OF [SIXTEEN MONTHS,] IS 2.8×10^{-6} MICROCURIES OF ALPHA EMITTERS PER MILLILITER OF WATER AND 3.1×10^{-6} MICROCURIES OF BETA EMITTERS PER MILLILITER OF WATER.
4. PART 20, APPENDIX B, TABLE II, COLUMN 2, SPECIFIES 7×10^{-6} MICROCURIES PER MILLILITER AS THE MAXIMUM AVERAGE PERMISSIBLE CONCENTRATION FOR NATURAL URANIUM AND 1×10^{-7} MICROCURIES PER MILLILITER FOR UNIDENTIFIED ALPHA EMITTERS OR UNIDENTIFIED BETA EMITTERS IN LIQUID WASTE DISCHARGED INTO UNCONTROLLED AREAS.
5. THE ST. LOUIS OFFICE OF THE U. S. ARMY CORPS OF ENGINEERS REPORTS THAT THE LOWEST RECORDED FLOW IN THE MISSISSIPPI RIVER IN THE ST. LOUIS AREA IN THE PAST TWENTY YEARS WAS 28,000 CUBIC FEET PER SECOND, OR 1.81×10^{10} GALLONS PER TWENTY-FOUR HOURS. THE AVERAGE FLOW RATE IS APPROXIMATELY 222,000 CUBIC FEET PER SECOND, OR 1.43×10^{11} GALLONS PER TWENTY-FOUR HOURS.
6. A MAXIMUM AVERAGE DISCHARGE CONCENTRATION OF 1×10^{-5} MICROCURIES PER MILLILITER OF UNIDENTIFIED ALPHA OR BETA EMITTERS WOULD RESULT IN A CONCENTRATION OF 6.8×10^{-10} MICROCURIES PER MILLILITER IN THE RIVER AT MINIMUM FLOW LEVELS IF COMPLETE MIXING WERE ACCOMPLISHED. AT AVERAGE

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RIVER FLOW RATES THIS CONCENTRATION IN THE RIVER WOULD BE APPROXIMATELY 8.6×10^{-11} MICROCURIES PER MILLILITER IF COMPLETE DISPERSION WERE OBTAINED.

COMPLETE AND THOROUGH MIXING OF THE LIQUID WASTE EFFLUENT IN QUESTION WITH THE WATERS OF THE MISSISSIPPI RIVER CANNOT BE ASSUMED TO OCCUR FOR A CONSIDERABLE DISTANCE DOWNSTREAM. HOWEVER, IT SEEMS REASONABLE TO EXPECT THAT MIXING WILL BE AT LEAST IN THE ORDER OF ONE-THIRD TO ONE-HALF COMPLETE. AT A POINT SEVENTY MILES DOWNSTREAM, WHICH IS THE LOCATION OF THE CLOSEST POTABLE WATER SUPPLY INTAKE BELOW THE COMPANY'S OUTFALL SEWER. THE CONCENTRATION AT THAT POINT SHOULD BE IN THE RANGE OF 1.7×10^{-9} MICROCURIES PER MILLILITER, BASED UPON AN INITIAL SEWER EFFLUENT CONCENTRATION OF 10^{-5} MICROCURIES PER MILLILITER AND A MINIMUM RIVER FLOW OF 28,000 CUBIC FEET PER SECOND.

ON THE BASIS OF THE ABOVE, WE REQUEST YOUR CONSIDERATION OF AN AMENDMENT TO OUR LICENSE NO. R-266 TO PERMIT A MAXIMUM ANNUAL AVERAGE CONCENTRATION OF UNIDENTIFIED ALPHA AND UNIDENTIFIED BETA EMITTERS IN THE LIQUID WASTE EFFLUENTS DISCHARGED IN THE MISSISSIPPI RIVER OF 10^{-5} MICROCURIES PER MILLILITER.

IF YOU SHOULD REQUIRE ADDITIONAL INFORMATION, PLEASE NOTIFY US ACCORDINGLY.

SINCERELY,

MALLINCKRODT CHEMICAL WORKS

Victor H. Knoop
SECRETARY

V.H.KNOOP
JWM:MS