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UNITED NUCLEAR
CORPORATION
CHEMICALS DIVISION

MARCH 31, 1964

ROUTE 21-A
HEMATITE, MISSOURI
VIA AIR MAIL

MR. DONALD NUSSBAUMER
U. S. ATOMIC ENERGY COMMISSION
DIVISION OF LICENSING AND REGULATION
WASHINGTON 25, D. C.

SUBJECT: SNM-33 AMENDMENT TO PERMIT BLENDING FULLY ENRICHED UO_2
WITH NATURAL ThO_2 IN THE PELLET PLANT

- REFERENCE: 1) OUR LETTER OF MARCH 17, 1964 SUBJECT AS ABOVE.
2) YOUR LETTER OF DECEMBER 13, 1963 FORWARDING REQUEST
FOR ADDITIONAL INFORMATION RELATED TO RENEWAL OF SNM-33.

GENTLEMEN:

IT IS OUR PLAN TO FORWARD COMPLETE INFORMATION IN REPLY TO REFERENCE 2) BY APRIL 22, 1964. HOWEVER, IN ORDER TO HELP EXPEDITE YOUR ACTION ON THE SUBJECT LICENSE AMENDMENT QUESTIONS IN REFERENCE 2) SPECIFICALLY RELATED TO THE PELLET PLANT ARE ANSWERED BELOW. THE NUMBER REFERS TO THE ORDER AS LISTED IN REFERENCE 2).

QUESTION 19 HOLDUP OF URANIUM IN CENTERLESS GRINDER (255-2-7)

WATER IS USED AS A LUBRICANT AND WASHING AGENT ON PELLETS DURING GRINDING. THE WATER CIRCULATION SYSTEM HAS BEEN MODIFIED TO BY-PASS THE SUMP IN THE GRINDER ELIMINATING HOLD UP OF WATER IN THE GRINDER. THIS IS SHOWN ON THE ATTACHED SCHEMATIC. THE SMALL TANK ASSOCIATED WITH THE PUMP IS USED TO MAINTAIN CONTINUOUS SUCTION ON THE PUMPS. AN OVERFLOW LIMITS ITS VOLUME TO 27.9 LITERS. ASSUMING A MASS OF 12.4 KG UO_2 (SAFE AT 6% ENRICHMENT) ACCUMULATED IN THIS TANK, THE UO_2 CONCENTRATION IN THE WATER WOULD BE .45 KG/LITER. THIS HIGH OF A CONCENTRATION CAN NOT BE TOLERATED IN THE GRINDING OPERATION IN ORDER TO YIELD ACCEPTABLE PELLETS.

ALSO, ONLY .002" TO .003" ARE GROUND OFF THE PELLET DIAMETER. MANY SAFE BATCHES OF PELLETS MUST PASS THROUGH THE GRINDER BEFORE EVEN A SAFE MASS IS ACCUMULATED IN THE CIRCULATION SYSTEM. THIS COUPLED WITH THE CONTINUOUS REMOVAL OF UO_2 FROM THE WATER AND THE OPERATION REQUIREMENT TO KEEP THE CONCENTRATION² BELOW 450 GRAMS/LITER INSURES THAT A SAFE MASS WILL NOT BE EXCEEDED IN THE TANK.

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TO AVOID THE POSSIBILITY OF ACCUMULATION OF WHOLE OR BROKEN PELLETS IN THE GRINDER, A SCREEN IS INSTALLED UNDER THE WORK SUPPORT TO CATCH ANY PIECES OF PELLETS THAT MAY FALL OFF THE WORK SUPPORT DURING THE GRINDING PROCESS. ANY ACCUMULATION ON THIS SCREEN IS REMOVED AT THE END OF EACH SHIFT.

QUESTION 20 MOISTURE PICKUP FROM THE AIR

THE MINIMUM CRITICAL PARAMETER OF ENRICHMENTS LESS THAN 6 1/2% OCCUR AT H/U-235 RATIOS GREATER THAN 100.

THE UO_2 POWDER IS STORED IN SEALED DRUMS AND MOISTURE PICKUP FROM AIR IS LIMITED TO THAT AIR SEALED WITHIN THE DRUM. FAILURE OF PROCESS FURNACES USED IN CONVERTING ADU TO UO_2 WOULD RESULT IN INCOMPLETE CONVERSION OF UO_2 AND REJECTION OF THE AFFECTED MATERIAL.

IN THE CASE OF PELLETS, THESE ARE SOLID CERAMIC BODIES THAT HAVE BEEN SINTERED AT TEMPERATURES EXCEEDING $1000^{\circ}C$. PROCESS FAILURES THAT WOULD RESULT IN INCOMPLETE SINTERING WOULD BE IMMEDIATELY DETECTED AS A RESULT OF FAILURE OF MATERIAL TO ACHIEVE DENSITY SPECIFICATION. ABSORPTION OF MOISTURE FROM THE AIR WOULD BE LIMITED TO THE PELLET SURFACES. WE HAVE EXTENSIVE DATA THAT SHOWS SURFACE "MOISTURE" DOES NOT EXCEED 40 PPM ON A TOTAL WEIGHT BASIS.

QUESTION 22 IN PROCESS FLOOR STORAGE AND OUTSIDE STORAGE AREAS

PELLET PLANT

THERE IS NO FORK TRUCK OR OTHER POWERED VEHICULAR TRAFFIC IN THE PELLET PLANT DURING PRODUCTION ACTIVITIES. SUCH TRAFFIC IS REQUIRED ONLY FOR MAINTENANCE OR REPLACEMENT OF HEAVY EQUIPMENT. AT SUCH TIME DRUMS STORED IN THE WORK AREA ARE RELOCATED PRIOR TO COMMENCEMENT OF WORK.

THE WEIGHT OF MATERIAL IN THE DRUMS IS SUCH THAT SHOULD A DRUM BE BUMPED BY A HAND TRUCK IT WOULD NOT BE DISLOCATED.

FINALLY, AS DISCUSSED UNDER QUESTION 20, THE MATERIAL IS DRY AND REMAINS DRY. THUS ACCIDENTAL DISLOCATION OF A FEW DRUMS WOULD NOT IN ITSELF BE SUFFICIENT TO ACHIEVE A CRITICAL MASS.

SAFE MASS AT 6.5% ENRICHMENT

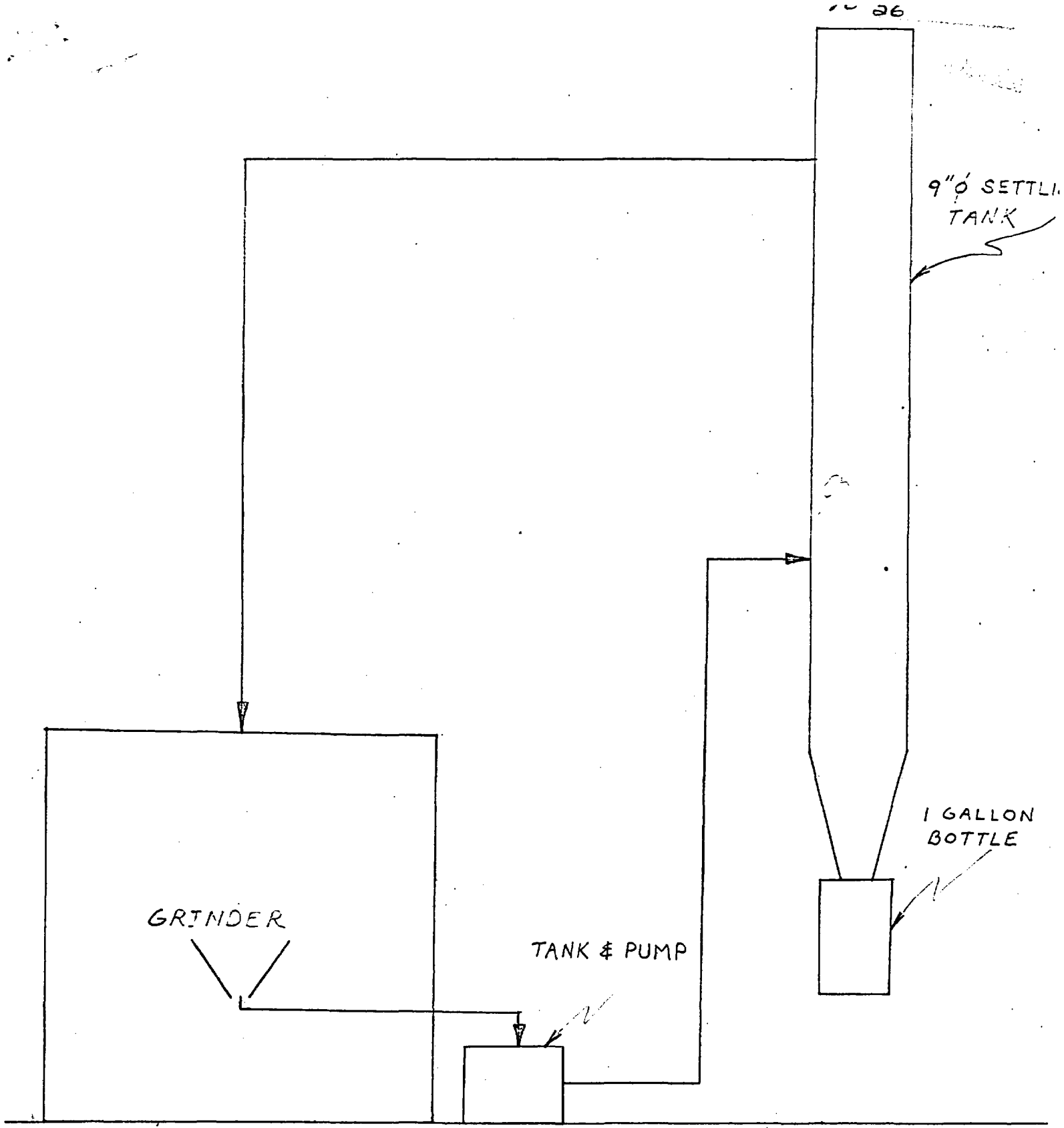
THE SAFE BATCH QUANTITY AT 6.5% U-235 ENRICHMENT WILL BE LIMITED TO 700 GRAMS U-235.

WE ARE STILL LOOKING FORWARD TO RECEIVING OUR LICENSE AMENDMENT AS PREVIOUSLY REQUESTED BY APRIL 13, 1964. IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT ME.

RESPECTFULLY YOURS,


L. N. SWALLOW,
OPERATIONS CONTROL MANAGER

LJS:JB
AEC: 6



SCHEMATIC OF CENTERLESS GRINDER WATER CIRCULATION SYSTEM.

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