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UNITED NUCLEAR
CORPORATION
CHEMICALS DIVISION

February 21, 1964

ROUTE 21-A
HEMATITE, MISSOURI

Mr. Robert L. Layfield, Acting Chief
Source & Special Nuclear Material Branch
Division of Licensing & Regulation
U. S. Atomic Energy Commission
Washington 25, D. C.

Dear Mr. Layfield:

Per our discussion of February 19, 1964, attached are:

1. A retyping of the attachments to replace those submitted under our cover letter of February 18, 1964.

2. A typed version of the letter and attachments dated February 19, 1964.

Very truly yours,

RW Shearer

R. W. Shearer, Manager
Administration/Engineering

RWS:cn

Encl.

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ACKNOWLEDGED
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IX. MONITORING SURVEYS

Surveys will be conducted on a regularly scheduled basis consistent with plant operation and survey results.

A. Air Sampling

Sampling is done with Whatman No. 41 filter paper. At least one cubic meter of air is filtered at a minimum rate of 0.5 cfm.

The schedule of routine sampling is included in the appendix. Additional sampling will be done as the need is indicated by the results of the routine sampling or as requested by line supervision.

The samples are counted for alpha in a gas proportional counter. Counting time is a function of sample activity, but in general is not less than ten (10) minutes.

As indicated in the appendix the initial frequencies of samples will be weekly and this will be maintained until start-up problems are resolved. Corrective actions will be taken if samples indicate contamination to be greater than 10 CFR 20 regulations allow. Within 90 days after the start of each area the AEC will be informed of the results of the weekly sampling program and the AEC's concurrence will be secured on a revised sampling frequency.

B. Surface Contamination

Total alpha contamination is measured with a portable gas proportional counter. Smear samples are taken with Whatman No. 41 filter paper or equivalent smearing an area of approximately 100 cm^2. The smear samples are counted by a gas proportional counter.

The schedule of routine sampling is included in the appendix. Additional samples will be collected based on results of routine sampling or as requested by line supervision.

C. Water Samples

1. Plant Waste Effluent

The contamination level of the plant waste effluent is measured at the lagoon discharge. A sample of the overflow is collected continously. The sample is analyzed for alpha and beta activity and pH on a weekly or monthly schedule. In the case of a monthly schedule the sample will be a composite of the weekly samples.

The effluent sampling system is shown on Sheet No. Y-403 and consists of a meter to provide a record of total discharge and a sample tap from which a proportionate amount of the total discharge flow will be diverted into a bucket sized container. These samples will be collected and analyzed initially at a frequency of at least once per week. Backup information on waste discharges are obtainable from operational samples.

The weekly samples frequency will be maintained until start-up problems are resolved. Corrective action will be taken if samples indicate contamination to be greater than 10 CFR 20 regulations allow. Within 90 days after the start of each area the AEC will be informed of the results of the weekly sampling program and the AEC's concurrence will be secured on a revised sampling frequency.

2. Pawcatuck River

One grab sample per month from above and below the plant outfall is analyzed for alpha and beta activity and pH.

3. Special Samples

Depending on the work in progress, special samples and tests are made on an as-needed basis.

D. Air Exhaust Systems

1. Process Exhaust

Inasmuch as process stacks are equiped with high efficiency filters and manometers designed to indicate filter pressure drop, stacks will be sampled initially (3 samples per stack) to insure that discharge is less than MPC. Thereafter, the stacks will be sampled when the routine air sampling program indicates levels in excess of 50% of applicable MPC in the plant supply systems and public areas, but each process stack shall be sampled no less frequently than once per quarter.

Process and/or system changes shall require that the effluent air from the exhaust system(s) thus affected should again be sampled at least three times to re-establish the effectiveness of the filtering system.

2. Exhaust System Efficiency

A weekly inspection of all process exhaust systems will be made. This will include intake velocity measurements and inspection of the degrees of filter loading. Velocity measurements are made with a velometer; filter loading is determined by pressure drop readings.

(# 8 - Revised)

February 18, 1964

Security Operations Officer
Committee Member — Plant Phone-- 286-448 New Haven

Superintendent of Material Control
Committee Member — Plant Phone-- 301 New Haven

Criticality Engineer

XIV. EVACUATION PLAN

1. Non-Nuclear Alarm

Alarm -- Loud, intermittent alarm by horn

Action -- All operators not urgently required will report to assembly area with fire extinguishers.

Operators engaged in hydrolysis, extraction, or other work requiring constant attention will remai at their posts, unless, of course, that is the emergency area.

One operator will remain in each unaffected production area in any case.

Assembly Point -- Driveway at main truck gate entrance

Emergency Coordinator will be that person present who is highest on list:

Plant Superintendent
Acting Plant Supervisor
Foreman

The Emergency Coordinator will determine source of alarm from the guard and will report to Assembly Point where he will take charge of the assembled group.

The Emergency Coordinator will determine as soon as possible if additional help is required.

The Emergency Coordinator will be in full charge and will take such action to reduce the emergency as required.

2. Nuclear Alarm

Nuclear Alarm -- Loud, continuous alarm by siren

Action-- Plant will be evacuated immediately; personnel wil leave by nearest exit by running until at least 500 ft. away from plant. Employees working in the northern and eastern portions of the building at the time of an incident, will exit on the north si of the structure, proceeding to the personnel gate located at the northwest corner of the building, using either the personnel gate or the door to the security police post as methods of egress.

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EMERGENCY PROCEDURE

NUCLEAR ALARM

Plan "B"

(Suspected Malfunction in Nuclear Alarm System)

In the absence of any indication of a nuclear incident, it may be possible that a failure in the system caused the alarm.

Under these circumstances, obtain the high level and the low level monitoring devices. Adjust them for proper operation on the lowest scale.

Approach the plant cautiously, noting the readings on the meters. Do not approach any area which gives a reading of 50 mr/hr.

NOTE:-- If readings of this magnitude are encountered it is almost certain that a nuclear incident has occurred. Put plan "A" into effect without delay.

If no reading is detected, carefully approach the alarm control panel to determine which detector was tripped. This will indicate which area must be investigated further. If no radiation is detected in the indicated area, a further check of the entire area within the fenced enclosure will be made.

Call the following persons in order listed until one has been contacted:

	HOME	OFFICE
R. A. Holthaus		
G. N. Briggs		
R. C. Johnson		
J. A. Lindberg		

If the person contacted agrees, the "ALL CLEAR" signal may be given and personnel may be readmitted to the plant. Particular care must be taken in startup of equipment left running at the time of the alarm.

The alarm system is to be put back into working order as quickly as possible; a spare detector will be up at the site for emergency replacement. Operations will not be resumed in areas not covered by a detector.

The cyclone normally is not flooded with liquor. It can only be flooded if the evaporator is overfilled. Under conditions of a flooded cyclone safety is assured since the 6" diameter is safe for an infinite length under conditions of nominal reflection. Conditions of nominal reflection are assured since the wall thickness is only 5/16" whereas up to 1" of steel constitute nominal reflection (page 13, TID-7016, Revision 1). Also, it is 13' above the floor so that reflection by water is impossible. Finally, it is sufficiently separated from other items such that their effect can be assumed not to exceed the 1" thick steel reflector limit for nominal reflection.

c) Entrainment Separator

This separator is used to remove any mists that may pass through the cyclone. A vent line from the evaporator system is lower than the separator eliminating the possibility of flooding the separator. Also, this seperator will be filled with Boron Raschig Rings; heavy stainless steel mesh screen will be installed over the bottom pipe outlet to provide loss of rings (also, see pages 1 and 2 of this section).

d) Interaction

The maximum solid angle calculated for the evaporator system is less than 1 steradian.

e) General

The following operating controls will be applied to the evaporator:

1. In operation pressure on shell side exceeds tube side preventing any leak of uranium into shell side.

2. The steam condensate drain from the evaporator shell will be kept open while evaporator is not in use. (This will prevent accumulation of uranium containing solution on shell side). A vacuum break valve will be installed below the expansion joint to avoid a vacuum on the shell after shutdown. This will avoid forcing OK liquor into the shell from the tubes in the event of a tube leak. There will be a conductivity meter to check the condensate. Bad condensate will sound an alarm; in this event, the operator will divert the condensate into an 11 liter, 5" diameter bottle until the condensate is OK or shut the unit down.

3. During startup the shell side condensate will be drained into a 5" diameter sample container and checked for acidity (to indicate any possible leak into the shell side).

4. After shutdown, tube side will be drained and drain line valve will be left open to prevent uranium solution inadvertently filling tube side.

207.1.2 (Continued)

1. Defining operational standards related to nuclear safety.

2. Obtaining AEC approval of procedures and equipment involved in processing source and special nuclear material.

3. Auditing all activities as related to criticality.

207.1.3 Supervisor, Health Physics

The Supervisor, Health Physics has the responsibility for:

1. Defining operational standards related to health physics and industrial safety.

2. Auditing all activities as related to health physics and industrial safety.

207.2. Description of General Nuclear Safety Procedures

The plant superintendent will make frequent trips through the facility paying special attention to adherence to procedures used. Any violations will immediately be reported to the supervisor in charge for disciplinary action. All new employees will be given a lecture on nuclear safety by a qualified employee during the indoctrination period. Monthly safety meetings will be held at which time special topics such as nuclear safety and health physics problems will be discussed.

Changes involving special nuclear materials to equipment, piping or procedures other than for such purposes as maintenance or replacement with like equipment will be described in writing subject to the approval by the Supervisor, Nuclear Safety, before such modifications or changes are made. Any modification of existing equipment, piping or procedures which the Supervisor, Nuclear Safety, considers a significant change in nuclear safety will be submitted as a request for license amendment and subject to approval of the AEC before such changes are put into use.