

Proposed Waste Management Plan
For
Disposal of Process Wastes
UNC Recovery Systems
License No. SNM-777

I. Introduction

This plan is an outline of future development activities and concepts to be evaluated and implemented related to decommissioning and decontaminating the process waste lagoons licensed for use at the Wood River Junction facility of UNC Recovery Systems. This plan is submitted in compliance with Condition 25 of Amendment No. 6 to License SNM-777.

II. Description of Current Status

The process waste lagoons contain neutralized sludge generated in the recovery operation, waste water from the plant laundry operation, and natural precipitation. Normal processing operations result in the accumulation of approximately 225,000 gallons of neutralized sludge per year. Natural precipitation collected in these lagoons prior to February 1979 at the rate of 400,000 gallons per year. Climatic conditions at the Wood River facility are such that annual precipitation rates exceed annual evaporation rates by a typical range of 12 - 15 inches per year. As of February 1979, an inflatable rain cover was installed to avoid this collection and provide the opportunity for normal evaporation.

III. Characteristics of Contained Material

The materials contained in the process waste lagoons consist of metal hydroxide sludge, supernatant liquid high in $\text{Ca}(\text{NO}_3)_2$ concentration, and excess CaO . The pH of the combined materials is typically 9.5 - 10.5. It is estimated that 3500 tons of solids are contained in the lagoon system. As of February 1979, it was further estimated that approximately 700,000 gallons of liquid were present. The high nitrate concentrations in the supernatant liquid have precluded the possibility of dilution and discharge to local water courses.

IV. Development Objectives

UNC Recovery Systems expects to operate processing equipment beginning in the Fall of 1979 to extract high-enriched uranium from the lagoon solids. It is anticipated that the residues resulting from this processing will contain less than 2ppm of uranium and increased concentration of nitrates. In addition to the recovery

589 355

7908090567

of uranium from the existing lagoons, and the concurrent retirement of the lagoon system, a major objective of this process is to provide a means of virtual elimination of discarded waste or at the very least, a substantial reduction in the quantity of discarded material.

The processing equipment to be installed for extraction of uranium from lagoon solids will also provide the capability for more efficient extraction of the existing plant raffinate.

It is proposed that two processing plans will be evaluated. In the first, sulphuric acid will be added to the raffinate followed by evaporation. The condensate will consist of dilute nitric acid to be re-used in the process. Calcium sulphate (Gypsum) will be precipitated in the evaporator making eventual disposal a more reasonable undertaking due to the inherent low solubility characteristics of gypsum.

A second process flow to be evaluated is direct evaporation of the nitrate raffinate. Evaporation equipment is to be selected which will collect nitric acid condensate for re-use and crystallize calcium nitrate for disposal through burial.

It is anticipated that burial of the precipitated residues will be required with either system due to the chemistry of the process lagoon solids. However, once the large quantity now present in the lagoons is processed, quantities generated during daily operation would be easily handled for burial.

The scale of the equipment to be obtained will be substantially larger than required for daily treatment of process waste from the main facility. This will permit high throughput to reduce the volume of lagoon material in a reduced time frame.

Concurrent with this development work, natural evaporation will proceed using heated air in the inflatable rain cover so as to reduce the volume of liquid processed. All discharges (e.g. burials) from this program will be made in compliance with applicable local, state, and federal regulatory requirements.

V. Current Activity

Pilot testing of evaporation equipment is proceeding in the laboratory facilities of two manufacturers utilizing synthesized calcium nitrate solutions. The final results of these tests will be available in late summer 1979. Other work is proceeding to

589 356

define the level of undesirable materials to be expected in the raffinate from the lagoon recovery process, to aid in selection of materials of construction.

VI. Summary

In summary, UNC Recovery Systems intends to pursue a course of action which will substantially reduce waste disposal from the main recovery process through evaporation and precipitation techniques. It is anticipated that the long term objective of decommissioning the existing lagoon system can be realized and "best efforts" will be undertaken to achieve the license condition of July 1982. The results of this work are expected to be safe disposal of existing waste, substantial reduction in uranium contained in plant raffinate, sharp reduction in the quantity of material which must be buried, reclamation of acid now required to be neutralized, and elimination of accumulations of waste materials resulting from the scrap recovery process.

589 357