

glass vials. One sample is retained at Port Hope, the second sample is forwarded to the producer, and a third and fourth sample held as reserve.

Both Eldorado and the producer subsequently perform a uranium analysis on the sample and exchange data simultaneously by registered mail. If the analyses do not agree within specified limits, one reserve sample is sent to the Department of Mines and Technical Surveys, extraction metallurgy section, for umpire. An accepted analysis is agreed upon from procedures outlined in the contract and this is used for official accountability.

Producers are officially advised of the weight and uranium content of each lot.

In the case of gravity concentrates the drums are weighed and a sample is obtained by passing the products through a Denver-Snyder sampler. The sample is eventually reduced and the same procedure is followed on exchange of analysis and official accountability.

Any producer may have a representative present during the weighing and sampling operations, if he so desires.

II. SOLVENT EXTRACTION OPERATIONS

Feed Preparation

In order to obtain a consistent feed to the refinery, the gravity concentrates and various precipitates are blended in the dry state.

To form a pre-calculated charge, drums are brought from storage to a drum dumping hood and the product is conveyed to one of three blenders. After adequate blending the dry product is then conveyed by means of bucket elevators and screw conveyors to the digestion system.

All hoods and blenders are vented to dust collecting equipment in order to minimize losses and ingestion hazards. The products so collected are returned to the blender's on a routine basis.

Digestion

By means of automatic feeder, the dry product is fed continuously into stainless steel kettles. Nitric acid and water are added simultaneously and the product is digested under agitation through a cascade system. In this operation the uranium and other acid soluble compounds are taken into solution as nitrates. Acid insolubles remain as a suspended slurry.

From the digestion circuit the slurry is pumped to the solvent extraction area.

Solvent Extraction

The principle of solvent extraction is based on the fact that certain solvents will selectively extract uranium from an aqueous solution. The uranium so extracted can then be withdrawn in a highly purified form to an aqueous phase by using large volumes of deionized water.

At Port Hope, solvent extraction is carried out in three stages using three separate pulse columns. Each column is equipped with perforated stainless steel plates and pulsing action is transmitted by means of a bellows type pulse generator. The principle of operation is that the pulse energy is used for intimately mixing the solvent and the slurry (aqueous phase) by counter current contact through the plates.

The uranium bearing slurry is entered at the top of the first extraction column, while the solvent, which in this case is a homogeneous mixture of tributyl phosphate and kerosene, is introduced at the bottom of the column. Due to the difference in specific gravity the solvent flows up the column while the slurry flows to the bottom.