

Heritage Minerals, Inc.

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April 27, 1989

Mr. Michael La Mastra, Chief
Commercial Use Safety Section
U. S. Nuclear Regulatory Commission
WF-1
Mail Stop 6H3
Washington, DC 20555

Re: Mail Control No. 110418
Docket No. 04008980

Dear Mr. La Mastra:

Pursuant to our telephone conversation last week, a brief description of Heritage Minerals' Operation has been prepared. I have attempted to answer the questions you raised with regard to the nature of the source material and its flow in the process.

The Raw Material

Heritage Minerals is engaged in processing stockpiled mineral sands which were left behind as tailings from a previous mining operation.

The stockpiled sand (also known as New Feed), which is the raw material for Heritage's plant, is a mixture of naturally occurring minerals. The major component is silica sand (about 70%) which has no commercial value. The next most abundant constituents are aluminum silicate minerals (15%). The rest is zircon (zirconium silicate) and leucoxene (titanium oxide). There is a trace amount (0.5%) of monazite which is a complex phosphate of rare earth elements containing about 3.5% thorium and uranium chemically bound with the rare earth phosphates. Monazite is the only known source of thorium and uranium in this deposit. The concentration of source material in the raw material is typically 180 ppm (Th & U).

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Zircon and leucoxene are the only constituents that are of commercial value to Heritage Minerals. While monazite is also a useful mineral, it exists in such a low concentration that it is uneconomical to extract it from the new feed. Hence, no attempt is being made to extract, recover or concentrate the source material.

Therefore, the plant processes the new feed to extract only the zircon and leucoxene values, which are marketed. The unused sand portion is returned to a tailing area.


After removal of these commercial minerals, the monazite source material remains in the tailings at about the same concentration and is rejected for on-site disposal. The process is entirely physical. That is, no chemicals are used nor do any chemical changes take place during any part of the process.

The Concentration Process

While inside the plant, one of the steps involves separating the heavy minerals (mixed together) from the light fractions using spirals and shaking tables. The monazite, being a heavy mineral, comes out in a concentrated form along with the other heavy minerals (titanium and zircon) in the table concentrate. The concentration of source material in the table concentrate is typically 0.075% or 750 ppm. This material is dried and further processed by electrical and magnetic separation, whereby the titanium and zircon products are extracted while the monazite waste (containing about 0.6% source material) is recombined with the light minerals from the gravity plant to form the final tailings. The attached block diagram depicts the flow of the source material in the plant.

If you require any more details or clarifications, please don't hesitate to call.

Very truly yours,

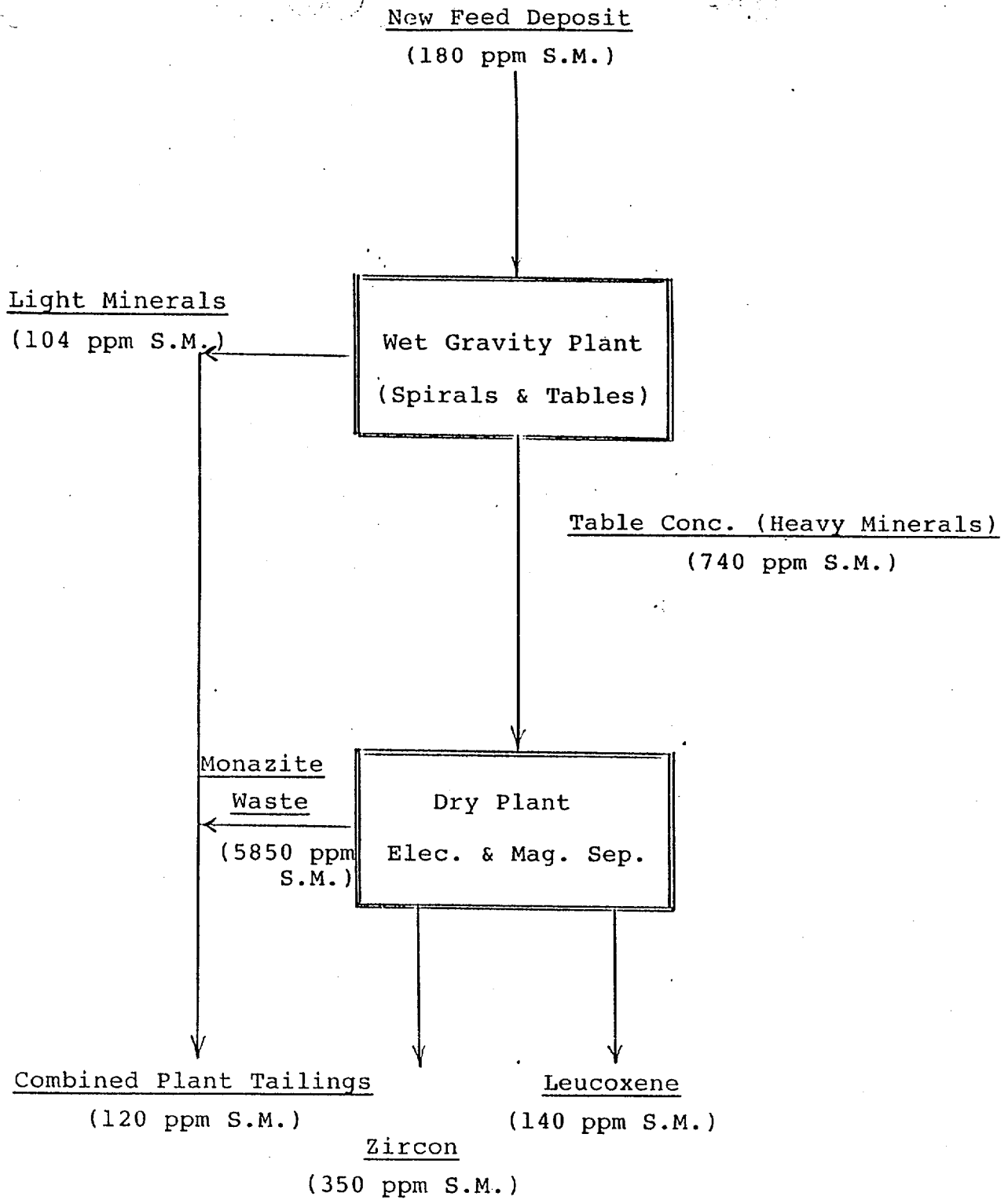


Max M. El Tawil, PhD
Consulting Engineer

MET:ljc

Attachment

cc: John F. Lord, w/a
Edele Hovnanian, w/a



S.M. = Source Material (Th & U)

Analyses taken from NRC inspection report No. 99990000/89-001