

## Site Background Information

HMI requested release for unrestricted use of the NRC-licensed areas at the Heritage site as authorized by NRC License No. SMB-1541, and termination of the license. HMI was authorized by the NRC from January 2, 1991 for the possession of radioactive materials resulting from past operations at the site, and for decommissioning of the affected portions of the site. The facility had been used in 1972 to 1990 for the mechanical processing of dredged, native sands to extract various heavy minerals (zirconium and titanium). The native sand also contained natural uranium and monazite (an ore containing natural thorium), which were incidentally concentrated due to the processing operations. A process change in 1989 led to reprocessing of previously-stockpiled tailings (unwanted sands from earlier processing). The resultant waste stream from this process contained sufficient concentrations of natural radioactive material to require an NRC license. 10 CFR, Part 40 "Domestic Licensing of Source Material" defines source material, in part, as ores which contain by weight, one twentieth of one percent (0.05%) or more of uranium, thorium, or any combination thereof. The 10 CFR 0.13(a) cites an exemption to NRC regulations for source material which is by weight less than 0.05% of the mixture, compound, solution, or alloy.

Although the Heritage site comprises almost 7000 acres, processing activities were confined to approximately 287 acres, and the remainder of the site was not utilized. Within this smaller area, the NRC-licensed areas (those areas involving licensed material), consisted of portions of two mill buildings and a stockpile of approximately 1400 tons of licensed material. The Wet Mill was a three-story steel structure on a 229' X 99' concrete slab. The Dry Mill was also a three-story steel structure, and was situated on a 120' X 95' concrete slab. Both mill buildings have been demolished and only the concrete pads remain. The 1400 tons of stockpiled licensed material was stored within a fenced area. The material has been shipped offsite and the fence removed. Together, the NRC-licensed portions of the site comprise less than one acre.

### *Site Operating History*

The Heritage site was originally owned and operated by ASARCO, Inc. (ASARCO). In the late 1950s, ASARCO investigated the area around the site for deposits of titanium-bearing minerals. In 1960, ASARCO purchased 7000 acres for the purpose of titanium mineral recovery. In 1968, design and construction of the mineral recovery plant began, and was completed in 1973. Between 1973 and 1982, ASARCO dredged and processed native sands to extract ilmenite, a titanium-bearing mineral. The mined sand contained mostly (95%) light silica sands, clays, and gravels. The remaining 5% consisted of the titanium-bearing minerals ilmenite, leucozene, and rutile, as well as other heavy minerals, including zircon, thorium, and uranium.

The ASARCO operation was completely mechanical (i.e. no chemical processing took place). Dredged sands were screened for size and pumped to a Wet Mill, where gravity separation removed the lighter silica from the heavy minerals (concentrate). The silica was returned to the dredging pond as backfill, and the concentrate was stored on the ground east of the Wet Mill to dewater and be fed into a Dry Mill with front-end loaders. The concentrate pile was continually being added to, graded, blended, and picked up throughout this process. In the Dry Mill, the material was conveyed through dryers and electrostatic and electromagnetic mineral separators. The non-conductor materials (including zircon, thorium, and uranium) were stored on site in a location designated the Gray Area. The ilmenite product was stored until shipment. ASARCO ceased operations in March 1982, and leased the site to another company (Humphrey's Gold, Inc.) that wished to process the Gray Area material for commercial grade

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zircon. The company leased the site for six months, and conducted unsuccessful pilot tests for one month. All of the processed and waste material was returned to the Gray Area.

From the end of the Humphrey's Gold lease until 1986, ASARCO maintained the site in standby. In 1986, HMI purchased the property and leased the plant to Mineral Recovery, Inc. (MRI). The MRI successfully processed the Gray Area material for its zircon content by sending it through a smaller dryer. The waste material from this process was stored in a location north of the Wet Mill, called the Blue Area. The MRI operated the site from October 1986 until August 1987, when HMI assumed control over site operations, and processed the remaining Gray Area material. Tests indicated that the stored Blue Area material also contained sufficient amounts of the desired minerals, and HMI began processing it.

HMI's reprocessing of the Blue Area material resulted in uranium and thorium concentrations in excess of 0.05% by weight (specifically, after the light fraction had been removed in the Wet Mill). An NRC inspection performed on January 12, 1989, identified that HMI was concentrating source material, and that an NRC license was required. Following the inspection, HMI separated the source material from all other waste material, and stored this sand under tarps. Later, HMI erected a fence around this stockpile area. On March 10, 1989, HMI submitted an application for an NRC source material license.

Before the license was issued, reduced demand and prices for zircon caused HMI to suspend all processing operations. On August 23, 1990, HMI informed the NRC that the plant would be placed in standby until market conditions improved. In the meantime, HMI stated that they would initiate decontamination of the plants and equipment. Between 1989 and the cessation of plant operation, HMI had processed 200,000 tons of Blue Area material. As a result, an estimated 1000 tons of source material had been segregated and stockpiled for disposal. HMI never restarted processing operations.