Gay Mine

The J. R. Simplot Company's Gay Mine is located on the Fort Hall Indian Reservation, about 16 miles east of Fort Hall, Idaho (Figure 83). It was the only phosphate mine in the southeastern Idaho phosphate field to be located on the Shoshone-Bannock Indian land, and was the first open pit mine in southeast Idaho to extract Federally-owned phosphate. The mine eventually consisted of about 7,000 acres of leased Tribal and allottee lands within the reservation.

Early surveys of the land and geology of the area of the Fort Hall Reservation (Mansfield, 1920) include the following:

> The Astorians, a collection of pioneer fur trappers and traders in the employ of John Jacob Astor, were probably the first organized expedition to pass through the general area of the Gay Mine on their way to Oregon in 1811-12.
>
> Captain Benjamin Louis Eulalie de Bonneville surveyed the general area for fur resources during the years 1833 and 1834. Nathaniel J. Wyeth established the Fort Hall fur trading post in 1834 near the confluence of the Portneuf and Snake Rivers, naming the post after the oldest member of the party.
>
> John C. Fremont surveyed the area in 1843 and 1844 for agricultural possibilities and general exploration.
>
> Captain Stanisbury followed Fremont into the area in 1849 in order to survey proposed wagon roads. This was also the time of the first emigrants on the Oregon Trail which, in its many variants, ran very near the site of the Gay Mine.
>
> The United States Geological and Geographical Survey of the Territories, under the charge of Ferdinand V. Hayden, systematically surveyed the eastern part of the reservation area in the late 1860s and the 1870s. Members of the Hayden Survey, F. H. Bradley in 1872, A. C. Peale in 1877, and Orestes St. John in 1877, mapped the geology and minerals of the eastern reservation area (they failed to recognize the existence of the phosphate deposits, however).

The Fort Hall Indian Reservation was created by an Act of Congress July 3, 1868, ratified on February 16, 1869, and formally proclaimed on February 24, 1869. The Shoshone and Bannock tribes were moved onto the Reservation from several areas throughout southern Idaho.

G. R. Mansfield (1920) examined the area of the Reservation in 1913 and was the first to do detailed geologic mapping and reporting of the phosphate deposits of the Fort Hall Indian Reservation. Mansfield's work included excavating trenches and test pits on the phosphate (Figure 84).

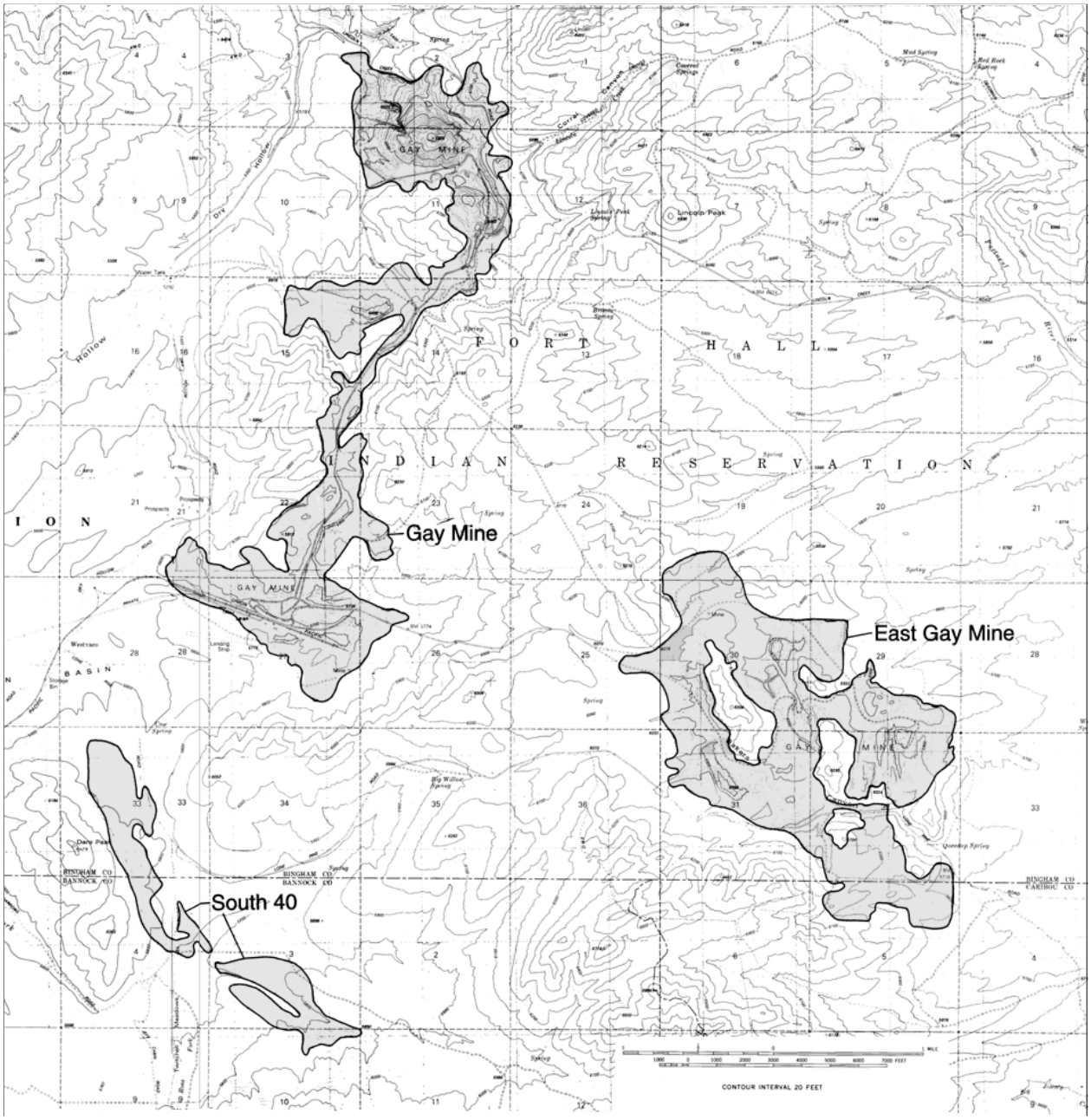

Figure 83. Map showing the location of the Gay Mine, Bingham and Bannock Counties, Idaho.

Based on Mansfield's work and subsequent geologic exploration, the Simplot Fertilizer Company started exploring for phosphate on the Indian Reservation in 1945 (Service, 1966). The Simplot Fertilizer Company (now J. R. Simplot Company) was established in 1945 to serve regional agricultural markets for phosphate fertilizers. The company's exploration program consisted of drilling, trenching, sampling and mapping (Figure 85). The exploration proved successful and in 1946, the company negotiated and obtained Tribal and allottee leases on about 7,000 acres (Carter, 1978). The Simplot

Figure 84. Prospect trench, date unknown. Photo by R. W. Richards, #189, USGS Photographic Library.

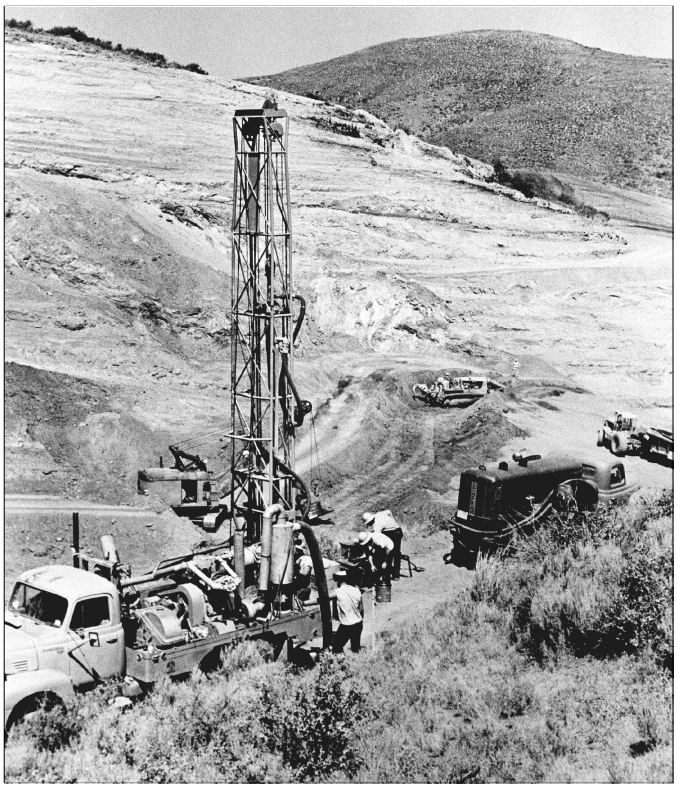

Figure 85. Drilling rig, Gay Mine. Photo courtesy of the FMC Corporation.

Fertilizer Company also obtained a Tribal business lease authorizing the company to commence phosphate extraction on February 4, 1946. The Simplot Company opened the Gay Mine that same year (Figure 86), and ultimately became the longest operating open pit phosphate mine in Idaho. The Gay Mine was named after J. R. Simplot's only daughter. The initial production from the Gay Mine marked the beginning of Idaho's present day phosphate mining/fertilizer industry (Carter, 1978).

Figure 86. Start of Mining, Gay Mine. Photo courtesy of the Idaho State Historical Society, #63-160.221.

In 1944, prior to the opening of the Gay Mine, the Simplot Fertilizer Company began construction of a fertilizer plant at Pocatello, Idaho. The plant did not go into production until the Gay Mine started producing phosphate ore in late 1946. In late 1946, the U. S. Quartermaster's Office contracted for a million tons of phosphate rock to be shipped to Japan to build up that country's soil as part of the post-war reconstruction effort (Hansen, 1964; Day, 1973). The Gay Mine provided about one-quarter of the contracted amount in 1947 and 1948, blending lower-grade phosphatic shales with the fertilizer-grade phosphate rock.

Associated with the high-grade phosphate rock suitable for fertilizer manufacturing, there are extensive deposits of lower-grade phosphatic shales that were not suitable for fertilizer. The main bed fertilizer-grade phosphorite averages 31% P_2O_5 while the overlying phosphatic shales, or furnace-grade ore, averages 24% P_2O_5 (Schmitt, 1967). The Simplot Company stockpiled those shales at the mine until a market could be developed (Service, 1966, 1967). The Simplot Fertilizer Company laboratory conducted extensive tests to discover the commercial possibilities of the phosphatic shales (Power, 1947). In 1948, the Union Pacific Railroad constructed 21 miles of standard gauge railroad line between the Fort Hall Agency and the mine tipple (Figure 87). The Simplot company promptly shipped 150 tons of phosphatic shales to the Westvaco Chlorine Products Company in Tennessee to determine if the phosphatic shales were amenable to electrolytic reduction to elemental phosphorous. The tests proved successful and negotiations were commenced with the view of Westvaco building a reduction plant at Pocatello for utilization of the lower grade shales of the Gay Mine. In 1949, the Westvaco company built the first elemental phosphorous plant in Idaho at Pocatello (Bennett, 1989). The Food Machinery and Chemical Corporation (FMC) bought the plant the same year and made it into the largest elemental phosphorous plant in the world. The first production of elemental phosphorous from the plant in Idaho was August, 1949 (Hansen, 1964).

Figure 87. Gay Mine loading area, view east, August 15, 1973. Photo courtesy of the FMC Corporation.

Between the years 1946 to 1952, in addition to opening the Gay Mine, going online with a brand new fertilizer manufacturing facility and creating a feed stock supply to an elemental phosphorous facility, the Simplot Company was undergoing a series of internal changes. The original Simplot Fertilizer Company, incorporated February 28, 1946, merged into the Simplot Investment Company, which in turn, on March 7, 1952 merged into the present J. R. Simplot Company (McDowell, 1952).

The phosphate ore in the vicinity of the Gay Mine lies in a horizontal to near horizontal attitude but it is broken by extensive northeast- and northwest-trending normal faulting which transects earlier regional thrust faulting. The large number of normal faults created a mosaic of rotated, discontinuous blocks containing phosphate ore (Lehman, 1966). Mining of the phosphate ore resulted in a series of small- to medium-sized open pits (Figure 88). Mining depths averaged 250 feet, however, several pits exceeded 300 feet in depth. Pits were generally small, averaging 15 to 20 acres, although several reached as much as 50 acres. It is estimated that 45 pits were eventually mined. The operations of the mine were located in three primary areas: the Gay Mine proper, the East Gay mine, and the “South 40". At the beginning of the mine, stripping of the overburden (Figure 89) was done on a year-round basis while mining of the ore beds was carried out only during the spring and summer months. Eventually, it was not feasible to only mine in the summer. Consequently, mining was carried out year round and the ore mined during the winter was stockpiled at a site near the tipple for loading and shipping during the summer shipping season. Initially, phosphate ore was mined by 1½- and 2½-yard shovels (Figure 90) and loaded onto 20- and 30-ton trucks and shipped to the railroad at Fort Hall (Power, 1947). A rail spur was laid from the main line at Fort Hall to the mine site, and loading facilities were developed at the terminus at the mine. Those facilities included screening, crushing, sampling and weighing equipment.

By the early 1960's, the Gay Mine was producing over 1 million short tons of phosphate rock per year. The original shovel and truck fleet was too small to produce this volume and conversion of the stripping fleet to scrapers and dozers and the mining fleet to larger (7-yard) electric shovels and 35-ton trucks began. By the mid-1970's production approached 2 million tons per year, pit development had extended to the north end of the original lease block. The East Gay Mine leases were placed in production and 120-ton tractor-trailer trucks were added to haul ore from surge stockpiles at the pits to the loading facility. In 1974, the first hydraulic shovel (7 cu. yd. capacity) was tested successfully for mining ore and the mining fleet was gradually converted to the faster and less costly hydraulic machines.

From 1983-1985, in anticipation of peak production of about 2.2 million tons per year and development of the South 40 leases, the stripping fleet was also converted from scrapers to large (12-yard) hydraulic shovels and 85-ton trucks. This conversion produced a significant increase in mine productivity and reduction in mine operating costs.

The J. R. Simplot Company held the majority of the Tribal and allottee leases. The FMC Corporation held several other leases and the two companies jointly held leases, particularly in the mining area called

Figure 88. Gay Mine, August 12, 1975. Photo by Peter Oberlindacher, BLM.

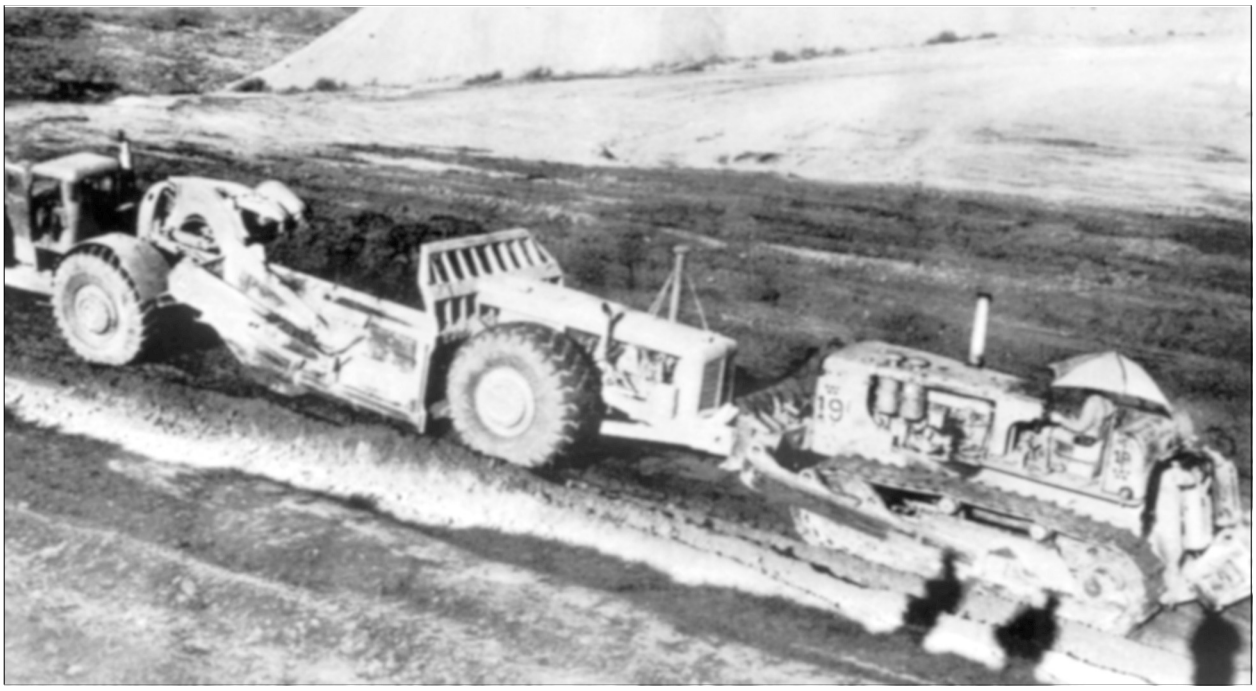

Figure 89. Stripping overburden at the Gay Mine. Photo from Service, 1967, p. 167.

Figure 90. Gay Mine, October 18, 1948. Photo courtesy of the Idaho State Historical Society, #72-201.101.

the “South 40". As stated before, there was a total of about 7,000 acres held under lease by the two companies, however, only about 2,496 acres were actually mined.

Prior to 1956, the J. R. Simplot Company owned the mine and the FMC Corporation purchased their ore requirements from the Simplot company. In 1956, FMC acquired certain leases at the Gay Mine and entered into joint ownership and operating agreements with Simplot. The Simplot company remained the mine operator but FMC received all of the lower grade (24-25 percent P_2O_5) “furnace

grade" shale, which constituted about 80 percent of total production. The Simplot company received the higher-grade (30-32 percent P_2O_5) "main bed" ore, about 20 percent of total production.

In 1990, shortly after the Simplot company opened its Smoky Canyon Mine and began delivering beneficiated ore in slurry form through a pipeline to its plant in Pocatello, FMC purchased the remaining high grade ore reserves at the Gay Mine and from that point forward until mine closure total mine production was delivered to FMC.

Along with being the first open pit phosphate mine in southeastern Idaho to mine Federally owned phosphate, and being considered as the beginning of the modern phosphate mining era in that part of Idaho, the Gay Mine is also known for another "first". In August, 1980, a D-9 Caterpiller bulldozer, operating in Pit CC-3, reduced the limestone footwall that remained above the pit backfill. This was the first highwall removal ever to be done in the southeastern Idaho phosphate field.

After 47 years of more or less continuous production, mining at the Gay Mine finally stopped for good in September, 1993 and all remaining mined ore was shipped. Reclamation of all of the mine pits open at that time was started in October of that year.