Phase I Archaeological Study of the Proposed Durability Quarry Expansion

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Management Summary

TEAM Engineering and Management, Inc., completed a Phase 1 Archaeological Survey for the proposed Durability Quarry Expansion project, located east of Swansea in Inyo County, California. The quarry would be located on 245 acres within a 480-acre parcel owned by F.W. Aggregate, Inc. The entire 480-acre parcel, excluding the current quarry, was included in the survey. Six archaeological sites and 41 archaeological isolates are located within the parcel.

All six sites are related to mining, and date from the late-nineteenth to the mid-twentieth century. The earliest also apparently represents the most intensive, and expensive, investment: the Owens Lake Silver-Lead Company’s smelter, which operated from 1869 until 1874, processed ores from the mines at Cerro Gordo, located 7 miles to the east. The smelter site, previously recorded as site CA-Iny-6661H, is a State Historical Landmark, and is considered eligible for the California Register. Most of the smelter site is located on federal land managed by the Bureau of Land Management, but it extends into the F.W. Aggregate, Inc., property near the parcel’s southwest boundary. However, it is not within the 245-acre area proposed for development, and would not be affected by the proposed Durability Quarry Expansion project.

Existing Durability Quarry, view to east. November 2017
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December 8, 2017

F.W. Aggregate, Inc., proposes to expand the Durability Quarry, located approximately 10 miles southeast of Lone Pine, in Inyo County, California. TEAM Engineering and Management, Inc., of Bishop, California, completed a Phase I archaeological study as part of environmental studies conducted for the project. The quarry would be expanded by 185 acres, from its current 60-acre size, for an eventual total size of 245 acres. Aggregate from the expanded quarry would be used in the Owens Lake dust mitigation projects and other projects in and around Inyo County. The archaeological study described in this report was conducted to meet Inyo County requirements to determine whether the proposed expansion would affect cultural resources eligible for listing on the California Register of Historical Resources, as required by the California Environmental Quality Act (CEQA).

Introduction and Project Description
The project site is located northeast of Owens Lake, within the southern Inyo Range, which, along with the contiguous White Mountains to the north, forms the eastern boundary of Owens Valley. The existing Durability Quarry operations and reclamation plan was previously approved by Inyo County and the Bureau of Land Management (BLM); the expansion would allow F.W. Aggregate to quarry aggregate resources from its Durability, North Pole, and Translucent Claims. Aggregate production would increase from 800,000 annual tons up to 2,000,000 annual tons.

F.W. Aggregate’s private land at the project site totals 480 acres, in Sections 24 and 25 of T. 16 S., R. 37 E., and Sections 19 and 30 in T. 16 S., R. 38 E., MDB&M (Figures 1 and 2). The parcel is east of Swansea and northeast of Keeler, California. The current quarry access road crosses public land administered by the Bureau of Land Management. Although the quarry expansion would entail only 185 acres, the entire 480-acre parcel, excluding the area of current quarry operations, was included in the Phase I archaeological study. Elevation ranges from approximately 3660 feet at the southwest corner of the parcel near Highway 136, to 4427 feet at an unnamed peak west of the existing quarry. As explained in F.W. Aggregate’s proposal, the Inyo Mountains in this area are composed of strongly folded and faulted sedimentary rocks. Most of the proposed quarry expansion acreage is very steep, but there are areas of gently sloping or nearly level terrain on ridges and saddles. Outside the proposed quarry expansion to the west are the moderate-to-gentle slopes of the alluvial fan above Swansea; to the east and south lie the alluvial fans above Keeler. Even on the alluvial deposits, however, sediments are dominated by angular gravels and cobbles, interspersed with layers of sands and silts derived from sedimentary and metamorphic rocks.
Annual precipitation in the project area is less than 5 inches. But because elevations vary from below 4,000 feet on the valley floor to above 14,000 feet in the mountains to the west and east, there is a great diversity of vegetation, from desert scrub species to alpine forests, within a day’s walk of the project area. Hall (1991:xii) notes that over 34,500 native species and varieties of plants occur in the Inyo Floristic Region. Owens Lake, naturally fed by the Owens River, Sierran streams, and springs, historically supported salt- or alkali-adapted riparian vegetation including alkali sacaton, saltgrass, reeds, and rushes (DeDecker 1988:8-10). In the 1800s, Owens Lake was the second largest natural lake in California, covering about 110 square miles. After the 1913 completion of the Los Angeles aqueduct, which diverts the Owens River, the water level dropped until by 1926 it was approximately what it is today (Steiner 2001:4). The lake’s highest historic level was about 3,600 feet, recorded in 1872, but as Wells (2003:1-4) notes, there is geological and archaeological evidence that the lake level varied considerably in the past.

The parcel lies within the Mojave desert scrub vegetation community; vegetation in the parcel is very sparse, but species include desert holly and saltbush (*Atriplex hymenelytra* and *A. confertifolia*), greasewood (*Sarcobatus vermiculatus*), buckwheats (*Eriogonum ssp.*), needlegrass (*Stipa*), barrel cactus (*Ferocactus sp.* and *Echinocactus sp.*), prickly pear (*Opuntia sp.*), and occasional creosote bushes (*Larrea tridentata*). The proposal lists coyote, antelope, ground squirrel, black-tailed hare, western whip-tail lizard and other lizards, turkey vulture, red-tailed hawk, American kestrel, and other animals as inhabitants of the vicinity.

Figure 1. Location of proposed Durability Quarry Expansion (outlined in red), in relationship to Owens Lake and the town of Lone Pine, California.
**Records Review**

A records search was conducted through the regional office of the California Historical Resources Inventory System (CHRIS) at the Eastern Information Center, University of California, Riverside. As the designated information center for Inyo, Mono, and Riverside counties, the Eastern Information Center stores copies of all available archaeological reports and site records for the area. CHRIS records indicate that five archaeological surveys have been conducted within a quarter-mile of the parcel boundary, and two archaeological sites have been recorded near the parcel’s southwest corner.

**Surveys**

Survey INY-0563 was a sample survey to gauge the potential for cultural resources in areas that would be affected by the Owens Lake dust-mitigation projects (Jones and Stokes 1997). The report provides a concise summary of the history of the area from Owenyo to Olancha, from 9,000 years ago to the twentieth century. Areas around Swansea were identified as having potential for nineteenth- or early twentieth-century sites related to mining, habitation, or trash disposal (Jones and Stokes 1997:23).

Survey INY-0834 was conducted to determine the effects of installing air quality monitoring stations at several locations around the lake (Haverstock 2008). Survey IN-00928 was a very large inventory of archaeological and historical sites along highways conducted for Caltrans; it included State Highway 136, at the southwest corner of the F.W. Aggregate parcel (Leach-Palm et al. 2010). The records review for that report noted numerous archaeological sites northwest of the project area, closer to former lake shorelines. Survey INY-0642 was conducted for the existing quarry access road as well as an equipment yard on the lake playa (Burton 2005). One site, described below, was recorded at the southern boundary of the F.W. Aggregate parcel.

Survey IN-1028 was conducted by Sapphos Environmental to assess potential effects of a dust-control project initiated by the Great Basin Unified Air Pollution Control District in the Keeler Dunes. The report provides a summary of archaeological, historical, and paleontological resources in the vicinity of the Keeler Dunes, and their record search area abuts the southwest corner of the F.W. Aggregate parcel.

**Archaeological Sites**

Two archaeological sites have been previously recorded within or near the F.W. Aggregate parcel boundary. CA-Iny-6661H is the remains of the Owens Lake Silver-Lead Company’s mill and smelter, which operated from 1869 until 1874. The site record (Burton 2005) states:

This site is the remains of the Owens Lake Silver-Lead Company mill and smelter. Encompassing almost 10 acres, it is situated on the south-facing slope of a predominantly limestone ridge, just east of the current State Highway 136 alignment. The oldest artifacts observed, including a soldered hole-in-cap can, other soldered cans, three fragments of sun-colored amethyst glass, and square-cut nails, reflect its late nineteenth century use. However, more modern artifacts (sanitary seal cans with church-key openings, broken beer bottles, broken wine bottles, aluminum cans) are also present. Nineteen features were recorded, including a millsite, two adits, a quartz quarry, a gravel quarry, a stone foundation, and a rock corral.
Figure 2. Proposed Durability Quarry Expansion is in Sections 24 and 25 of T. 16 S., R. 37 E., and Sections 19 and 30 in T. 16 S., R. 38 E., MDB&M. The F.W. Aggregate, Inc., private property is indicated by a red outline, and the existing quarry by cross-hatching. The dotted black line outlines the proposed quarry expansion area. The Phase 1 archaeological survey described in this report covered the area outlined in red, minus the existing quarry area. Topographic map adapted from USGS 1987 Dolomite 7.5-minute quadrangle.
Considered eligible for the California Register of Historical Places, the Owens Lake Silver-Lead Company’s mill and smelter site is associated with the processing andfreighting of ore from the Cerro Gordo mines, which had a major economic effect not only on Owens Valley but also on the City of Los Angeles. It is located mostly on public land managed by the BLM, but extends into the southeastern portion of the F.W. Aggregate property. The current access road was designed to avoid impacting the site.

CA-Iny-451 was reported over 60 years ago as an area of pottery, grinding stones, projectile points, and bone in an area 200 by 50 yards in size. The locational information on the site record is contradictory, suggesting that the site was reported from memory without a detailed map in hand in the field. For example, the record states that the site is located 20 feet from Highway 190 (now Highway 136). But the record also indicates the site is in the NE¼ of the NE¼ of Section 25 of T. 16 S., R. 37 E., which would place it at least 600 feet from the road, on a rocky mountain slope. The 20-foot distance from the road is most probable, and the types of artifacts listed are more likely to occur in the relatively level terrain alongside the road. However, the site was not encountered during the Caltrans survey conducted alongside the highway (Leach-Palm et al. 2010). The site record notes that “up to 35 obsidian points” from the site had been collected by one person, and the site may have been collected out of existence, or it may have been obscured by road work.

**Historic Background**

In large-scale archaeological studies undertaken for the Owens Lake dust-abatement project, Wells (2003) provides a concise summary of the cultural history of the area. More detailed information about archaeology and history can be found in Bettinger (1977, 1982), Burton (1996), Busby, et al. (1979), and Basgall and McGuire (1988). The following summary is adapted, with permission, from Burton (2005).

The following chronology, based on time-sensitive projectile points (Betninger 1982:89-92), provides a theoretical chronological structure for the history of the Inyo-Mono region before the incursion of European Americans:

**Pre-Medithermal**

Mohave complex (pre-3500 B.C.)—indicated by Mohave, Silver Lake, and Great Basin Transverse projectile point assemblages.

**Medithermal**

Little Lake Period (3500 to 1200 B.C.)—indicated by Little Lake and Pinto series projectile points and Humboldt Concave-base bifaces.

Newberry Period (1200 B.C. to A.D. 600)—indicated by Elko series projectile points.

Haiwee Period (A.D. 600 to 1300)—indicated by Eastgate and Rose Spring series projectile points and Humboldt Basal-notched bifaces.

Marana Period (A.D. 1300 to historic)—indicated by Cottonwood and Desert Sidenuched projectile points and Owens Valley Brown Ware ceramics.
Information compiled from archaeological excavations and surveys provides a glimpse of lifeways during these periods. Mohave complex and earlier sites are limited to a few sites in Long Valley, at Mono Lake, and at Owens Lake, and isolated points found in surface contexts. The Little Lake period appears to have been characterized by high mobility: wide-ranging groups maintained base camps near riparian areas, and made frequent use of temporary camps. Sites dating to this period are generally sparse, with a narrow artifact assemblage consistent with use by highly mobile groups. Structures and associated artifacts at Newberry period sites suggest use as seasonal base camps or temporary hunting camps. Flaked-stone tool types became standardized and ground stone artifacts became formalized and diverse. Haiwee period sites are dominated by casual flaked stone tools and shaped ground stone artifacts. There appears to be increasing settlement centralization during the Haiwee period, and a shift towards intensive land use focused on increased use of small animals and plants. The trend towards intensifying land use continued in the Marana period, with some villages occupied essentially year-round. Also during the Marana period there is a greater shift to expedient technologies with the introduction of casual ground stone types. Archaeological studies undertaken for dust-control projects in the dried Owens Lake playa have encountered numerous sites dating to throughout most of the human occupation of the region and reflecting adaptation to changing lake levels and climatic conditions (Hildebrandt and Carpenter 2017).

The Bureau of Land Management overview (Busby et al. 1979) provides an excellent review of what is known about the ethnography of the region. No attempt is made here to recapitulate all known ethnographic information, but rather what follows is an outline of a few relevant ideas. The predominant inhabitants of the eastern Sierra region at the time of Euroamerican contact were the Paiute and Shoshone, Numic speakers of the Uto-Aztecan language family. The Owens Valley Paiute term for themselves, meaning “the people,” has been transcribed as *Nümü* (Steward 1933: 235) or “Nu-Mu” (Bishop Paiute Tribe).

The territory of the Owens Valley Paiute encompassed the area bounded on the west by the Sierra Nevada crest, Owens Lake to the south, the crest of the Inyo Mountains to the east, and Long Valley on the north (Steward 1933, 1938). The Shoshone occupied lands to the south and east, and both groups may have made use of the project area. The Owens Valley Paiute were relatively sedentary for a Great Basin group, with year-round occupation in permanent villages located along streams flowing from the Sierra Nevada. Short-term visits were made to temporary camps for resource procurement. Their subsistence revolved around gathering, hunting, fishing, horticulture, and trade (Busby, et al. 1979:179). Brine fly larvae (*Ephydra hians*) were collected from the shores of Owens Lake (Steward 1933), and waterfowl were hunted from the shore (Busby, et al. 1979:166). Greasewood, abundant near Owens Lake, was used for arrow foreshafts. Basalt and obsidian outcrops in the region were quarried for stone tools. The Koso Shoshone were less sedentary, and for most of the year families traveled alone. The single-most important foods were pinyon pine nuts, acorns, and mesquite beans. Chiefs were appointed to control intervillage activities. Walter (1986) points out, however, that all ethnographic information about the Owens Valley Paiute was gathered after they had moved to camps near towns to earn their living doing ranch work and domestic labor. Some of the settlement and migration patterns noted were likely already influenced by this wage labor.
The term “Inyo” has been translated from Paiute as “the dwelling place of a great spirit” (Hall 1991:xii), and modern Tribes in the Owens Valley consider archaeological sites and the landscape as a whole in the region to have traditional and cultural importance.

Prospecting and mining in the eastern Sierra region began in the 1850s. The Owens Valley was used as a transportation route to the gold strikes to the north in the Mono Basin. The first permanent herds of cattle were brought into Owens Valley in 1861 to supply the growing mining camps of the region. Cattle grazing, along with the cutting of pinyon for lumber and firewood by the miners and ranchers, greatly reduced the Native Americans’ food supply by the winter of 1862. That winter was especially severe, and to survive, the Paiute began killing cattle for food. Descriptions of the ensuing battles are given in several accounts. The U.S. Army established Camp Independence in July 1862 on behalf of the ranching and mining interests. By the time the first phase of war was over, in June 1863, over 200 of the Paiute had been killed, 36 of them in a single battle at Owens Lake. Nearly 1,000 Paiute were force-marched to a reservation at Fort Tejon, over 175 miles south. However, some of the Indians who escaped the forced removal continued to fight, and the army reoccupied Camp Independence in 1864. Hostilities ended by the winter of 1865-1866. Over the next few years, most of the dislocated Paiute returned, but they were then dependent on the Euroamerican economy (Burton 1996:124-125).

Much of the late-nineteenth-century economic development on the eastern shores of Owens Lake revolved around the mines at Cerro Gordo, located 7 miles to the east of the project area, in the Inyo Mountains. Likes and Day (1975) provide the following information about Cerro Gordo. Mineral deposits there were reportedly discovered by Pablo Flores in 1865. Mining of silver in the area was small in scale until 1868, when Mortimer Belshaw built a smelter with a blast furnace at Cerro Gordo. Belshaw also built the first wagon road to Cerro Gordo, known as the Yellow Grade Road, to bring the supplies and equipment to construct the smelter; he let other companies and individuals use the road for a fee.

By 1869, there were 700 mining claims within one square mile of Cerro Gordo, and the population had increased to 1,500 (Likes and Day 1975:20). That same year another smelter was built along the Yellow Grade Road, completed by the Owens Lake Silver-Lead Company at an estimated cost of $25,000 (Likes and Day 1975:17). This smelter, located at the southwest corner of the project area, housed two blast furnaces and processed ore from the Santa Maria mine at Cerro Gordo. The settlement of Swansea developed to support the Owens Lake smelter.

In 1872, the Owens Lake Silver-Lead Company built a steamboat to transport Cerro Gordo’s bullion across the lake. A wharf was built at Swansea, using slag and low-grade ore. However, the major earthquake that shook Owens Valley in March of 1872 caused setbacks for the company. The two furnaces at the Owens Lake Silver-Lead Company smelter collapsed, partially burning the buildings in which they were housed. The earthquake caused a rise in the valley floor at the northeast end of the lake, so that the water receded about 150 feet from the former shoreline at Swansea. The smelter was repaired and the wharf at Swansea extended, but the Owens Lake Silver-Lead Company lost six months of production.
The Owens Lake Silver-Lead furnace and mill have been listed as California State Landmark 752, with the following information:

The Owens Lake Silver-Lead furnace and mill were built here by Colonel Sherman Stevens in 1869 and used until March 1874. James Brady assumed their operation in 1870 for the Silver-Lead Company and built the town of Swansea. During the next few years the output of this furnace and one at Cerro Gordo was around 150 bars of silver, each weighing 83 pounds, every 24 hours. *Inyo California Historical Landmarks, Office of Historic Preservation* (http://ohp.parks/ca.gov)

Cerro Gordo also inspired transportation developments that had long-term effects on the Owens Valley. The Carson and Colorado Railroad, which skirts the east side of Owens Lake west of the project area, was originally conceived to connect Carson City, Nevada, to the Colorado River to serve the mines of Cerro Gordo, Bodie, and others east of the Sierra Nevada. However, the Carson and Colorado Railroad was not completed until 1883, when the mining boom had passed,
and then only as far south as Keeler. However, the railroad provided the first steady and modern transportation in and out of Owens Valley, and created markets for Owens Valley agricultural products in western Nevada. It ran regularly until the 1950s, freighting zinc from Cerro Gordo. The railroad also facilitated the development of the soda ash manufacturing industry, which began on the shores of Owens Lake in 1887, and increased during both World Wars. Jones and Stokes (1997) provide a history of several soda ash plants at the lake. But as highways and truck travel improved, the railroad fell into gradual disuse (Busby, et al. 1979:70-71; Turner 1964). The segment of narrow gauge track from Laws to Keeler was abandoned in 1960, and a salvage company removed the rails in January 1961 (Likes and Day 1975:83).

As described in Government Land Office Document 06148, Patent No. 820600, the current 480-acre project area was patented by the Inyo Marble Company on August 26, 1921, to include the Durability, North Pole, and Translucent placer claims. This Inyo Marble Company was apparently a successor to the Inyo Marble Company that was in operation in the nineteenth century and mentioned in the 1919 State Mineralogist’s Report. The 1919 report is most likely referring to the quarry at Dolomite, rather than in the project area, which was not patented until 1921:

These deposits were first quarried in 1888 by the original Inyo Marble Company, of San Francisco, of which M. J. McDonald was president. The quarries lay idle for a number of years due to the shattered condition of the marble and the expense in obtaining large blocks. Assessment work was not kept up and the claims were relocated by the present owners, now known also as the Inyo Marble Company. (California State Mining Bureau 1919)

This Inyo Marble Company’s property was purchased in 1959 by Premiere Marble Products, which in turn was purchased by the present owner, F. W. Aggregate, Inc., in 1992 (Dick Bowman, personal communication 2017). Likely because of the presence of the Owens Lake Silver and Lead Smelter at its base, Merriam (1963) refers to the property as “Smelter Hill.” Although Merriam depicts mines and adits in the vicinity, his report shows nothing at Smelter Hill other than the smelter. However, Merriam’s geologic map does show quartz monzonite and quartzite intrusions into the Paleozoic limestone deposits of the hill (Figure 3). Because similar intrusions caused the formation of the silver and lead deposits at Cerro Gordo, the geology would have inspired prospecting in the F.W. Aggregate parcel.

Budding ranching and agriculture in Owens Valley was interrupted in the early twentieth century when the City of Los Angeles bought up the rights to much of the water in the valley. By the late twentieth century, tourism had become a major component of the economy of Owens Valley, but limited ranching and farming, as well as mining, continue. The dust abatement project at Owens Lake has not only brought additional workers to the area, but is also necessary to protect the air quality of the region.
Figure 3. Detail of geologic map in Merriam 1963, Plate 2. The F.W. Aggregate, Inc., project area is centered on the area Merriam labels as Smelter Hill.

Field Methods
Field work, which occurred November 15-17, 2017, was conducted by a team of two archaeologists and one archaeological technician, all of whom have experience in archaeological survey and excavation in Inyo and Mono counties. For safety reasons, the active quarry areas were excluded from the archaeological survey. However, no cultural resources would be expected in those areas: the quarry areas were previously inspected (Burton 2005), and no significant cultural resources were encountered. In addition, current operations would have removed evidence of cultural resources, if any had been present.

In the rest of the 480-acre parcel, a variety of survey strategies was employed, appropriate to the terrain and expected archaeological sensitivity. Where slopes are less than about 10 percent, parallel traverses were walked at 10- to 15-meter intervals. Where slopes were between 10 and 30 percent, parallel traverses were walked at 25-meter internals. On steeper slopes, inspection was more purposive and directed: ridges and hilltops as well as roads, trails, adits, waste dumps, mining claim markers (rock piles), and prospects that could be seen from above or below, or that could be discerned on aerial photographs or on historic maps, were inspected and recorded.

Features and sites more than 50 years old were plotted with a Trimble Juno Global Positioning System (GPS) receiver, and photographed. Mining claim markers were plotted with the GPS receiver and photographed. Isolated artifacts were also plotted with the GPS receiver and
Figure 4. Location of archaeological sites within the F.W. Aggregate, Inc., parcel. Map adapted from USGS 1987 Dolomite 7.5-minute quadrangle
recorded; where several artifacts were encountered together, as in a trash scatter, sample diagnostic artifacts were recorded, measured, and photographed. California state site forms were completed for the five newly recorded sites encountered.

Results

Five sites were encountered during the survey (Figure 4). A sixth site, the Owens Lake Silver-Lead Company’s mill and smelter (CA-Iny-6661H), extends into the southern boundary of the F.W. Aggregate parcel and was previously recorded (Burton 2005). A quick inspection indicated that the existing site record is still accurate, and the site is outside the proposed quarry area. Site CA-Iny-451, which had been mapped by the California Historical Resources Information System as on the western boundary of the F.W. Aggregate parcel, was not encountered.

Site FWA-1 – Hilltop Mine (Figures 5 – 12)

This site is depicted on the 1951 USGS New York Butte, CA, 15-minute topographic map as a shaft, a building, and a road to a flat-topped peak at 4,427 feet elevation, the highest point of the F.W. Aggregate parcel. As an archaeological site, it includes two deep shafts with one wooden headframe, two shallow shafts (one with a makeshift ladder), several test pits and prospects, and a trash dump atop the deep shafts’ waste dump. The road is still passable. Two shallow adits on the slope to the northwest are connected to the hilltop features by trails, and building materials and trash dispersed down a drainage on the east side of the hill are likely related to this mine, too. Artifacts suggest a mid-twentieth-century date.

Features

Two deep shafts with headframe and waste dump are located on the west slope below the hill’s peak. The top of the shafts’ waste dump forms a level pad on which sits a head frame or brace made of large-dimension lumber. It measures approximately 12 feet high, and is braced against the bedrock slope. One shaft is adjacent to the head frame; wooden bracing can be seen below the opening, but there is no collar or bracing at the top of the shaft. The other is about 10 feet to the northwest, and has both bracing within the shaft and a cover made of 2-by-12-inch lumber suggesting that the original shaft was about 5 feet square. The sides of the shaft have collapsed so the hole is now about 8 feet in diameter. The waste dump extends downslope to the west, and also appears to have been the main trash dump for the site: cans, bottle fragments, a cot, and pieces of metal were observed from the level pad above.

Two shallow shafts and a building pad are located north of the end of the still-drivable road. One shallow shaft, with a makeshift ladder that reaches halfway up from the bottom, is about 10 by 15 feet in plan by 10 feet deep. The other is slightly smaller. Between the two shafts is a leveled area outlined with rocks. This is likely a building pad for the structure depicted on the 1951 USGS New York Butte, CA, topographic map.
Connected to the top of the hill by a well-made trail are two shallow adits, located down the northwest slope. The trail departs from the road near the summit, extends northward over 500 feet, then splits, with one branch going west about 200 feet to the adits, the other branch headed east about the same distance. The trail consists of a narrow path cleared of rocks, with the downhill side built up with an uncoursed rock wall up to 2 feet high.

One of the shallow adits on the northwest slope is about 4 feet high, 6 feet wide, and inclines slightly downward about 10 feet into the bedrock. The other, almost adjacent, has an opening about 6 feet square and extends slightly downward about 6 feet. The northeast part of the waste dump is held in place by a rock retaining wall to form a platform about 6 by 12 feet in size by up to 4 feet high. A trail extends a short distance to the southwest, to a mining cairn. A metal strap and lumber were observed at the adits.

In addition to the adits and shafts, there are ten mining cairns, three prospects, and two test pits within the site boundary. The prospects indicate more intensive effort than the test pits, which are smaller and shallower. Some of the cairns have four-by-four-inch posts, one of which has the

Figure 5. Overview of Site FWA-1, toward north. Shallow shafts are on the ridge behind the vehicle; deep shafts and headframe are down road to the left; shallow adits are on the other side of the peak beyond the vehicle.
name “Leary” scratched into it. This may be James D. Leary, who filed a homestead claim on the SE¼ of the SW¼ of Section 24, T. 16 S., R. 37 E., in 1932. Leary’s 40 acres, which includes the Swansea townsite, is just west of the F.W. Aggregate, Inc., parcel. Other features at the site include an iron stake set into the ground near the road; another iron stake, a rail, and a cable embedded in the ground near the building platform; two low rock walls; and a once-buried water pipe that crosses a lower switchback of the access road.
Artifacts
Mining-related artifacts at the site include segments of cable and heavy-duty bolts, battery carbon rods, nails, hacksaw blades, a bolt possibly from an engine head, and a welded sheet-metal scooper. One can lid is embossed “Blasting cap / dangerous” and a fragment of a glass vessel (possibly a beaker) of thin glass with wide mouth and no lip is labeled “Pyrex made in USA / US Pat Off.” There are lumber fragments across the site, with concentrations at the deep shafts and the adits, and corrugated metal sheathing, window screen, a tire, and two cans are scattered down the hill in a drainage to the northeast. Also in the drainage, and possibly associated with the mine, is a 1926 California commercial license plate (“287-863”).

Domestic artifacts include fragments of a cup and saucer, pocket tobacco tins, a few sanitary seal tin cans, a “Hills Bros” coffee can lid, a tin salt or pepper shaker, and clear, green, and brown glass fragments. Artifacts suggest a mid-twentieth-century date: one Mission soda bottle has a 1955 base mark, and beverage cans have church-key openings, which date to anytime between 1935 and the 1970s. Bottle bases include some with the Owens-Illinois Glass Company’s “Diamond O-I” mark, used between 1930 and the 1950s; one may have a 1941 or 1951 date code. One amber beer bottle has a Thatcher Glass Manufacturing Company mark that dates between 1944 and approximately 1982 (Whitten n.d.); another amber beer bottle has a Hazel-Atlas mark used between 1923 and 1982 (Lockhart et al. 2016:84). One clear bottle base has the Glass Container Company’s logo used between 1934 and 1968. One gallon-size Owens-Illinois Glass Company bottle has a large “X” on the base, which Lockhart and Hoenig (2007:12) interpret to mean, possibly, an experimental bottle mold. More recent artifacts include aluminum-topped and all-aluminum beer cans, which are probably casually deposited litter post-dating the mining operation.
Figure 12. Sample of FWA-1 artifacts. Clockwise from upper left: Hazel-Atlas bottle mark dating between 1923 and 1982; Can embossed “Blasting Caps / Dangerous”; California commercial 1926 license plate “287-863”; cable near summit; corrugated sheathing in drainage; Mission soda bottle dating to 1955.
**FWA-2 – Hillslope Mine (Figures 13 – 20)**

This site is located north of Site FWA-1, on the north slope of the hill and in an adjacent saddle that lies outside of the F.W. Aggregate parcel. It includes two shafts, three shallow adits, a rock seat-like feature, a rock shelter/building platform, and a can dump, tied together by a trail that extends downhill to the northwest. Artifacts indicate the site dates to before World War I.

**Features**

The rock shelter/structure pad is a leveled area, about 6 by 10 feet in size, created with a 2-foot-high rock retaining wall at the base of a rock cliff. The cliff projects over the leveled area about 3 feet, at a height of about 3 feet, creating a small shelter.

There is a shaft to the east, on another level area created by its waste dump. The shaft, about 8 feet square and estimated to be about 40 feet deep, is braced with four-by-eight-, two-by-eight-, and two-by-six-inch lumber, nailed and notched. A second shaft, to the northwest of the rock shelter, has collapsed to the point that it is difficult to measure, but its waste dump is larger. An adit next to the northwest shaft is about 2 feet wide, 4 feet high, and 6 feet deep. There are two adits on the hill above, one 4 feet wide, 6 feet high, and 8 feet deep, the other about 5 feet wide, 8 feet high, and 10 feet deep. Two mining cairns and a prospect are included in the site boundary, and one unusual feature is a rock “seat” created by positioning a thin slab atop a rocky outcrop.

A trash dump, composed mostly of tin cans, is located on the saddle to the east of the shafts and adits. A trail and its branches connect the features of the site, and travels all the way down to the base of the hill, although it has been washed out in some areas where it crosses a drainage. This steep trail is less substantial than the trail that connects the features of Site FWA-1; for most of its length it is defined by a cleared narrow pathway just a foot or two wide, rather than built-up retaining walls.

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Figure 13, left. Shaft near rockshelter, view to east. Figure 14, above, closeup view of shaft and collar.
Figure 15. Adit (to right of person) and shaft (left and below person) at western end of site.

Figure 16. Person stands on waste dump of shaft at west end of site; view to northwest.

Figure 17. Rockshelter/building platform, view to east.

Figure 18. Enamelware water pitcher.
Artifacts
On or adjacent to the leveled area/rock shelter were observed a barrel hoop, lumber with nails, a round hole-in-cap meat can with a key opener, metal rods, bolts, and welding plates. Fragments of olive glass were observed near the trail, and an enamelware water pitcher was found nearby. Two fragments of Chinese brown-glazed stoneware, a bent rod, and a sun-colored amethyst glass were also observed. The Chinese brown-glazed stoneware almost certainly indicates that at least one of the mining party was Chinese, by birth or ethnicity (Choy 2014; Yang and Hellman 1998). The Chinese presence in Owens Valley is documented in census records: ten immigrants born in China are listed in the Cerro Gordo census enumeration district, which may have included the project area, in 1870. Most are cooks or laborers, but one, Sing Lup, was a miner. Only eight Chinese are listed in the Cerro Gordo district in the 1880 census; Sing Lup is not listed. Chinese immigrants were subjected to harassment, discrimination, and violence in the Owens Valley in the late nineteenth century (Walton 1992) and are underrepresented in the historical record, so the presence of the Chinese stoneware is intriguing. However, the archaeological deposit overall at Site FWA-2 is too sparse to yield information beyond that already recorded.

The trash dump at the saddle includes dozens of tin cans, most of them hole-in-cap and knife-opened. An unidentified object of cast iron, with a “lid” about 14 inches square and 2 inches thick and a round “stopper” about 6 inches thick, was found near an adit.
**FWA-3 – Canyon Rock Structures (Figures 21-26)**
This site is located in a canyon on the west side of the project area, less than a half mile from Swansea. It consists of five features (four rock structures, a flat building platform or ledge created by a waste dump) and a few artifacts that date to the late nineteenth or early twentieth century.

*Features*
Feature 1 is a rock structure, the most carefully constructed at the site. Built up against the cliff, it incorporates some large boulders and bedrock into its walls. It measures about 15 feet square, and the walls are up to 7 feet high. The door opening, in the eastern third of the north wall, is 5 feet wide. Walls are about 2 feet thick; although the rocks are not formally coursed, 2-foot-long rocks were placed across the width of the walls at irregular intervals to increase the walls’ stability. Remnants of mud mortar are visible on the interior face of the walls. Bedrock in the southwest corner makes the floor uneven.

Feature 2 is an oval-shaped stone corral, about 60 by 35 feet in plan. It is composed of a rock wall, up to 6 feet high, butted up to a rock cliff, which forms its southwest side. Small walls (several feet wide and up to 4 feet high) were built in crevices in the cliff to make the corral complete. There is an opening on the north end that is 6 feet 5 inches wide, and another opening on the northwest curve that measures about 9½ feet, but the northwest opening may have been created, or at least enlarged, by erosion, since there is a drainage running through it.
Feature 3 is a rock structure, up to ten rocks and 3 feet high. It likely originally measured about 25 feet square, but the northeast corner has eroded into the adjacent wash. There are a few pieces of lumber outside its southeast corner.

*Figure 24. Feature 3, to south.*

Feature 4, like the other structures at the site, consists of uncoursed stone walls. It is 12½ feet by 10¾ feet (exterior dimension) and stands up to 28 inches above the ground surface. There are enough rocks in the center to suggest it was originally at least a foot higher. There may have been a window on the north side, and a door on the south.

*Figure 25. Feature 4, view toward west.*

Feature 5 is a prospect, with a flat-topped waste dump, at the base of the slope north of Feature 4. The waste dump measures about 50 feet long and 8 feet wide, and about 10 feet high. The prospect above it is up to 15 feet high, but the fractured nature of the rock makes it hard to estimate the size of the prospect cut (versus natural weathering).

*Figure 26. Feature 5, view toward northwest.*

In addition to the rock structures, there is one mining claim marker within the site, consisting of a pile of rocks atop a boulder in the canyon bottom. On the slopes above the site are four more mining claim markers.
Artifacts
Artifacts include a barrel hoop, a heavy metal strap folded into a “J” shape, and four lap-seamed hole-in-cap cans, all of which were knife-opened. Three of the cans are 4½ inches high; two are 3⁹/₁₆ inches in diameter and one is 4⁴/₈ inches diameter. The fourth can is 4¾” high and 4⁴/₁₆ inches in diameter.

Even though field stone is readily available in the surroundings, the rock structures represent a substantial investment of time and energy. Features 1, 3, 4, and 5 may have been intended as dwellings; Feature 1 is tall enough that a roof could have been placed directly on the walls, but no evidence of lumber or beams was observed. Even before the collapse of the rock walls, Features 3, 4, and 5 would have required additional walls above the rock. With only a few scraps of lumber in the area now, it seems likely the walls were made of canvas. Canvas, lumber, or other building material was apparently taken away to be reused elsewhere. The paucity of artifacts is puzzling, suggesting the site was occupied only ephemerally, in spite of the effort that went into the structures.

FWA-4 –Large Quarry (Figures 27-35)
This quarry appears on the 1987 Dolomite, California, 7.5-minute USGS topographic quadrangle, but not the 1951 New York Butte quadrangle, suggesting it was first excavated sometime between 1951 and 1987. It includes a main quarry area, a loading ramp, piles of gravel, several road traces, and scattered trash. A steep road leads uphill, to the southeast of the main quarry area, to several test and prospect areas on the hillside.

Features
The main quarry area is a flat area roughly 300 feet in diameter, with the south end cut into the hillside and the north end composed of waste rock. Part of the waste rock is held with a wooden retaining wall, 44 feet long and 12 to 14 feet high, made of three-by-twelve-inch horizontal planks held in place with eight-by-eight-inch posts and cables. West of the quarry area is a loading ramp, with a retaining wall 4 feet high and 25 feet wide. The center of the retaining wall

![Figure 27. Site FWA-4, to south.](image)
Figure 28. Lumber retaining wall, view to south.

Figure 29. Loading dock, view to east.

Figure 30. 55-gallon drums at south end of site.

Figure 31. Gravel stockpiles, view to north from quarry

Figure 32. View of road from upper prospect.

Figure 33. Upper prospect, near end of road.
is constructed of vertical timbers (eight-by-eight-inch and twelve-by-twelve-inch) and horizontal planks (two-by-twelve-inch) held in place with cable and rebar. Rock walls at each end (6 feet and 7 feet long) help anchor the wood. The ramp fill is white gravel, quarry debris, extending from one of several short road segments west of the main quarry area.

One road switchbacks up the ridge to the south 1500 feet, with tests at each switchback and a prospect at the end of the road. There are multiple short branches of other roads and tracks to the north and west of the main quarry area. Two piles of sands and gravels and a concentration of quarried boulders and cobbles north and west of the main quarry area may have been stockpiled for later use.

Features and artifacts to the west and south of the main quarry area were also mapped as part of the site, although whether they are temporally and functionally related to the quarry is uncertain. These include a possible benchmark indicated by “B.M.” and a down-pointing arrow painted on a vertical rock outcrop at ground level west of the main quarry area. A galvanized metal pipe set into the ground and approximately 3 feet high may be a boundary marker; several mining claim markers, composed of piled rocks, occur within the site boundary. A campfire ring, 7 feet in diameter, is located between the main quarry area and the highway. With a couple dozen church-key-opened sanitary seal cans, this campfire ring may be unrelated to quarry activities.

**Artifacts**

Most of the trash at the site is located below, and north of, the main quarry area. Artifacts include metal strapping and wire, three 55-gallon drums, paint buckets, conveyor belt fragments, quart-size oil cans, and a strip of metal (possibly part of a conveyor belt). Domestic artifacts include sanitary seal church-key opened beverage cans, aluminum-topped beer cans, a galvanized wash basin, a glass ice-tea pitcher, and mason and pickle jars, some with lids. Many of the domestic artifacts were used for target shooting: they are located at a long mound at the base of the slope, and are riddled with bullet holes. One bottle base has the Owens-Illinois glass company’s maker’s mark used from 1954 to the present (Lockhart and Hoenig 2007).

Near the top of the road that extends south from the main quarry area are pieces of lumber (one-by-six-inches by 48, 24, and 60 inches long), two metal pieces (both were painted yellow and appear to be from pieces of equipment), and a clear glass bottle fragment.
FWA-5 – Small Quarry (Figures 36 – 40)
This site may be related to marble prospecting; it includes a small quarry and associated waste dump of white cobbles and boulders, at least five prospects, one shallow adit/quarry, a trail, and at least 19 claim markers. A quarry is marked at this location on the 1951 New York Butte, California, USGS 15-minute topographic quadrangle.

Features
The small quarry, oriented northeast-southwest, is located at the base of the steep hillslope, and measures an estimated 50 feet long. The waste dump adjacent measures 70 feet long and is 7 to 12 feet high; the flat area atop the waste dump is 50 by 15 feet wide, with a gradual slope down to the north. On the flat area are two small areas partially outlined with concrete and rocks. One has two low, narrow alignments of concrete and rock extending from the bedrock on the upslope of the flat area and a third alignment connecting the two, so that the alignments and bedrock together form a rectangle 65 by 58 inches in size. The concrete is irregular, 4 to 8 inches wide, and not continuous, and it appears to be shallow, as though poured on the ground surface. The rectangle, in fact, is partially defined by the absence of white gravel that occurs to the west.

Three feet to the northwest is an oval, about 17 by 14 inches in size, outlined with concrete. There is an iron drill bit set into the bedrock adjacent to the waste dump, as though additional blasting was planned. Artifacts on the level top of the waste dump include a barrel hoop, cable, and wire.

Four of the five prospects are shallow, but one is a trench cut into the bedrock 15 feet long, 3 to 6 feet wide, and up to 5 feet deep. Dark bedrock at the end of the trench gives it the appearance of an adit, from afar. There are mining cairns on either side of the trench, about 3 to 3½ feet high and 3 feet in diameter.

Figure 36. FWA-5, marble quarry, view toward west.
The adit on the slope might be more properly called a quarry area: it is a cut almost 100 feet deep into the hillside, by 30 feet wide, with a mining claim cairn on its southern edge. A narrow 1-foot-wide trail, cleared of rocks, switchbacks up to the cut from the base of the hill.

Another possible adit or quarry area is indicated by a large waste dump or rock slide of white boulders and cobbles. It measures about 60 feet, running downslope, and about 30 feet wide. No cut or adit is visible above the waste dump.

At the southern end of the site is a rock pile/mining cairn adjacent to a rectangular rock alignment that measures about 8 by 10 feet. Nearby three knife-opened hole-in-cap cans, two of them \(4\frac{7}{16}\) inches high by 4 inches in diameter, and one \(4\frac{13}{16}\) high by 4 inches in diameter.

**Artifacts**

Artifacts are sparse: besides the few items on the quarry waste dump and the three hole-in-cap cans described above, there is a large rectangular can (as for oil or gas), and a metal handle. Northwest of the waste dump are three drilled core fragments about 6 inches in diameter, with the longest 20 inches in length.
The site of the Owens Lake Silver-Lead Company mill and smelter was recorded in 2005 by Jeff Burton and Mary Farrell as part of environmental studies conducted for the initial Durability Quarry operations. Encompassing almost 10 acres, the site is situated on the south-facing slope of a predominantly limestone ridge, just east of the current State Highway 136 alignment. The oldest artifacts observed, including a soldered hole-in-cap can, other soldered cans, fragments of sun-colored amethyst, aqua, and olive-green glass, barrel hoops, and square-cut nails, reflect its late-nineteenth-century use. However, more modern artifacts (sanitary seal cans with church-key openings, broken beer and wine bottles, aluminum cans) are also present. Nineteen features were recorded, including a millsite, two adits, a quartz quarry, a gravel quarry, a stone foundation, and a rock corral. No trash dumps or artifact concentrations were identified at the site, so artifacts are described below with the features where they were observed.

Features
Feature 1 is the mill foundation, the most prominent feature at the site, easily visible from State Highway 136. It includes two retaining walls that form two levels or platforms, filled with gravels that are apparently waste material from mines or quarries. The walls are made of well-fitted dry-laid rock, almost exclusively quartz. The lower wall is 28 feet long, 5 feet high, with a “foot” 12 to 18 inches high extending a foot more at the base. The lower wall forms a platform about 7½ feet wide, butted up to the southeast end of the upper wall, which is 63 feet long, about 8 feet high, and up to 3 feet thick. At the northwest end of the main section, the wall turns a right angle and extends 11½ feet to the northeast, then 16 feet northwest, then almost 12 feet northeast again, to form an extension off the main platform. Below the northwest end of the upper wall, and about even with the lower wall, are four anchor bolts set in the slope, two ¾ inch in diameter and threaded, one 1 inch in diameter with a square nut or head, and one 1¼ inches in diameter with a pounded head. Artifacts near Feature 1 include a sanitary-seal, church-key-opened can, a heavy metal machine part, a soldered-seam lap-cap can, a red brick fragment, and a 5-inch-diameter riveted pipe, about 2 feet long. A path, 2 to 6 feet wide, leads to Feature 2.
Feature 2 consists of two leveled platforms, constructed of dry-laid field stone, mostly irregular limestone, in contrast to the white, well-fitted quartz rocks of Feature 1. The upper platform is a rectangle 23 feet by 9 feet in size, three sides formed by a retaining wall up to 5 feet high, and the fourth side formed by limestone bedrock. The southern corner has collapsed onto the gravel bench below. The lower level is formed by a rock wall, 35 feet long, which extends to the southeast from about the middle of the upper platform. This retaining wall is up to 57 inches high, near its center, where an eroding gully reveals the full height; ends of the wall are 24 inches and 30 inches high above the current ground surface. A 12-foot-long section of less carefully laid rocks extends to the southwest, from near the end of the retaining wall, but this section does not, at least at present, serve as a retaining wall. Artifacts found near Feature 2 include fragments of a green wine bottle, a sanitary-seal can with church-key openings, and a lap-seam can.

Feature 3 is an irregular L-shaped platform, formed by a retaining wall made of limestone rocks and boulders, adjacent to limestone bedrock. The main area is 12 feet by 10 feet wide, maximum, with the “ell” about 4 feet long, 4 feet wide. Maximum height of the retaining wall is 3 feet; a large boulder is incorporated into a corner.

Feature 4 is a rock-walled depression excavated in the artificial platform created by the waste dump. The main part of the interior is 14 feet, 6 inches by 8 feet, but there is an extension “pop-out” 6 feet 6 inches long and 2 feet wide at approximately the center of the southwest wall. No drawings or plans of the Owens Lake Silver-Lead Company plant were available at the time of this report, but an illustration in Likes and Day (1975:16) of the Belshaw blast furnace at Cerro Gordo shows the base of the furnace set into an excavated area, and Feature 4 may mark the location of one of the Owens Lake Company’s furnaces.

Feature 5 is a pile of rocks, rich in iron and quartz, about 3 feet high and 10 feet in diameter, atop a large gravel ramp.

Figure 42. Mill site Feature 3, leveled platform.

Figure 43. Mill site Feature 4, possible furnace foundation.
Feature 6 is the eroded remnant of a retaining wall for a road (now washed out); it measures 5 feet long and 1 foot high.

Feature 7 is a rock ring, 5 feet in diameter, composed of a single discontinuous row of large rocks. Some burned wood in the center suggests it was used recently, and perhaps made recently, as a campfire ring; the rocks are not deeply set into the ground.

Feature 8 is a roadside dry-laid rock retaining wall, up to 1 foot high, 35 feet long. It has been breached 22 feet from its western end by an erosion gully.

Feature 9 is an 8-foot-long section of roadside retaining wall. Numerous pieces of broken clear and amber glass and a “Gilbey’s” brand bottle cap are nearby (all modern).

Feature 10 is an 18-foot-long section of roadside rock retaining wall, up to 3 feet high. It has been breached by an erosion channel.

Feature 11 is a rock concentration, 3 feet by 3½ feet in plan and about 1 foot high, composed of about 20 rocks of quartz and limestone, the longest of which is about 14 inches.

Feature 12 is an adit, 5 to 6 feet tall and 4 feet wide. It curves inward at least 40 feet from the portal. Rock to the west and above the adit is dominated by limestone, but quartz or quartzite is visible in the east wall of the adit, and there is some quartz waste rock at the entrance. Two fragments of whiteware along with modern green, brown, and clear bottle glass were observed near the entrance.

Feature 13 is an area, about 50 by 30 feet in size, where it appears that a large quartz outcrop was quarried. Quartz boulders and cobbles are piled along the east edge and in linear piles to the west. This quarry may be the source of the building stone used to construct Feature 1. No drill holes are visible in the cliff but the outcrop is very irregular and jointed, and may have fractured easily along natural cleavages. Two pocket tobacco tins were observed near the quarry, one to the south, the other to the southwest. One piece of safety glass (as is used in automobiles) was observed about 20 feet to the south.
Feature 14 is a one-room stone perimeter foundation, probably for a cabin, 18 feet by 14 feet in size, with a 2½-foot opening at the center of the south end. Walls, uncoursed and dry laid, are up to 28 inches thick. The highest portion remaining is 3 feet tall; rocks are neatly stacked up to six high. The northeast corner is partially collapsed, and a low area along the west wall may indicate a window opening. Outside the north wall is a sanitary seal can stamped “WJRX3” with smaller, undeciphered letters beneath. At the northwest corner are numerous brown glass fragments (possibly from one modern bottle), two aqua bottle fragments, and two green bottle fragments. No artifacts were observed inside the structure, but wind-blown sand covers the interior. About 15 feet to the east of the structure is a road paved with quartz gravels; the main traveled road through the site is about 40 feet to the south. About 30 feet to the west is a deep-cut erosion channel, about 6 feet wide and 6 feet deep.

Feature 15 is a stone corral, approximately 38 feet by 46 feet in size, constructed against a large rock outcrop. The corral is oriented northwest-southeast, and there are 5-foot-wide openings in the center of the southwest side and at the east end of the northwest side. The uncoursed unmortared walls are about 2 feet thick, composed of rocks of various sizes, some over 30 inches long, but most between 12 and 16 inches in length. At its highest, the wall is only 30 inches high,
and although there are some fallen rocks inside and outside the structure, there does not seem to be enough fallen rock that the original structure could have been much higher, unless the rock was removed for use elsewhere. Artifacts at the corral include a fragment of pressed tin, with a shell design and nail holes, a post fragment, amber glass, and a few tin fragments, including parts of a rectangular can and a soldered-seam can. About 75 feet to the southwest of the corral are a horseshoe fragment, three pieces of barrel hoop, a hole-in-cap lid, and a heavy-gauge metal fragment with three holes.

Feature 16 is a 6-foot-diameter rock concentration, composed of about 30 rocks, the longest of which are about 2 feet in length.

Feature 17 is an adit, bearing north-northwest into the cliff face. Quartz waste rock is present at the entrance, and probably indicates the kind of vein that was followed; limestone rock is dominant on the slopes above and to the west. The adit, 4 to 5 feet high and 3 to 4 feet wide, curves 20 feet toward the west. Outside, there is a 25-foot-long unroofed (or collapsed) cut at the entrance. A modern aluminum meat can was found inside the adit.

Feature 18 is a small L-shaped retaining wall, 3 feet by 4 feet and about 2½ feet high, near the upper (Feature 17) adit.

Feature 19 is an old gravel pit, located where the 1987 USGS topographic map has depicted a “quarry.” The approximately 110-yard-diameter area appears disturbed, but leveled out, as though the ground contours were restored when the operation was completed.

With the exception of the gravel pit (Feature 19), it appears likely that most of the features at the site are associated with the 1869-1874 operation of the Owens Lake Silver-Lead Company mill and smelter. The quartz quarry (Feature 13), for example, probably provided the building stone for the main wall of the mill (Feature 1). It is possible, however, that the two adits (Features 12 and 17) are later developments related to galena mining, and equally possible that the mill site was reused to process the galena deposits found in 1885.

**Artifacts**

Considering how substantial the mill and other structures appear to be, there is surprisingly little historic trash around the site. No trash dumps or trash concentrations were encountered, suggesting material was cleaned up at some time after the main occupation, or destroyed during subsequent operations. Near the road are cans with sanitary seals and church-key openings, which date to after 1935, a clear glass bottle base with the base mark for Latchford Marble Glass Co., Los Angeles, CA, used from 1939 to 1957, and glass bottle fragments, which are probably associated with casual visits to the site by sightseers. A few fragments of sun-colored amethyst glass and other artifacts suggest an earlier date, but these are not clearly associated with any feature nor other historic trash.
**Isolates (Figures 50-55)**

Forty-one isolates were recorded; isolates are single artifacts (for example, a bottle, even if it has broken into several pieces) or simple features that have no associated artifacts. The isolates include four single artifacts, one trail remnant, and 36 mining claim markers encountered outside the boundaries of recorded sites (Table 1). The 36 mining claim cairns are stacks of rocks, 3 to 5 feet in diameter and 1½ to 3 feet high. Many have a four-by-four-inch post, and some have pocket tobacco tins at their base. Pocket tobacco tins or other containers were often used to hold a document describing the mining claim, but no paper, either intact or in fragments, was found at these cairns.

<table>
<thead>
<tr>
<th>Isolate # (keyed to map, Figure 50)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dark green wine bottle base with deep push-up (Figure 50).</td>
</tr>
<tr>
<td>2</td>
<td>Large rectangular oil can with soldered-on spout and twelve holes punched in the top, in the opposite corner from the spout.</td>
</tr>
<tr>
<td>3</td>
<td>Small prospect on the ridge west of the southernmost lobe of the existing quarry.</td>
</tr>
<tr>
<td>4</td>
<td>Adit and waste dump located at the southern boundary of the F.W. Aggregate parcel. The adit is 48 inches wide, 36 inches high, and estimated to be 20 feet deep. The waste dump is 20 by 25 feet and up to 8 feet high.</td>
</tr>
<tr>
<td>5</td>
<td>Traces of a trail, just 1 to 2 feet wide, on the west side of project area. Although washed out in numerous places by small drainages, the trail is estimated to be approximately 875 feet long, and runs east west to east. It is truncated by a large drainage just west of the parcel boundary and by several small drainages at its eastern end. It may have once continued to the trail recorded as part of site FWA-2, which begins 800 feet to the east.</td>
</tr>
</tbody>
</table>
Figure 50. Location of isolated finds 1-5 and mining claim cairns. Cairns are indicated by green-filled dots; other isolated finds are indicated by green triangles for #1-4, and a green dashed line, for #5.
Figure 51. Isolate #4, adit and waste dump. Note the white posts indicating the southern boundary of the F.W. Aggregate, Inc., parcel on the hill above the adit. View to northeast.

Figure 52, left. Example of mining claim cairn, with pocket tobacco tin at its base.

Figures 53-55, below. More examples of mining claim cairns.
Context for Evaluation
Properties listed on, or eligible for listing on, the California Register of Historical Resources need to be considered in environmental reviews undertaken to comply with the California Environmental Quality Act (California Office of Historic Preservation n.d.). Properties may be eligible for listing on the California Register if they retain integrity of location, design, setting, materials, workmanship, feeling, and association, and:

1. Are associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States;
2. Are associated with the lives of persons important to local, California, or national history;
3. Embody the distinctive characteristics of a type, period, region, or method of construction or represents the work of a master or possesses high artistic values; or
4. Have yielded, or have the potential to yield, information important to the prehistory or history of the local area, California, or the nation.1

Recognizing the importance that mining has had in the history of the United States, the National Park Service has developed guidelines for evaluating the historic significance of mining properties (Cowie et al. 2005; Noble and Spude 1997). In addition, the California Department of Transportation has prepared a thematic study to assist with evaluating the information potential of mining properties in California (Caltrans 2008). Although these studies are geared toward evaluating eligibility for the National Register of Historic Places, rather than the California Register of Historical Resources, the state criteria are based on the national criteria, and are almost identical. Furthermore, any property determined eligible for the National Register is automatically considered eligible for the state register, so the guidelines can be used to help evaluate the mining properties in the Durability Quarry expansion project.

Both of the National Park Service publications explain how a mining property could be “associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California” (criterion 1). For example, Noble and Spude discuss how mining properties could represent important contributions to historical patterns of commerce, community planning, engineering, ethnic heritage, labor relations, and science (Noble and Spude 1997). Cowie et al. (2005:73) outline the process, citing another standard text:

To develop a determination under this criterion, a researcher must identify the appropriate event or pattern, document its importance in history, demonstrate an association between the event or pattern with the archeological remains at the site, and demonstrate the site’s integrity and ability to display this association (Hardesty and Little 2000:33)

Similarly, to evaluate significance under criterion 2, it is necessary to identify the important person with whom the property is associated, document that person’s importance, show an

1 From the California Office of Historic Preservation, http://ohp.parks.ca.gov/?page_id=21238
association between the person and the physical remains of the site, and demonstrate the site’s integrity and ability to convey that information (Cowie et al. 2005:74, citing Hardesty and Little 2000:34-35).

According to Cowie et al. (2005:74), mining sites are often considered significant under criterion 3 when they:

- display architectural properties particular to the industry (e.g., an ore mill);
- demonstrate innovation in building materials;
- represent unique vernacular architecture;
- represent technology that is the first of its kind or the last of an era;
- represent a major change in technology, or an innovation in technology; or
- represent a well-preserved and contextualized example of a technology that is typical of a period of significance.

Significance under criterion 4 requires there to be important information potential at the site. For example,

The features and artifacts at the site might provide important information concerning the characteristics and evolution of mining camps, consumer behavior in miners’ domestic households, the development of a technology, or the application of a technology under unusual environmental or logistical circumstances. (Cowie et al. 2005:74, citing Hardesty and Little 2000:37-38).

The Caltrans context for evaluating mining sites (Caltrans 2008:113) notes that some research topics are important to both historians and archaeologists:

1. Technology: mining and technological development.
2. Historical Ethnography/Cultural History: stories of mining sites and their populations.
3. Ethnicity: studies of distinctive cultural groups and ethnic interactions.
5. Economy: market development, consumption, and class.

All three studies note that for a site to be able to provide important information about any of these research themes, it must contain sufficient archaeological data (in the form of intact features or industrial or domestic trash) and discernible association with the important event or theme under study.
Applying the California Register Criteria to the Durability Quarry Expansion Sites

One of the sites included in this study meets the criteria for eligibility for the California Register of Historical Resources. The Owens Lake Silver-Lead Company mill and smelter site (CA-INY-6661H) covers almost 10 acres, and contains substantial physical remains, including adits and building foundations. The site meets criterion 1 for its integral association with the mining at Cerro Gordo, one of the most significant mining sites in Inyo County. Mining at Cerro Gordo spurred a mining boom in the region, influenced the development of agriculture and transportation systems in Owens Valley, and even contributed to the growth of Los Angeles as a center of banking and trade.

The site could also be eligible under criterion 2, for its association with Colonel Sherman Stevens and James Brady, both associated with the use of steamships on Owens Lake and for other Owens Valley developments. The mill and smelter site might also be eligible for the California Register under criterion 3, for the distinctive quartz masonry of the main mill and other features. In spite of the apparent paucity of associated artifacts, the site may be eligible under criterion 4 for its information potential: the layout of buildings and other features could provide information on the milling technology.

The other sites within the F.W. Aggregate parcel, FWA-1, -2, -3, -4, and -5, do not appear to meet the criteria for the California Register. FWA-1 and FWA-2 represent small-scale mining, with FWA-1 dating to the mid-twentieth century and FWA-2 dating to the late nineteenth or early twentieth century. FWA-4 represents relatively large-scale quarrying in the mid- to late-twentieth century, and FWA-5 represents earlier, smaller-scale quarrying and prospecting. FWA-3’s rock structures suggest the builders had intended a long-term occupation, but the few artifacts at the site reflect very short-term, ephemeral use: the only domestic artifacts encountered were two pocket tobacco tins at a mining claim marker, a barrel hoop, and four small food tins. Artifacts reflecting activities are even sparser, consisting of a single bent piece of metal.

Although mining in general has been an important factor in Inyo County history, there is no evidence that any of these five sites made a significant contribution to local, state, or national history or heritage (Criterion 1). Likewise, there is no evidence that any of the sites is associated with the lives of persons important to local, California, or national history (Criterion 2), and they do not appear to embody the distinctive characteristics of a type, period, region, or method of construction (Criterion 3).

As for Criterion 4, none of the five newly recorded sites in the Durability Quarry Expansion project area have significant data potential beyond that already recorded. Likewise, none of the sites meets the definition for a “unique archaeological resource” as defined in the California Public Resources Code 21083.2(g).

The five isolated finds and the 36 mining claim cairns do not meet site definition criteria and are not eligible for the California Register.
**Recommendations**

The Owens Lake Silver-Lead Company mill and smelter site (CA-INY-6661H) is a California State Landmark and should be considered eligible for listing on the California Register of Historical Resources. It is located outside the boundary of the proposed Durability Quarry Expansion project, but care should be taken to ensure that it is not impacted by proposed or future quarrying operations.

The other five sites (FWA-1 through 5) and the isolates are not considered eligible for the California Register of Historical Resources, and do not need to be considered further under the CEQA guidance for cultural resources.

Unless affected tribal cultural resources are identified, the proposed project would have no significant impacts on cultural resources.

Figure 56. Sketch map of the Owens Lake Silver-Lead Smelter and Mill site, CA-Iny-6661H, adapted from the 2005 site record. The orange line in the sketch is the current road alignment. The F.W. Aggregate, Inc., property includes the north part of the archaeological site, as indicated by gray shading. The boundary of the proposed quarry expansion is to the north, outside the map frame.
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