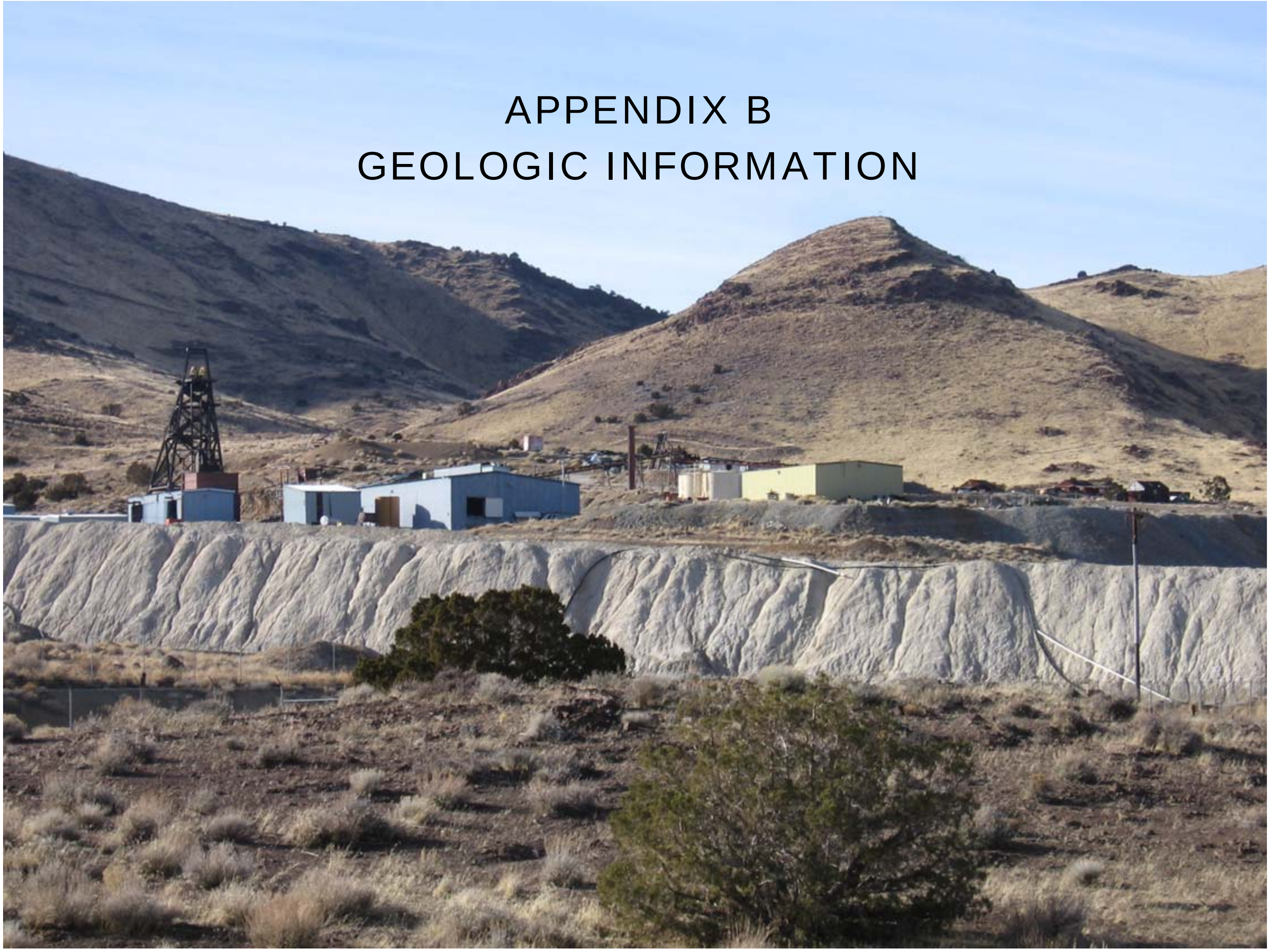
APPENDIX B
GEOLOGIC INFORMATION



GOOSEBERRY MINE
BROWNFIELDS PROJECT
STOREY COUNTY, NEVADA

3.0 DESIGN CRITERIA

3.1 Topography

The project site is at 5,350 feet above sea level where surrounding relief rises some 1,000 feet. The dip of the leach pad area is approximately 6.4 percent. Map 4 shows the topography on and around the project sites on 1 inch equals 50 feet. Map 2 is the USGS quadrangle including all waterways, streams, springs, and seeps around the project. The lone drinking water source presently or historically developed is located at the current mill, in the form of bottled water. No other potable water is near the project site.

3.2 Geology & Mineralogy

Gold and silver mineralization at the Gooseberry Mine is restricted to a narrow, pinching and swelling calcite-quartz vein. The vein, which averages 7.5 feet in width, has a very weak expression on the surface. Underground, over 3,000 feet of strike length and 1,150 feet of dip length have been exposed. The average strike of the vein is N65°W and generally dips 80° to the south. Local changes in strike and/or dip created dilation zones which caused the pinching and swelling nature of the vein. This also created voids into which mineralizing solutions entered forming ore shoots. These ore shoots plunge shallowly to the west and can have strike lengths up to 800 feet and dip lengths of up to 500 feet.

Mineralization occurred in at least three stages. A barren massive calcite was deposited first. A second stage dominated by quartz was accompanied by pyrite, argentite, electrum and native gold. The third stage was barren massive calcite. Calcite makes up 80 to 90 percent of the vein throughout the mine.

The Gooseberry vein crosscuts a series of dacite and andesite volcanic flows called the Kate Peak Formation. The unaltered Kate Peak Formation is up to 1,500 feet thick in areas adjacent to the mine.

The Kate Peak flows have been altered to a propylitic alteration assemblage in an envelope up to 400 feet thick around the vein.

This description of the ore body geology is included to describe the type of material from which the mill tailings resulted. Generally, flotation recovery of gold and silver values from an original ore feed at 7.5 Ag oz./ton, 0.17 Au oz./ton resulted in tailings at 1.00 Ag oz./ton, 0.025 Au oz./ton. Report 3.1 is a 32 element ICP of a sample taken from the mill tailings.

3.3 Lithology

The stratigraphy of Gooseberry can be generalized as being within a sequence of Tertiary volcanic flows, flow breccias, tuff breccia, laharic flows, volcanic conglomerates and agglomerates locally intruded by pyroxene andesites to rhyodacites. Intercalated sedimentary beds of shale, shaley sandstone, waterlain ash fall tuff and lenses of diatomite are also included within this collection of units and are collectively characterized as the Kate Peak Formation.

A field investigation of the site was conducted by Wahler Associates in 1983 to provide lithology and to test physical properties of materials in the general site area. The field investigation program consisted of geologic mapping, backhoe and dozer trenching work and drilling exploration. The field program was directed to assess the foundation conditions and availability of borrow materials.

Mapping was performed using a 1"-200' topographic base provided by Asamera Minerals (U.S.) Inc. Trenching and test pitting work was performed using a Caterpillar D-9 equipped with a single ripper and a Dynahoe backhoe. This work was performed on November 15 to 18, 1983. The test pits were logged by A.S. Buangan, engineering geologist with Wahler Associates. A total of 29 test pits were excavated and logged. The locations of the test pits are shown on Figure 3.1 and the test pit logs are included in Reports 3.2. Samples were obtained and transported to the Palo Alto laboratory for testing.

Drilling was performed on December 9-10, 1983, using a CME75 hollow-stem auger supplied by Erickson-Ford Drilling Co., of Boise, Idaho, under subcontract to Asamera Minerals (U.S.), Inc. Two holes were drilled in the channel foundation area to depths of 25 and 35 feet. Undisturbed samples were obtained by pushing 3-inch diameter thin-wall tubes and transported to Palo Alto for laboratory testing. Disturbed samples were also obtained using the standard penetration test. In the proposed impoundment area, 4 auger holes were drilled to assess the depth of potential borrow materials. These hole depths ranged from 15 to 30 feet.

The locations of these holes are shown on Figure 3.1 and the boring logs are included in Report 3.2. Map 3 includes soils information at the site and Report 3.3 describes the soils located on the map.

3.4 **Surface and Ground Water Hydrology**

A previous study on the ground water supply for Gooseberry Mine and vicinity was performed by Hydro-Search, Inc. in 1976 (1976a and 1976b). This investigation indicates that ground water occurrence in the Kate Peak Formation is related to fracture permeability and alteration, rather than to intergranular porosity. For example, the Well #4A, principal water bearing fractured rocks were encountered at depth intervals of 150 to 190 feet, 265 to 285 feet, 300 to 372 feet, and 455 to 485 feet. Pumping tests in this well indicated a low transmissivity value (608 gpd/ft). The apparent lack of influence of pumping on water levels in nearby wells suggests that fractures contributing ground water to Well #4A are not in efficient hydraulic communication with the overall fracture system in the surrounding rocks. This well and other wells south of the proposed impoundment were abandoned because of low yield and low production.

During our investigation on November 18, 1983, water levels were measured at 155 feet in Well #4A and 95 feet in Well #3. On December 9, 1983, water levels were measured at 150 feet in Well #4A, 108 feet in Well #4 and 79 feet in Well #3. Ground water was also encountered in exploration borings drilled on December 9 and 10, 1983, at depths of 19.5 feet (DH-1), 18.6 feet (DH-2), 14.5 feet (DH-3) and 14.0 feet (DH-4). These borings were located near the stream channel. Ground water occurs in the weathered bedrock and appears to be confined along the contact of the decomposed volcanics and the rockier zones.

A strong seepage area was noted during field exploration along the toe of the south portion of the existing pond and is apparently related to seepage along the contact of the natural materials and embankment materials of the tailings impoundment.

In test pits located in the channel (TP-12 and TP-13), strong flows were encountered in the alluvial materials. Slow seeps were also noted in the decomposed dacite adjoining the drainage channel at shallow depths.

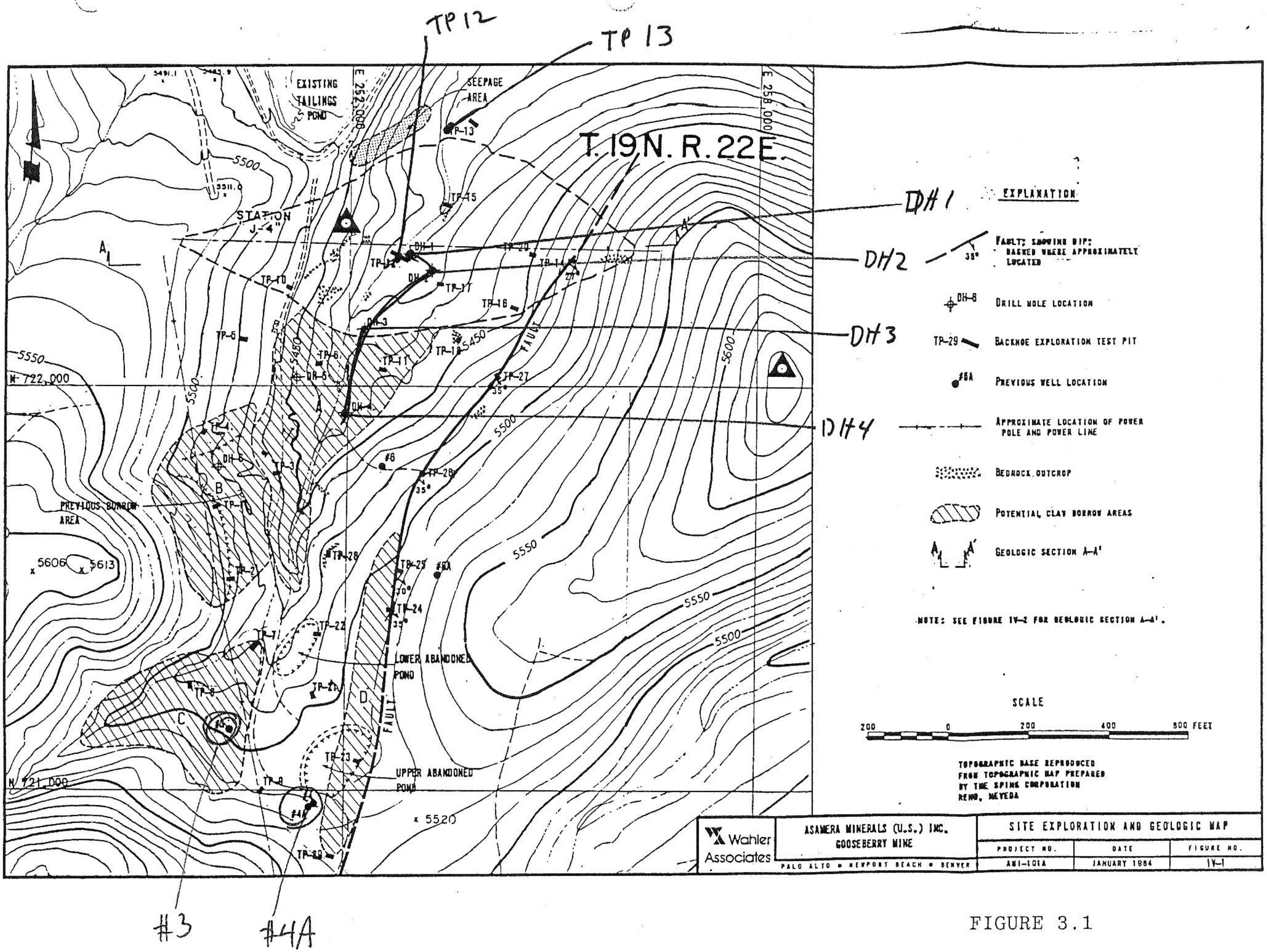

TP 12
TP 13
T. 19N. R. 22E.
DH 1
DH 2
DH 3
DH 4
#3
#4A
EXISTING TAILINGS POND
SEEPAGE AREA
STATION J-4"
PREVIOUS BORROW AREA
LOWER ABANDONED POND
UPPER ABANDONED POND
FAULT
E 252,000
E 258,000
N 722,000
N 721,000
5500
5550
5600
5450
5606
5613
5520
EXPLANATION
FAULT; SHOWING DIP; DASHED WHERE APPROXIMATELY LOCATED
DRILL HOLE LOCATION
BACKHOE EXPLORATION TEST PIT
PREVIOUS WELL LOCATION
APPROXIMATE LOCATION OF POWER POLE AND POWER LINE
BEDROCK OUTCROP
POTENTIAL CLAY BORROW AREAS
GEOLOGIC SECTION A-A'
NOTE: SEE FIGURE IV-2 FOR GEOLOGIC SECTION A-A'.
SCALE
200 0 200 400 600 FEET
TOPOGRAPHIC BASE REPRODUCED FROM TOPOGRAPHIC MAP PREPARED BY THE SPINK CORPORATION RENO, NEVADA
Wahler Associates
PALO ALTO • NEWPORT BEACH • DENVER
ASAMERA MINERALS (U.S.) INC.
GOOSEBERRY MINE
SITE EXPLORATION AND GEOLOGIC MAP
PROJECT NO. AMI-101A
DATE JANUARY 1984
FIGURE NO. IV-1

FIGURE 3.1

The project site is located in Storey County, Nevada, about six miles south of Clark and twenty miles east of Reno. The nearest weather station operated by the Weather Bureau is located in Reno.

This part of Nevada is generally arid to semi-arid, due primarily to the shadowing effect of the Sierra Nevada Mountains. Most of the approximately seven inches average annual precipitation (1921 to 1950 data, U.S. Department of Commerce, 1960) falls as light snow during the winter months and as infrequent, but high intensity, thunderstorms during the summer.

The design flood for the tailings project derives from such thunderstorm. It is likely that the precipitation would occur with an intensity great enough to preclude a significant amount of seepage into the soil; rather, the water would tend to run off as sheet flow. The 100-year, 24-hour storm precipitation is estimated at 2.8 inches (U.S. National Weather Services, 1973). The 25 year, 24-hour storm precipitation is estimated at 2.2 inches.

3.5 Climate

The Gooseberry Mine is located some seven miles south of the Truckee River drainage in the semi-arid Pah Rah Mountains. Temperatures, on a whole, are mild, but the difference between the high and low often exceeds 45 degrees. Afternoon highs may exceed 90 degrees with night lows rarely over 60 degrees.

Based on the 1951-1980 period, the average first occurrence of 32 degrees Fahrenheit in the fall is September 16 and the average last occurrence in the spring is June 1.

More than half of the precipitation occurs mainly as mixed rain and snow, and falls from December to March. Although there is an average of about 25 inches of snow a year, it seldom remains on the ground for more than three or four days at a time. Summer rain comes mainly as brief thunderstorms in the middle and late afternoons. While precipitation is scarce, considerable water is available from the high altitude reservoirs in the Sierra Nevada where precipitation is heavy.

Humidity is very low during the summer months and moderately low during the winter. Fogs are rare and usually confined to the early morning hours of midwinter. Sunshine is abundant throughout the year.

Report 3.4 includes climatological data for the nearest weather station located in Reno, Nevada.