Name and Location of Facility Inspected	**Facility Permit**	**Inspection Date**	**Inspection Time**
Former Jackson Mercury Mine Sonoma County APN 069-060-035 APN 069-060-033	N/A Closed in May 1972	June 3, 2016	10:00 AM

Names & Titles of On-Site Representatives and Consenting Parties	**Consent Provided?**	**Contact Information**	Notified of Inspection?
Mr. David Reed Mr. James Henry and family	☑ **Yes**	Phone: 707 570-6632 (Reed) 707 953-6206 (Henry)	☑ **Yes**
Property Owner(s)		**Address:**	
Mr. David Reed Mr. James Henry and family		18045 Sweetwater Springs Road, Guerneville 18001 Sweetwater Springs Road, Guerneville	

WQ Inspector Name(s) & Title(s)
Lindsay Whalin, Engineering Geologist, Regional Water Board, Region 2
Jon Mistchenko, Engineering Geologist, Department of Conservation
Claudia Villacorta, Supervising Engineer, Regional Water Board, Region 1
Paul Keiran, Water Resource Control Engineer (WRCE), Regional Water Board, Region 1

Weather Conditions at the Time of the Inspection:	**Facility Receiving Water Names:**
Warm morning, hot, sunny afternoon	Wilson Creek

Prepared By:	Paul Keiran on June 28, 2016
Reviewed By:	Mona Dougherty, Senior Water Resource Control Engineer

Foot Notes:

1. Photographs taken by Paul Keiran and Lindsay Whalen

I. Background

The former Jackson Mercury Mine, located 4 miles north of Guerneville on Sweetwater Springs Road in Sonoma County, is presently owned by three individuals. Mine waste piles (rock that has been "cooked" to remove elemental mercury) and the ore processing buildings (power plant, furnace, retort oven, material storage) remain onsite. The mine shaft, a vertical shaft some 1,500 feet deep, has been completely sealed shut. The mine site borders Wilson Creek to the north and woodlands in all other directions. The mercury mine

operated between 1946 and 1971, with ore crushed and baked in a furnace, and the elemental mercury recovered through condensation. A retort was installed in 1968 to recover mercury from the "mud" cleaned out of the condensers. The mine wastes consist primarily of baked crushed ore and the "flour" from the retort. Most of the mine wastes were subsequently removed by a local construction company who used the mine wastes for road base and other foundation-based uses. This company has since dissolved. The site was never covered under any Regional Water Board permits.

On June 3, 2016, the Department of Conservation, and North Coast and San Francisco Bay Regional Water Quality Control Board staff (hereinafter staff), met with property owners who accompanied the staff on an inspection of the facility. Staff's inspection objective was to sample areas onsite to identify the extent of any metals, including mercury that might create the potential for pollution in site storm water runoff. Sampling was performed via the XRF metals analyzer, a non-destructive analytical technique used to determine the elemental composition of materials. XRF analyzers determine the chemistry of a sample by measuring the fluorescent (or secondary) X-ray emitted from a sample when it is excited by a primary X-ray source. XRF analyzers can report concentrations in parts per million as well as two-sigma confidence for a wide range of elements. A system check was performed on the instrument prior to taking the first reading, with all readings taken in the "soils" mode.

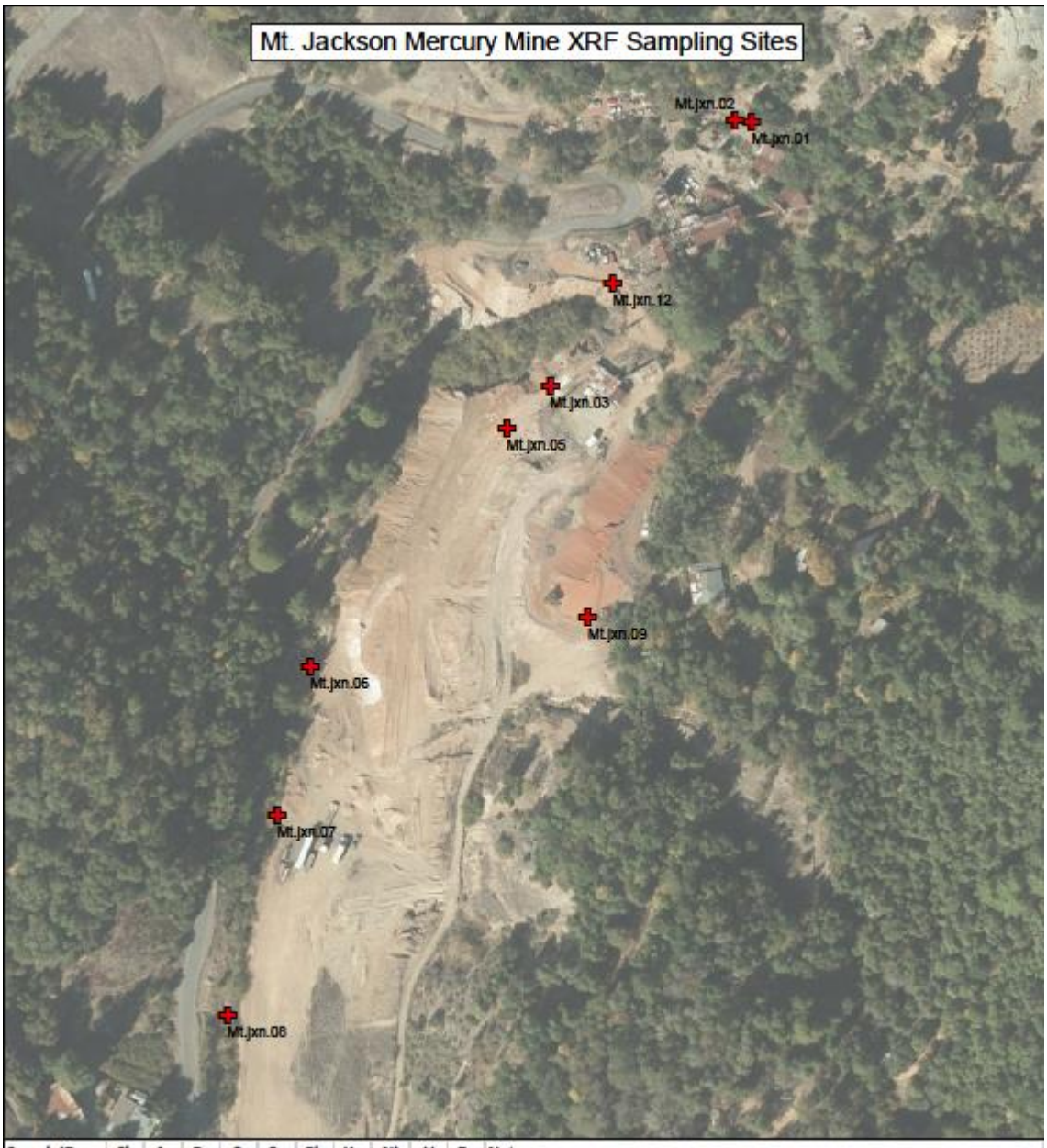
II. Inspection observations

Staff arrived at 10:00 am on June 3, 2016, and met with landowner Mr. David Reed. Staff walked the entire site with Mr. Reed (and later on with a second landowner, Mr. James Henry), viewing all areas that formerly processed ore, former building sites, chemical storage areas, all areas of stockpiled mine wastes, and storm water drainages. Property owners were cooperative and helpful in describing the site history and accompanying staff on accessing mine processing areas.

The bulk of storm water flows directly into Wilson Creek via several well defined drainages. The fines that were sampled in these drainages revealed the presence of total mercury and other total metals. Other sources of mercury were detected in driveway dust (see Photo 5) and in one area where rocks with a reddish brown mineral coating were noted (see Photo 6). Concentrations of mercury higher than 20 mg/kg are considered hazardous. The highest concentrations of mercury found onsite were at sample site Mt.jxn.05 (114 mg/kg), followed by Mt.jxn.12 (81 mg/kg), Mt.jxn.06 (61 mg/kg), Mt.jxn.07 (34 mg/kg), and Mt.jxn.08 (20 mg/kg). Four other sampling points revealed mercury as non-detect, albeit these areas did reveal evidence of other detected metals. A review of Department of Toxic Substances Control Criteria for Inorganic Constituents of Hazardous Wastes (see Attachment 1) for these metals shows that 4 out of the 9 mercury samples collected show total threshold limit concentrations (TTLC) of mercury that are four to five times higher than the Mercury TTLC limit in soil of 20 mg/kg. No other metals showed levels that exceeded their TTLC limit (See Attachment 1 for list of TTLC limits).

III. Site map showing sampling sites

The following map details the sampling sites and associated metals concentrations for 10 species of metals.



SampleID	Sb	As	Ba	Cr	Cu	Pb	Hg	Ni	V	Zn	Notes
Mt.jxn.01	86	ND	920	282	54	ND	ND	433	ND	105	Background soil profile exposed in cut above processing area.
Mt.jxn.02	51	22	373	468	ND	ND	ND	1524	ND	108	Reddish soil in modern domestic garden.
Mt.jxn.03	ND	95	294	1650	122	378	ND	263	603	373	Lightweight gray bricks in a pile.
Mt.jxn.05	112	ND	2520	ND	ND	ND	114	481	ND	0	Reddish brown mineral coating on a rock hand sample.
Mt.jxn.06	68	18	471	1214	ND	ND	81	1335	ND	70	Fine grained area of steep dump face eroding into creek.
Mt.jxn.07	59	15	490	669	ND	ND	34	1399	ND	50	Eroding sediment in gully leading off edge of waste rock pile directly to creek.
Mt.jxn.08	46	ND	614	450	ND	ND	20	663	92	53	Sand bar in channel of small creek.
Mt.jxn.09	54	43	371	1443	ND	ND	ND	2756	ND	74	Finer grained portion in face of tall red pile.
Mt.jxn.12	38	13	404	908	81	ND	61	1230	ND	82	Dust on driveway.

IV. Photographs

The following photographs depict present site conditions at the Jackson Mine site.

Photo 1: Typical mine waste rock at Jackson Mercury Mine

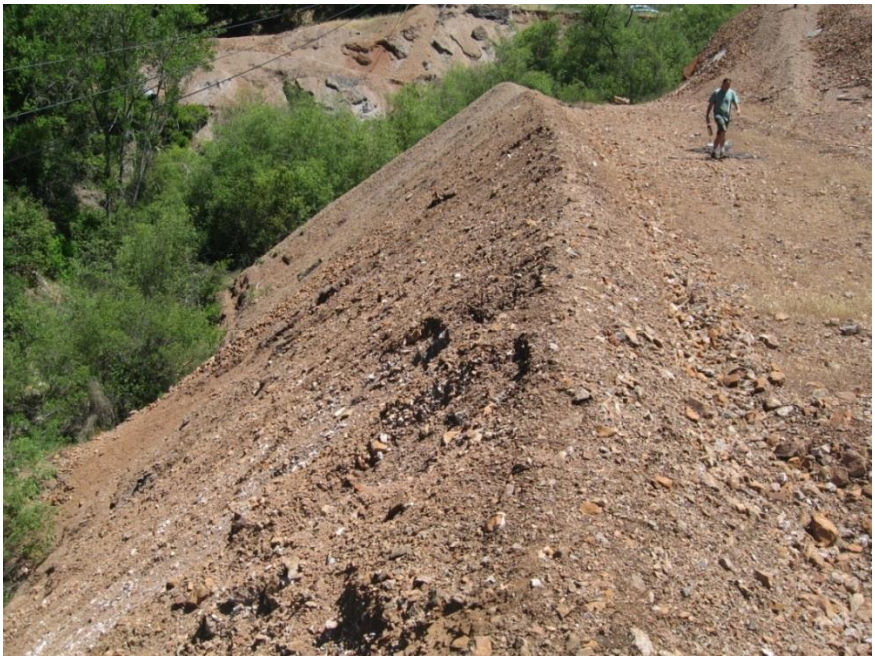


Photo 2: Mine waste pile adjacent to Wilson Creek

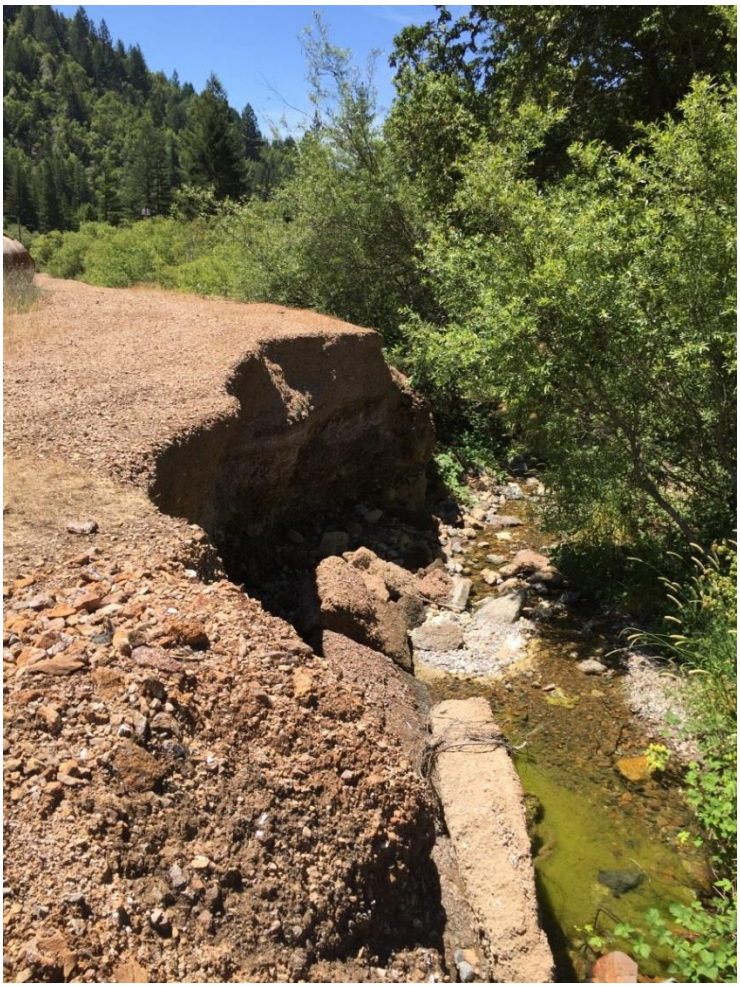


Photo 3: Mine wastes cleaving off side slope into Wilson Creek

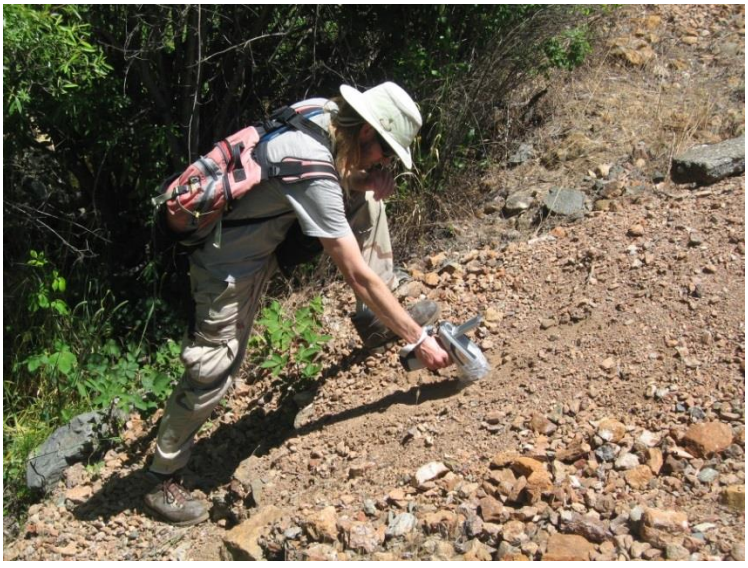


Photo 4: Sampling drainages adjacent to Wilson Creek.

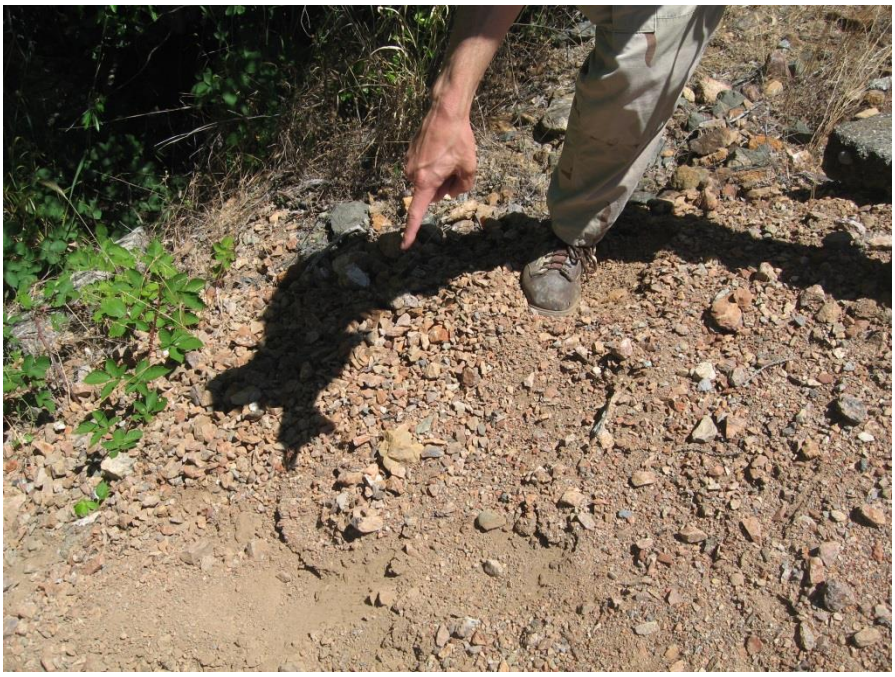


Photo 5: Eroded fines adjacent to Wilson Creek

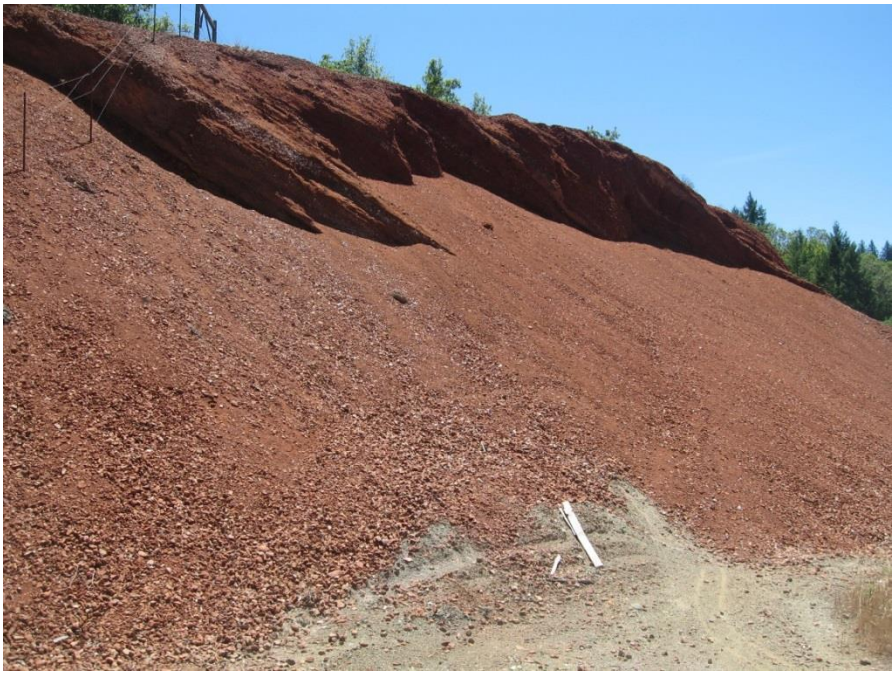


Photo 6: Upper area mine waste pile

Photo 7: Sampling upper (red) mine waste pile

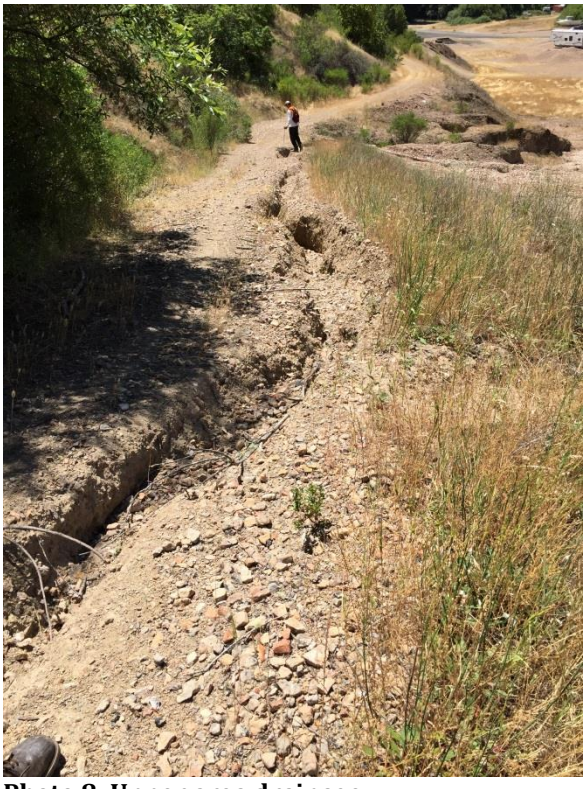


Photo 8: Upper area drainage

Photo 9: Evidence of vegetative growth where soils aggraded

Photo 10: view of upgradient mine waste piles

Photo 11: Steam generation power plant flywheel

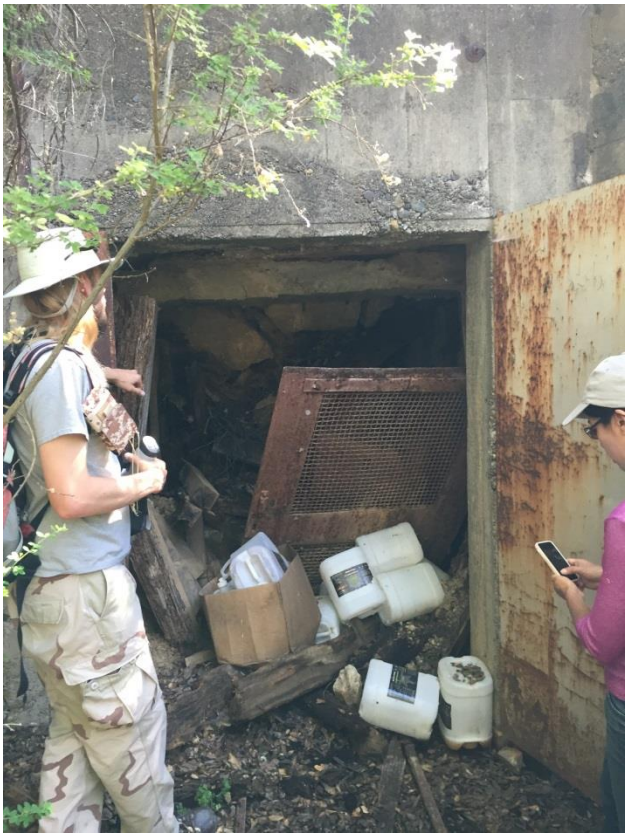


Photo 12. Mine shaft entrance

Photo 13. Former ore processing zone

V. Staff Conclusions

A large volume of mining wastes remain onsite and also several mining structures. Mining waste piles were a heterogeneous mixture in both makeup (serpentines, cherts, and other native rocks) and size fraction (from fines to cobbles). The vast majority of mining waste piles appeared light pink with a white crust, which fits the visual description of calcines. All of the waste piles onsite showed signs of erosion, including signs of direct discharge into Wilson Creek. Some of the piles were cemented, which have reduced surface erosion, but portions of these tightly packed piles could potentially calve off into the creek during periods of high flows. XRF samples taken of mining waste piles stored in the upper portions of the mine site were non-detect.

The riparian areas and creek bank, mostly on the south side but also in places on the north side of the creek, appeared to consist primarily of mine wastes interspersed with willows. The three XRF samples taken of fines in these creek bank soils, above the ordinary high water line, indicated concentrations of mercury above hazardous waste thresholds. This is of concern due to these fines eroding into the creek. In addition, mining wastes were evident in the creek bed. No samples of sediments in the creek bed were collected for analysis. It is known that acid mine drainage is not an issue at this site as the mine is over 1500 feet deep and does not have any surface discharges.

VI. Recommendations

Further investigation of the Jackson Mercury mine may be warranted given the identification of elevated concentrations of mercury in the creek bank soils, which were eroding into the creek during periods of precipitation. A characterization of mercury concentration in soils that are eroding to the creek could quantify potential water quality

impacts. This soil characterization could be done using a Waste Extraction Test (WET) of soil to determine the solubility of mercury and whether there exists a water quality concern when soils are eroded into the creek during winter rains. An assessment of the receiving waters during a rain event could also be performed concurrent with soil characterization efforts. Additionally, the implementation of both short-term and long-term erosion control to prevent the mine wastes from being discharged to Wilson Creek during storm events and creek cleanup of mine wastes that are already deposited in the creek and creek restoration might be warranted.