NATURAL RESOURCES

INACTIVE AND ABANDONED MINE LANDS—Young America Mine, Bossburg Mining District, Stevens County, Washington

by Fritz E. Wolff,
Donald T. McKay, Jr.,
Matthew I. Brookshier,
and David K. Norman

WASHINGTON
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AND EARTH RESOURCES
Information Circular 105
July 2007
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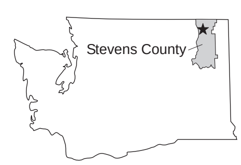

site location

WASHINGTON STATE DEPARTMENT OF
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WASHINGTON DEPARTMENT OF NATURAL RESOURCES

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Errata: The last row of Table 4 and Table 7 was missing in the previous version.

Published in the United States of America

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Inactive and Abandoned Mine Lands— Young America Mine, Bossburg Mining District, Stevens County, Washington

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INTRODUCTION

The Washington State Department of Natural Resources (DNR), Division of Geology and Earth Resources (DGER), is building a database and geographic information system (GIS) coverage of major mines in the state. Site characterization was initiated in 1999 (Norman, 2000). Work is funded through inter-agency grants from the U.S. Forest Service (USFS), Region 6. Other agencies sharing in the project are the U.S. Bureau of Land Management (BLM), the U.S. Environmental Protection Agency (EPA), and the Washington Department of Ecology (DOE).

More than 3800 mineral properties have been located in the state during the last 100 years (Huntting, 1956). Many are undeveloped prospects of little economic importance. Therefore, in considering the population to include in the Inactive and Abandoned Mine Lands (IAML) inventory, we have identified approximately 60 sites that meet one of the following criteria: (a) more than 2000 feet of underground development, (b) more than 10,000 tons of production, (c) location of a known mill site or smelter. This subset of sites includes only metal mines no longer in operation.

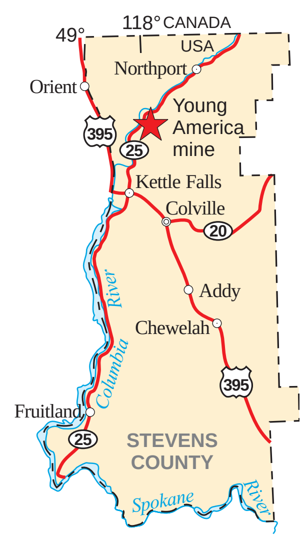
We have chosen to use the term *inactive* in the project's title in addition to the term *abandoned* because it more precisely describes the land-use situation regarding mining and avoids any political or legal implications of surrendering an interest to a property that may re-open with changes in economics, technology, or commodity importance.

The IAML database focuses on physical characteristics and hazards (openings, structures, materials, and waste) and water-related issues (acid mine drainage and/or metals transport). Accurate location, current ownership, and land status information are also included. Acquisition of this information is a critical first step in any systematic approach to determine if remedial or reclamation activities are warranted at a particular mine. Reports such as this one provide documentation on mines or groups of mines within specific mining districts or counties. The IAML database may be viewed by contacting Fritz Wolff (360-902-1468). IAML reports are posted online at http://www.dnr.wa.gov/geology/pubs/.

SUMMARY

The Young America mine is located in the SE¼SW¼ sec. 28, and NE¼NW¼ sec. 33, T38N R38E, about 2000 feet northeast of and 400 feet above Bossburg, Wash., a small settlement on the east bank of Lake Roosevelt (Fig. 1). DGER personnel performed site characterization work in September 2001, July 2003, and August 2006.

Like the nearby Bonanza and Old Dominion mines, the Young America property was discovered by prospectors in 1885, thus making it one of the first mines to produce lead, zinc, and silver in the Colville–Northport area. Production records prior to 1905 are unknown, but data assembled for the period 1905 through 1954 show cumulative production of 13,389 tons of raw ore containing approximately 940,000 pounds of lead, 771,000 pounds of zinc, 50 ounces of gold, and 70,000 ounces of silver (Fulkerson and Kingston, 1958). All but 561 tons of reported pro-



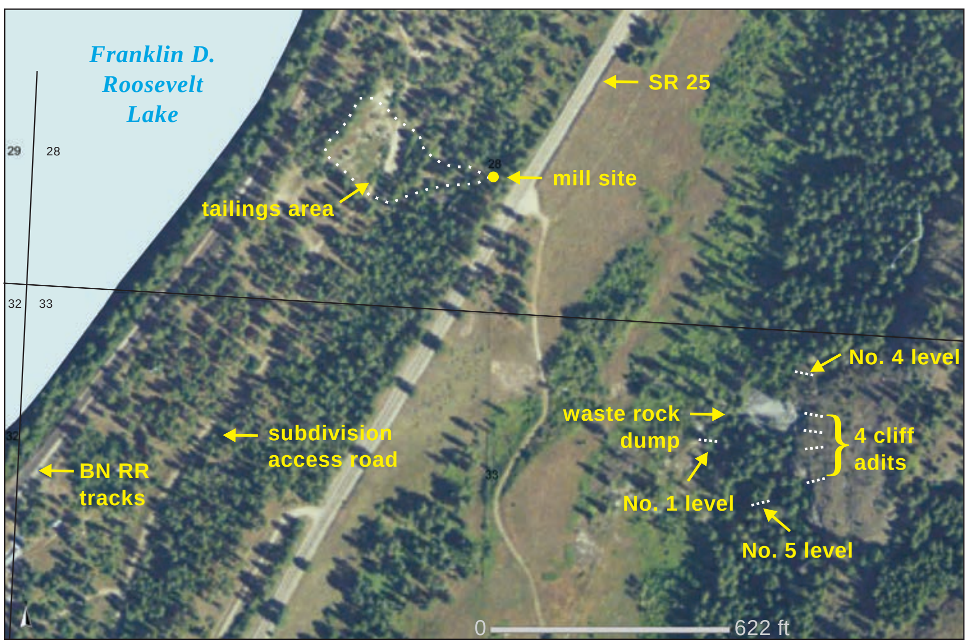


Figure 1. Map showing the location of the Young America mine in Stevens County *(top)* and an air photo of the mine site *(bottom)*. Black lines and numbers indicate sections. Photo downloaded Nov. 2, 2006, from DNR's State Uplands Viewing Tool.

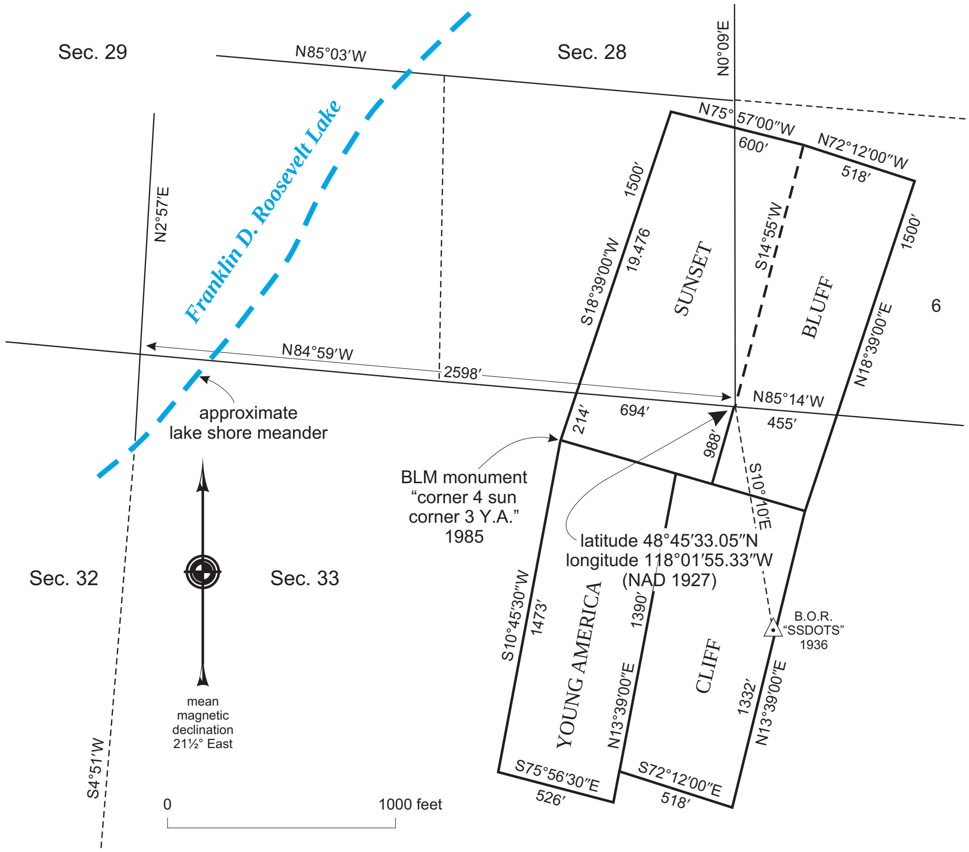


Figure 2. Location of the original four unpatented claims: Young America, Sunset, Cliff, and Bluff (1994 BLM survey, DGER map file). The lake shore meander shows current shoreline of Lake Roosevelt, which was impounded behind Grand Coulee Dam in the 1930s.

duction were mined in the years 1945 through 1954.

Development at the Young America mine occurs in the lower unit of the Middle Cambrian Metaline Limestone, a dense, fine-grained, bluish-gray dolomitic limestone. This unit strikes N20°E and dips 12 to 20°E. In the immediate vicinity of the mine, the host rock is highly brecciated and silicified. Production came from two relatively flat-lying mineralized layers ranging from a few inches to 6 feet in thickness. Although attempts were made to find ore from several lower-elevation adits, virtually all production came from five closely connected stopes driven into a cliff band at the point of discovery. The map in Hundhausen’s (1949) report indicates that mining progressed horizontally to a point 240 feet into the cliff face, penetrating and continuing through a post-ore calcite-rich shear zone.

Primary sulfide minerals consist of an intimate mixture of sphalerite, argentiferous galena, and pyrargyrite. Significant concentrations of geocronite, a rare lead–antimony mineral, were encountered in one stope (Purdy, 1951). Stannite and stibiconite have also been identified (Bunning, 1985).

The U.S. Bureau of Mines (USBM) conducted a diamond-drilling program on the cliff crest to the north, east, and south of the known ore body in the years 1946 through 1948 (Hundhausen, 1949). This report is an excellent description of the property and includes some geologic and metallurgical data from tests conducted at the Bureau’s (then) Albany, Oregon, research station. The program drilled 15 holes totaling 4590 feet. The drilling failed to find extensions of the high-grade sulfide mineralization previously mined, but did discover a low-grade body of highly disseminated lead-zinc mineralization.

Water impounded 36-inches deep behind a wood crib dam at the No. 1 level portal overflowed at a rate of about 1 gpm and infiltrated the waste rock dump. The pH was 8.4. Analyses for cadmium, copper, lead, and zinc met the requirements for ground water, domestic consumption, shown in (WAC 246-290). Analyses for lead and zinc exceeded the hardness-based standards for surface freshwater, chronic effects to aquatic life shown in (WAC 173-201A).

Gregor Mines, Inc., built a 100-ton/day (tpd) flotation mill directly west of the mine on the west shoulder of SR 25 in the late 1940s (Orlob, 1950). The mill and the mine were operated intermittently by various concerns until about 1957, at which time the equipment was moved to the Utahcan mine near Ione, Wash. The tailings were discharged downhill from the mill into a one-acre area situated between the highway and the east shore of Franklin D. Roosevelt Lake, a distance of 650 feet. Judging from the tonnage mined during the mill’s operation from 1948 to 1954, the total volume is approximately 9500 cubic yards with an average thickness in the range of 2 to 3 feet. Analysis of a sample taken in 2006 indicates the tailings exceed DOE established standards for arsenic, cadmium, lead, and zinc for both categories (industrial and unrestricted use) shown in Table 4. The property between SR 25 and the lake was being developed for recreational use at the time the sample was taken (see Fig. 13). A 12-inch-thick mantle of locally available sand and gravel has been spread over the tailings in the past.

The room and pillar stopes in the cliff provide excellent habitat for cave-dwelling wildlife. We observed a cougar (*Puma concolor*) in the southernmost of the five adits. Four unidentified bats were observed flying between the adits. See Table 5.

ACCESS

The mine is located on BLM-managed land a quarter mile north of Bossburg, Wash., on SR 25. A two-wheel-drive gravel road, crossing private property, leads directly to the No. 1 adit. The mill ruins are located on private property below and adjacent to the west shoulder of SR 25 directly west of the mine.

OWNERSHIP

No active unpatented claims or patented claims were in place at the Young America mine as of June 2006 (Allen Agnew, BLM Land Records, written commun., 2006). The original four claims were named the Sunset, Young America, Bluff, and Cliff (Fig. 2). A BLM cadastral survey monument placed in 1985 is located at the foot of the primary waste rock dump. It is marked “Sunset cor 4/ YA cor3/ T38N R38E S33”. Digital coordinates for this marker are shown in Table 2. Restaking activity between 1979 and 1997 on and around the original claims has not been kept current.

HISTORY

Like the nearby Bonanza and Old Dominion mines, the Young America mine was discovered by prospectors in 1885, thus making it one of the first mines to produce lead, zinc, and silver in the Colville–Northport area. The mine was operated sporadically by a number of different companies and leaseholders until its last known production in 1954 (Appendix C). Production records prior to 1905 are unknown, but during the period 1905 through 1954, cumulative output amounted to approximately 940,000 pounds of lead, 771,000 pounds of zinc, 50 ounces of gold, and 70,000 ounces of silver from 13,389 tons of raw ore (Fulkerson and Kingston, 1958). Production records prior to 1905 are unavailable. Of the total reported, all but 561 tons were mined during the years 1945 through 1957. Several companies conducted exploration activities in recent years: Silver Hill Mines, Inc. (1990–1992); Conjecture Silver Co. Inc. (1997); and Itex Corporation (1997–2000).

The earliest documented operator of the mine was Young America Cliff Consolidated Mining Co. for the years 1897 to 1905, followed by Robena Land Co. from 1907 to 1915. Cuprite Mining Co., a consortium of Yakima investors, purchased the property in 1916 and held the property until 1948. Ownership by possessory title after 1948 is murky, but it appears Cuprite Mining sold or leased their interest at about that time. An article in the *Spokesman-Review* (March 2, 1949) stated that “Gregor Mines, Inc. . . . entered the Inland Empire last year and expects to operate throughout the coming season at . . . the Young America [mine] at Bossburg, Wash.” Orlob’s report (1950) credited Gregor Mines with construction and operation of the flotation mill. An agreement dated Oct. 1, 1950, stated that Walter Morris and Perry Leighton of Colville were at that time “owners of the Young America mine and mill” and that the property was under lease and purchase option to Young America Mines, Inc. of Seattle (DGER mine file). The purchase option appears to have been exercised as indicated by an article stating that six men were at work for Young America Mines, Inc., “. . . under the direction of W. Morris, former owner [of the mine]” (*Spokesman-Review*, May 27, 1951). The *Wallace Miner* (May 1, 1952) reported that Earl Gibbs and Ira Hunley of Colville, *dba* Bonanza Lead Co., had begun producing 60 tons per day at the Young America in a profit-sharing agreement with Young America Mines, Inc. The last reported production at the mine was 3600 tons mined by Bonanza Lead Co. in 1953.

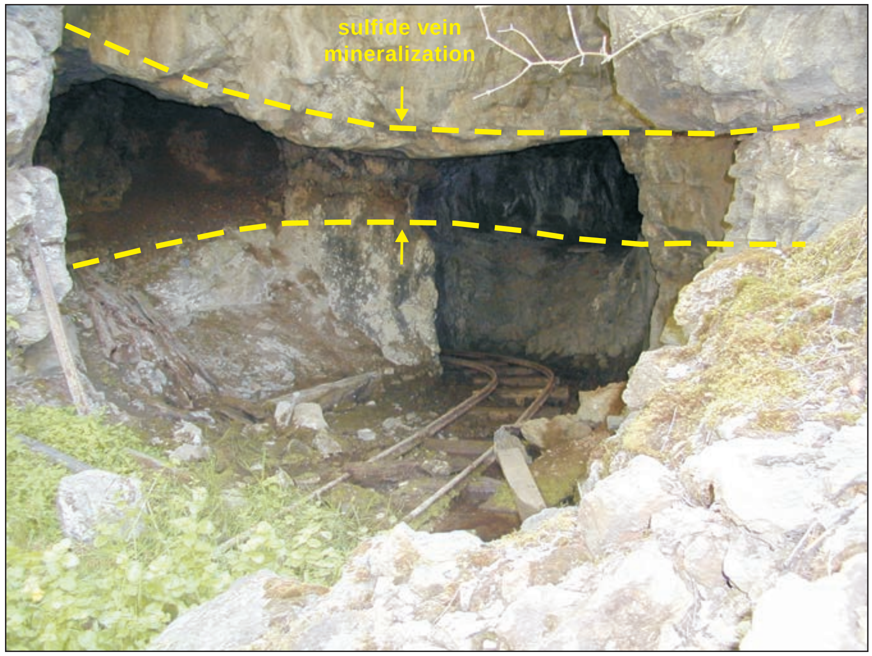


Figure 3. No. 4 level portal. Arrows and dashed lines delineate a zone of primary sulfide mineralization. View is to the east.

GEOLOGIC SETTING

All development at the mine was in the lower unit of the Middle Cambrian Metaline Limestone, a dense, fine-grained, bluish-gray dolomitic limestone that strikes N20°E and dips 12–20°E. In the immediate vicinity of the mine, the host rock is highly brecciated and silicified. Production came from two relatively flat-lying mineralized zones parallel to each other but separated by about 30 feet in elevation. These two zones transgressed bedding planes and have been mined up-dip about 60 feet in elevation to a point 240 feet distant from adits in the cliff face where a post-ore, calcite-rich shear zone was encountered. It dips 72°SE, but the reported displacement is relatively small—“in most places the east side is down only a few feet”—and ore continued on the down-thrown east side of the shear (Hundhausen, 1949).

The ore lenses range in thickness from a few inches to 6 feet. Primary sulfide minerals consist of an intimate mixture of sphalerite, argentiferous galena, and pyrargyrite. In addition, the upper ore horizon carried a significant concentration of geocronite, a lead–antimony mineral. In metallurgical tests conducted by USBM, the galena and sphalerite fractions were found to range in size from minus 48 to plus 560 mesh (Hundhausen, 1949). Some tetrahedrite and chalcopyrite inclusions appeared in the galena. Bunning (1985) reported that a sample of primary sulfides from the upper mineralized zone contained 1000 ppm tin, probably from the mineral stannite. She also identified the presence of stibiconite, a hydrated antimony oxide. In addition to identifying stibiconite var. schulzite, Purdy (1951) identified microscopic inclusions of cobaltite in euhedral grains of pyrite. The carbonates of lead and zinc, cerussite and smithsonite, were mined from a narrow high-grade zone of oxidation prior to 1905. Although hand-picked specimens are reported in anecdotal accounts as containing bonanza-type assays of lead, zinc, and silver, a 350-pound sample taken by the USBM from the cliff stope is probably the best representation of the kinds of values contained in the sulfide vein material:

Zn (%)	Pb (%)	Cu (%)	Fe (%)	Sb (%)	Ag (opt)	Au (opt)
10.9	5.9	0.09	1.2	0.07	10.6	0.011

The gangue minerals are pyrite, quartz, calcite, and siderite.

A feature discovered in 1920 appears to be a pre-ore void filled with post-ore erosional or glacial deposited materials. Patty (1921) reported that a 40-foot inclined shaft sunk at the north end of the No. 4 level stope encountered “. . . ore for the first 20 feet in the shaft, then gravel carrying occasional boulders of ore, and after sinking through 10 feet of gravel the shaft was abandoned”.

The primary mineralization shows some characteristics of a replacement-type deposit and some characteristics of open-space filling as indicated by observations made by different investigators. It is possible that both processes have taken place at separate times on one or more occasions. On the basis of thin-section studies, Purdy (1951) postulated eight different stages of mineralization at the Young America, beginning with pre-ore fracturing, followed by deposition of sulfides, quartz, calcite, and siderite in different episodes, and ending with post-mineral movement on the calcite-rich shear zone described above.

Hundhausen concluded that the " . . . ore shoots in the mine consist of replacement stringers, veins and lenses along an irregular, gently dipping zone of movement. The ore is not confined within sharply defined walls. In some places the zone consists of a series of narrow bands of ore separated by unreplaced limestone".

We observed sharp boundaries above and below the few exposures of sulfides left in place, which lends credence to the role played by open-space filling (Fig. 3). Numerous flexures within the mine, faults both normal and reverse, and a tightly folded syncline on a cliff immediately south of the cliff adits indicate that the area has been the scene of significant tectonic activity in the past. Bunning (1985) examined a piece of dump rock consisting of brecciated limestone clasts cemented with quartz. "The quartz, deposited concentrically around each fragment, suggests passive, open-space filling. The passive breccia filling, sharp contacts of ore with the wall rocks, and variable thickness and pitch of the ore zone, all indicate the ore was deposited in an open zone—most likely a fault—in the otherwise unaltered limestone."

The USBM diamond-drilling program in the years 1946 through 1948 investigated possible extensions of the known ore bodies. Their report is an excellent description of the property and includes some geologic and metallurgical data from tests conducted at the Bureau's (then) Albany, Oregon, research station. In the course of the program, 15 holes totaling 4590 feet were completed. Drill sites were located on top of the NE-striking limestone cliff along a line extending 200 feet north of and 1000 feet south of the last-developed stopes. The holes were approximately 200 feet apart. The drilling failed to intersect primary sulfide mineralization of the type and grade previously mined. It did identify a large area of disseminated sphalerite and galena in a "bleached, silicified dolomitic limestone southwest of the mine". Hundhausen used the term "dolomitic ore" to describe the discovery. This zone starts about 80 feet beneath the surface and "ranges from 30 to 150 feet in thickness. It trends N30E and dips gently to the southeast . . . throughout a distance of 900 feet from northeast to southwest and throughout a distance of 200 feet from east to west." A general assessment of assay data from the recovered core indicates consistent assays of ≤1% Pb, ≤1% Zn, ≤1 opt Ag, and a trace to 0.01 opt Au. Cross sections in Hundhausen's report show subsurface geology and drill intercepts.

Figure 4. Site of four interconnected cliff stope adits. View is to the south.

Figure 5. No. 2 level haulage way. View is to the east.

OPENINGS

In this report, we have used the same nomenclature as Hundhausen (1949) for the features readily identifiable in the field in 2001 and 2003, the exception being post-1949 development that added minor changes to the landscape.

Most production took place in the four adjacent adits highest on the cliff face (Fig. 4). The opening shown in Figure 5 is probably the No. 2 level identified as the main haulage way by Hundhausen (1949). The other three 8 by 10 foot adits are about 20 feet apart and strike east into a conjoined room-and-pillar stope rising up-dip 12 degrees. The room is approximately 50 feet wide, 60 feet long, and 6 feet high. We discovered a cougar (*Puma concolor*) resting in the southernmost opening. Bats of an unidentified species inhabit the stope.

We found an extremely hazardous open stope terminating in a steeply inclined unfenced winze. This feature is located on a forested slope near the No. 5 tunnel portal, approximately 120 feet below the cliff adits (Figs. 6 and 7).

About 30 feet below and 100 feet north of the No. 2 level, an 8 by 10 foot opening has been driven east into the limestone and curves around to the southeast beneath the cliff adits. The location of this opening coincides with the No. 4 level, and the band of disseminated sulfide minerals shown in Figure 3 is the near-surface extension of the "lower vein outcrop" (Hundhausen, 1949).

Figure 6. Open stope near No. 5 level adit.

MATERIALS AND STRUCTURES

The assay office and a cabin were still standing in September 2003. A raw-ore storage bunker is located at the foot of the primary waste rock dump. The aerial tram cable and anchoring turnbuckles are still in place (Fig. 8). The mill, described below, is in ruins (Fig. 9).

WATER

Water was impounded 36 inches deep behind a wood crib dam at the No. 1 level portal (Fig. 10). An overflow of ~1 gallon/minute infiltrated the waste rock dump. The pH measured 8.4 (alkaline). Analyses for cadmium, copper, lead, and zinc met the requirements for ground water shown in Table 7. Analyses for lead and zinc exceeded the hardness-based standards for surface water shown in Table 7 and Appendix B. The water was clear; the bed unstained.

Water supporting a thick stand of grass, seeps out and infiltrates near the foot of the primary waste rock dump near the lower tram terminal. The pH measured 8.0 (alkaline).

MILLING OPERATIONS

In 1919, Cuprite Mining Co. attempted to make a separation of lead and zinc fractions in a pilot mill using Wilfley shaking tables to avoid the (then) heavy smelter penalty for zinc content in lead-silver ores. Patty (1921) reported the experiment was unsuccessful because equipment was unavailable to provide a uniform, screen-sized feed.

Gregor Mines, Inc., built a flotation mill of about 100-tpd capacity in the late 1940s (Orlob, 1950). Concrete footings and ruins of the mill lie adjacent to the west shoulder of SR 25 below the mine site. He reported, "Tailings from the mill have, in the past, been discharged onto a flat between the mill and a railroad embankment along the [Franklin D. Roosevelt Lake] shore. A culvert beneath the railroad would normally carry the overflow from the pond into the lake. Along the lake shore below the culvert there is a large deposit of white sludge . . . indicating that the dikes were not properly maintained during mill operations." We found the ravine under the railroad tracks, but the culvert appears to have been buried, and the deposit of white sludge is no longer visible. The shoreline at this point cannot be safely examined without climbing gear because of the railroad ballast embankment's high angle of repose.

Figure 7. Unfenced winze dipping –65 degrees. View is to the southwest.

Huntting (1956) reported that Young America Mines, Inc., shipped a total of 23 tons of lead concentrate and 50 tons of zinc concentrate in the years 1950 and 1951. Zinc concentrates went to the Bunker Hill and Sullivan Company's electrolytic zinc plant, and lead concentrate to the smelter, both in Kellogg, Idaho (Hundhausen, 1949). This mill processed approximately 12,800 tons of raw ore, with the last reported operation in 1954. The existing tailings, which date from this time period, inundate trees to a depth of several feet in the immediate area of the mill, and continue west across a flat toward the Burlington Northern railroad tracks (Fig. 11). We estimate the volume at about 9500 cubic yards, with an average thickness of 3 feet. They cover an area of approximately 2 acres as shown in Fig. 1.

The property in the immediate vicinity of the mill site between the Burlington Northern tracks and SR 25 has been subdivided into recreational-type lots. Photos of a utility trench opened in August 2006 show that the tailings underlie a gravel cover for a distance of 200 feet along the development's access road (Figs. 12 and 13). A grab sample of tailings from this area showed analyses of arsenic, cadmium, lead, and zinc that exceed the standards established by DOE for industrial or commercial use and for unrestricted use. (See Tables 3 and 4.) Backhoe pits indicate there are no tailings south of the impoundment berm shown in Figure 12.

The mill equipment was dismantled and re-erected in 1957 at the Utahcan Company's lead-zinc discovery 7 miles northwest of Ione, Wash. (*Metaline Falls News*, Nov. 14, 1957).

Figure 8. Primary waste rock dump. View is to the east.

Figure 9. Mill ruins and crusher foundations.

WASTE ROCK DUMPS

Three waste rock dumps of less than 500 tons (estimated) lie adjacent to portals No. 1, 4, and 5. The primary waste rock dump lies at a 40° angle of repose immediately beneath the cliff adits (Fig. 4). On the north side of this dump, estimated at 3000 tons, waste rock appears to have slid downhill exposing previously buried limestone bedrock (Fig. 14).

GENERAL INFORMATION

Names: Young America, Robena

MAS/MILS sequence number: 0530650435

Access: two-wheel drive

Status of mining activity: none

Claim status: closed June 2006

Current ownership: Bureau of Land Management and private

Surrounding land status: Bureau of Land Management

Location and map information: see Table 1

Directions: Follow SR 25 approximately 15 miles north of Kettle Falls to the settlement of Bossburg. The mine can be accessed by a short unpaved road ¼ mile north of Bossburg that leads to the toe of a nearly vertical limestone cliff in which the mine is established. The access road is ungated but traverses private land.

MINE OPERATIONS DATA

Type of mine: underground

Table 1. Location and map information.

Mine property	County	Location	Decimal latitude	Decimal longitude	1:24,000 quad.	1:100,000 quad.
Young America	Stevens	secs. 28 and 33, T38N R38E	48.75819	118.03586	Bossburg	Republic

Commodities mined: zinc, lead, silver; minor antimony and tin

Geologic setting: a flat-lying shear zone in the lower unit of the Middle Cambrian limestone or dolomitic limestone (Metaline Limestone) (Hundhausen, 1949)

Ore minerals: primary minerals: sphalerite (ZnS), galena (PbS), geocronite ($5PbS \cdot Sb_2S_3$) (Hundhausen, 1949);

Figure 10. Water impounded behind weir at No. 1 level portal. View is to the east.

Figure 11. Mill tailings exposure (notebook for scale). View is to the east.

Figure 12. Real estate development utility trench through tailings. View is to the north.

secondary minerals: smithsonite ($ZnCO_3$), cerussite ($PbCO_3$), stannite (Cu_2FeSnS_4), chalcopyrite ($CuFeS_2$), tetrahedrite (complex copper-iron sulfide solid solution containing various amounts of Sb, As, Ag, Te); stibiconite ($Sb_3O_6(OH)$) (Bunning, 1985)

Non-ore minerals: quartz (SiO_2), calcite ($CaCO_3$), siderite ($FeCO_3$), pyrite (FeS_2)

Host rock: dolomitic limestone

Period of production: 1885–1890, 1905, 1912–1924, 1935–1941, 1945–1954 (Fulkerson and Kingston, 1958)

Development: 1500 feet of drifts and adits, and considerable stoping (DGER mine file)

Production: ~940,000 pounds of lead, 771,000 pounds of zinc, 50 ounces of gold, and 70,000 ounces of silver from

Table 2. Mine features. N/A, not applicable; **, data from Hundhausen (1949).

Description	Condition	Fenced (yes/no)	Length (feet)	Width (feet)	Height/ depth (feet)	True bearing	Elev. (feet)	Decimal latitude	Decimal longitude
cliff adits (4), upper vein system stope(s)	open	no	60–240**	10	8	E	1760	48.75838	118.03478
No. 4 level adit, lower vein system stope(s)	open	no	100**	10	8	S20E	1730	48.75907	118.03471
No. 5 level adit	caved	no	80**	5	7	N80E	1600	48.75812	118.03465
BLM cadastral survey monument	brass	no	N/A	N/A	N/A	N/A	1600	48.75879	118.03523
No. 1 adit, water level	open	no	170**	5	7	S45E	1580	48.75819	118.03538
mill site	ruins	no	30	30	N/A	N/A	1410	48.76034	118.03821
tailings disposal site	dry, partially removed	no	~450	~340	2–3	N/A	1370	48.76031	118.03887

Figure 13. Tailings underlying gravel covering in trench. View is to the south.

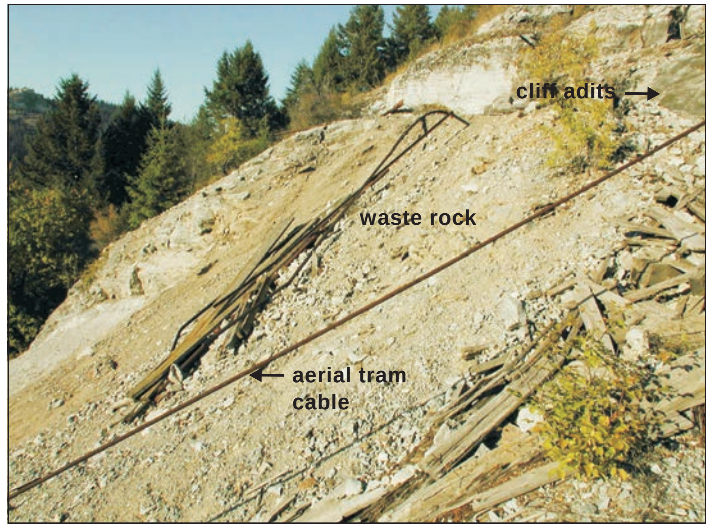


Figure 14. Waste rock dump below cliff adits. View is to the north.

Table 3. Soil Analysis. Metal concentrations are mg/kg. Analyses in bold indicate levels that exceed one or more standards shown in Table 4.

Sample location	Arsenic	Cadmium	Copper	Lead	Zinc	Antimony
tailings	**61**	**63**	93	**7000**	**10,000**	110

Table 4. Soil quality standards for unrestricted land use. WAC 173-340-900, Model Toxics Control Act, Table 749-2: Priority contaminants of ecological concern for sites that qualify for the simplified terrestrial ecological evaluation procedure (partial data). Concentrations are milligrams/ kilogram. Levels for silver, gold, and iron are not specified.

Metals	Arsenic III	Cadmium	Copper	Lead	Zinc	Antimony
unrestricted land use	20	25	100	220	270	no std.
industrial or commercial use	20	36	550	220	570	no std.

13,389 tons of raw ore (Fulkerson and Kingston, 1958); production prior to 1904 undocumented

Mill data: Ruins of 100-tpd flotation mill built in 1940s are situated a few feet west of SR 25 below the mine access road. It produced separate lead and zinc concentrates.

PHYSICAL ATTRIBUTES

Features: see Table 2

Materials: none

Machinery: none

Structures: assay office, cabin

Waste rock dumps, tailings impoundments, highwalls, or pit walls: Tailings lie on a flat west of the mill between the Burlington Northern railroad tracks and SR25.

Analysis of waste rock dumps: none

Waste rock, tailings, or dumps in excess of 500 cubic yards: three

Reclamation activity: none

Analysis of tailings: see Tables 3 and 4

Table 5. Bat habitat information.

Opening	Aspect	Air temp. (°F) at portal	Air flow: exhaust	Air flow: intake	Multiple interconnected openings	Bats or bat evidence
No. 1 portal	NW	48.5	yes	no	yes	no
four cliff adits and open stope at elevation 2000 feet	W	65.8	no	no	yes	4 individuals observed
adit at elevation 1940 feet (water seep in floor)	W	53.6	yes, at ~6 mph	no	yes	droppings

VEGETATION

Thick inland fir, larch, cottonwood

WILDLIFE

A cougar (*Puma concolor*) was observed in the southernmost of the four cliff adits at the 2000-foot elevation. See Table 5 for bat habitat information.

WATER QUALITY

Surface waters observed: Franklin D. Roosevelt Lake

Proximity to surface waters: tailings/mill 100 feet; mine 1400 feet

Domestic use: grazing?

Acid mine drainage or staining: none

Water field data: see Tables 6 and 7

Surface water migration: No. 1 adit discharge infiltrates waste rock dump

ACKNOWLEDGMENTS

The authors thank our editors Jari Roloff and Karen Meyers for helpful suggestions on the layout and content of this report. Lupita Lopez provided information on former owners of the Young America mine from records in the Washington State Corporate Archives.

REFERENCES CITED

Bunning, B. B., 1985, Tin, tungsten, and molybdenum geochemistry of parts of Stevens and Spokane Counties, Washington: Washington Division of Geology and Earth Resources Report of Investigations 28, 57 p.

Fulkerson, F. B.; Kingston, G. A., 1958, Mine production of gold, silver, copper, lead, and zinc in Pend Oreille and Stevens Counties, Wash., 1902–56; Annual totals by mines, districts, and counties: U.S. Bureau of Mines Information Circular 7872, 51 p.

Hundhausen, R. J., 1949, Investigation of the Young America lead-zinc deposit, Stevens County, Wash.: U.S. Bureau of Mines Report of Investigations 4556, 13 p.

Huntting, M. T., 1956, Inventory of Washington minerals; Part II—Metallic minerals: Washington Division of Mines and Geology Bulletin 37, Part II, 2 v.

Norman, D. K., 2000, Washington's inactive and abandoned metal mine inventory and database: Washington Geology, v. 28, no. 1/2, p. 16-18.

Orlob, G. T.; Saxton, W. J., 1950?, A preliminary survey of the sources of mining and mill waste pollution in the upper Columbia River basin and Lake Roosevelt: Washington Pollution Control Commission, 22 p.

Patty, E. N., 1921, The metal mines of Washington: Washington Geological Survey Bulletin 23, 366 p.

Purdy, C. P., Jr., 1951, Antimony occurrences of Washington: Washington Division of Mines and Geology Bulletin 39, 186 p. ■

Table 6. Surface water field data.

Description	Flow (gpm)	Conductivity (µS/cm)	pH	Bed color	Temp. (°F)
"No. 1" level discharge	<1	600	8.4	natural	52

Table 7. Surface water analysis. Metal concentrations are in micrograms/liter (µg/L); hardness is in milligrams/liter (mg/L); USEPA, U.S. Environmental Protection Agency; – – –, no data; **, standards for these metals are hardness dependent; ≤ indicates metal was not detected—the number following is the practical quantitation limit above which results are accurate for the particular analysis method—the metal could be present in any concentration up to that limit and not be detected. Conversion formulae are shown in http://www.ecy.wa.gov/pubs/wac173201a.pdf. Standards calculated for hardness values specific to Part 1 below are shown in Appendix B. Analyses in bold indicate levels that exceed one or more standards in Appendix B.

PART 1: ANALYSIS BY USEPA METHOD 6020, INDUCTIVELY COUPLED PLASMA/MASS SPECTROMETRY

Sample location	Arsenic	Cadmium**	Copper**	Iron	Lead**	Mercury	Zinc**	Hardness
"No.1" level portal	– – –	≤2.5	≤5.0	– – –	**12.1**	– – –	**375**	345

PART 2: APPLICABLE WASHINGTON STATE WATER QUALITY STANDARDS

Type of standards (applicable Washington Administrative Code)	Arsenic	Cadmium	Copper	Iron	Lead	Mercury	Zinc	Hardness
Surface water standards (WAC 173-201A, Standard for aquatic life in surface freshwater, chronic level maximums at 100 mg/L hardness)	190	**	**	none	**	0.012	**	100
Ground water standards (WAC 246-290, Washington State Department of Health, standards for ground water, domestic consumption)	50.0	none	1300	300 (cosmetic only)	15	2.0	5000	– – –

Appendix A. Methods and field equipment

METHODS

We recorded observations and measurements in the field. Longitude and latitude were recorded with a global positioning system (GPS) unit in NAD83 decimal degree format. Literature research provided data on underground development, which was verified in the field when possible.

Soil samples from dumps or tailings were taken from subsurface material and double bagged in polyethylene. Chain of custody was maintained.

Soil samples were analyzed for the metals listed in this report by inductively coupled plasma/mass spectrometry (ICP/MS) following USEPA (U.S. Environmental Protection Agency) Method 6010. Holding times for the metals of interest were observed.

Instrument calibration was performed before each analytical run and checked by standards and blanks. Matrix spike and matrix spike duplicates were performed with each set.

FIELD EQUIPMENT

barometric altimeter
binoculars
digital camera
flashlight
Garmin GPS III+, handheld GPS unit
Hanna Instruments DiST WP-3 digital conductivity meter and calibration solution
Oakton digital pH meter
Oakton digital electrical conductivity meter
Taylor model 9841 digital thermometer

Appendix B. Water quality standards for hardness dependent metals

Conversion formulae are given in WAC 173-201A at http://www.ecy.wa.gov/pubs/wac173201a.pdf.
Chronic standard in micrograms/liter (μg/L)

Sample location	Hardness (μg/L)	Cd (μg/L)	Cu (μg/L)	Pb (μg/L)	Zn (μg/L)
"No. 1" level portal	345	2.5	32.7	9.4	298.4

Appendix C. Mining companies and individuals associated with ownership at the Young America mine

Company	Registered in Washington?	Date registered with Sec. of State	Date stricken or dissolved	Comment	Place of business
Young America Consolidated Mining Co.*	yes	Jan. 1886	1923, for non-payment of fees	shipped hand-sorted ore until 1897 prox.	Spokane Falls, Wash.
Young America and Cliff Consolidated Mining Co.*	yes	1897	1909, for non-payment of fees	mined 1897–1905	Spokane, Wash.
Robena Lead Co.	no	N/A	N/A	1907–1915	unknown
Cuprite Mining Co.*	yes	1916	voluntary dissolution, 1948	1916–1948	Yakima, Wash.
Gregor Mines, Inc.*	yes	1941	1958	1948–1950	Seattle, Wash.
Leila Archibald, Frank Riggle, Perry Leighton, W. C. Morris	no	N/A	N/A	exploration activities, possessory title only; lease to Young America Mines, Inc., 1950	Bossburg, Wash.
Young America Mines, Inc.*	yes	1950	1957	operated in 1950 and 1951	Seattle, Wash.
Earl Gibbs and Ira Hunley, *dba* Bonanza Lead Co.*	yes	1957	1961	operated 1951–1954	Colville, Wash.
Silver Hill Mines, Inc.*	yes	March 1961	inactive; license expired March 2006	1990–1992 exploration activities, possessory title only; UBI #601333876	Spokane, Wash.
Conjecture Silver	no	N/A	N/A	1997 exploration activities, possessory title only	unknown

*, corporate tracking cards from State Archives in DGER mine file; N/A, not applicable