



For Info

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Northwest Regional Office, 3190 - 160th Ave S.E. • Bellevue, Washington 98008-5452 • (206) 649-7000

January 27, 1993

Dale Tonseth
USDA/Forest Service
Okanogan National Forest
Winthrop Ranger District
Winthrop, WA 98862

Dear Mr. Tonseth:

Re: Analytical Results for the Azurite Mine.

We have received the analytical results from the samples we collected at the Azurite Mine, a copy of which is included herein. The results are not particularly surprising, but do indicate some potential environmental issues. Arsenic is present in all dump and tailing samples at well above the cleanup standard of 20 mg/kg. Sample results were from 110 mg/kg for the oxidized tailings to 715 mg/kg for unoxidized tailings. Although the samples we collected did not show lead at above cleanup standards, they are close enough that may be a problem for parts of the tailings. Also, lead levels exceeded surface water standards in the ditch at the toe of the tailings, as did cyanide. Cyanide was detected in all solids samples, but was at a significant level only in the unoxidized tailings (19 mg/kg). It also exceeded surface standards in the ditch at the toe of the tailings pile (.45 mg/l).

Although the site would not rank high if a Site Hazard Assessment were conducted, the site does justify listing on the Site Management Information System List (SMIS List). It is unlikely that the Department of Ecology would require cleanup under the Model Toxics Control Act (MTCA), particularly if the reclamation of the tailings proceeds. That action would be, in effect, a voluntary cleanup, which is an acceptable action under the law.

I have also found that the lead agency under the State Environmental Policy Act for all mining activities is the Department of Ecology. Ecology would, therefore, be involved in either co-writing a joint NEPA/SEPA determination, or separately write the state environmental determination. Please keep us involved as the process progresses, and we will facilitate Ecology involvement.

Based on the data collected, measures will be required to control or eliminate certain discharges to surface and/or groundwaters from the site and operations.

Dale Tonseth
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Upstream water quality sample, parameters of concern

Parameter	Sample Result	Receiving Water Criteria
Arsenic	3.3 ppb	190 ppb
Cyanide	< 100 ppb	5.2 ppb
Mercury	0.18 ppb	0.012 ppb
Copper	4.6 ppb	2.3 ppb
Zinc	22 ppb	21 ppb

Seep water from toe of tailings pile, parameters of concern

Parameter	Sample Result	Receiving Water Criteria
Arsenic	118 ppb	190 ppb
Cyanide	450 ppb	5.2 ppb
Lead	73.7 ppb	0.28 ppb
Cadmium	9.5 ppb	0.26 ppb
Chromium	114 ppb	44 ppb
Copper	952 ppb	2.3 ppb
Nickel	101 ppb	32 ppb
Zinc	1310 ppb	21 ppb

Downstream water samples, parameters of concern

Parameter	Sample Result	Receiving Water Criteria
Arsenic	2.1 ppb	190 ppb
Cyanide	< 130 ppb	5.2 ppb

While the results for arsenic are under the criteria specified in WAC 173-201A-040, the EPA Quality Criteria for Water calls for no detectable arsenic in the water.

Analytical results for cyanide in the upstream and downstream samples are above the chronic water quality standards but the level of detection necessary was not specified to the laboratory.

Dale Tonseth
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Upstream samples

Background levels of mercury and arsenic above the criteria are identified with the P qualifier. This identifies that the analyte was detected above the instrument detection limit but below the established quantitation limit. This could be construed as an estimated value since the actual value could not be distinguished.

Seep water

Only cadmium is identified with the P qualifier. The rest of the metals identified are well over the water quality standards. The detection limit for silver is well over the criteria (0.25 ppb). The only way to identify if silver is also a problem would be to have the sample run only for silver through the ICP. This was not specified in the sample request.

Downstream samples

Even though there were no exceedances on the day of sampling because of infiltration of seep water, it is conceivable that there are periods of time when there would be overland flow of seep water from the tailings pile to surface waters. These periods could definitely affect the creek downstream of the site.

Comments

The anticipated method of processing the tailings pile where the re-processed tailings would be washed out with rinse water, placed above the existing pile and all wash out waters would be allowed to percolate down would not be in the best interests of the state. This additional water would accentuate the groundwater moving through and under the tailings pile. Another method of dewatering the tailings after re-processing should be planned so that the discharge does not affect surface waters of the state.

I would be curious about the groundwater quality under the tailings pile. I do know that in the mountainous region that the mine is located in, the soil layers are very thin and there may not be groundwater other than that contained in the tailings pile itself from rain or snow fall.

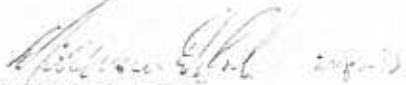
The type of discharge permit for the site would depend on the discharge. NPDES for surface discharges and a State permit for discharge to groundwater. The type of permit sought will be relative to the anticipated method of discharge.

If you have any questions about MTCA issues, please feel free to call Norm Peck at (206) 649-7047. Water Quality questions may be directed to Bob Newman at (206) 649-7046.

Dale Tonseth
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It has been a pleasure to work with the Forest Service and Winthrop Ranger District in this matter, particularly in such a proactive manner.

Sincerely,



Norman D. Peck
Initial Investigator
Toxics Cleanup Program



Bob Newman
Inspector
Water Quality Program

NDP:np
Enclosure

cc: Joe Gray

RECEIVED

AUG 26 1992

DEPT. OF ECOLOGY

WASHINGTON STATE DEPARTMENT OF ECOLOGY
ENVIRONMENTAL INVESTIGATIONS AND LABORATORY SERVICES
MANCHESTER ENVIRONMENTAL LABORATORY

August 21, 1992

TO: Norm Peck
FROM: Bill Kammin, Environmental_Lab_Director *BK*
SUBJECT: Azurite Mine Metals Results

SAMPLE RECEIPT

The samples from the Azurite Mine Metals project were received by the Manchester Laboratory on 7/28/92 in good condition.

HOLDING TIMES

All analyses were performed within the specified holding times for metals analysis (28 days for mercury, 180 days for all other metals).

INSTRUMENT CALIBRATION

Instrument calibration was performed before each analytical run and checked by initial calibration verification standards and blanks. Continuing calibration standards and blanks were analyzed at a frequency of 10% during the run and again at the end of the analytical run. All initial and continuing calibration verification standards were within the relevant USEPA Contract Laboratory Program (CLP) control limits. Atomic Absorption (AA) calibration gave a coefficient of correlation at or above 0.995. This is the CLP acceptance criteria for AA calibration curve fit.

PROCEDURAL BLANKS

The procedural blanks associated with these samples showed no analytically significant levels of analytes.

SPIKED SAMPLE ANALYSIS

Spiked sample and duplicate spiked sample analyses were performed on sample number 92318052. For water samples, all spike recoveries were within the acceptance limits of +/- 25%. For solid samples, antimony and silver are qualified with N, denoting spike recoveries outside acceptance windows.

ANALYSES FOR DETERMINATION OF PRECISION

Spike and spike duplicate samples were analyzed to determine sample/method based precision. For water samples, all analytes were in control. For soil/sediment samples calcium, potassium, sodium and antimony were outside the +/- 20% precision windows established by USEPA. The precision variability is likely due to sample-based variability in the concentrations of these elements. The results for sodium, potassium, and calcium are flagged with E, to denote estimates.

SERIAL DILUTION ANALYSIS

Sodium and zinc failed the serial dilution test, and are flagged with E.

SUMMARY

The data generated by the analysis of the above referenced samples can be used with the above-mentioned qualifications.

If you have any questions about the results or the methods used to obtain these results, please call me at SCAN 744-4737.

WRK:wrk

cc: QA file
Project file

Project: DOE-41Y AZURITE MINE

Officer: NDP

Account: J1A04

Laboratory: Ecology, Manchester

Sample No: 92 318050

Description: AZMIN 01 Mine Dump

Source: Soil (Spill/Contaminated Area)

Begin Date: 92/07/24

*All list-
Contract Data*

Metals - Specified	Sediment Result	Units
Hg-Sedmt	0.456 *	mg/kg-wt

Cleanup standard

0.05 mg/kg

Metals - ICP Scar	Sediment Result	Units
Calcium	1640E*	mg/kg-dr
Magnesium	12700 *	mg/kg-dr
Sodium	368E*	mg/kg-dr
Potassium	1200E*	mg/kg-dr
Arsenic	246 *	mg/kg-dr
Barium	12P*	mg/kg-dr
Beryllium	0.50U	mg/kg-dr
Cadmium	1.9P*	mg/kg-dr
Chromium	31.7 *	mg/kg-dr
Cobalt	16.9E*	mg/kg-dr
Copper	430 *	mg/kg-dr
Lead	78 *	mg/kg-dr
Manganese	344 *	mg/kg-dr
Molybdenum	13UE	mg/kg-dr
Nickel	14P*	mg/kg-dr
Silver	1.5UN	mg/kg-dr
Vanadium	48.7 *	mg/kg-dr
Zinc	242E*	mg/kg-dr
Antimony	15UN	mg/kg-dr
Aluminum	17700 *	mg/kg-dr
Selenium	60U	mg/kg-dr
Titanium	210 *	mg/kg-dr
Iron	139000 *	mg/kg-dr
Thallium	30U	mg/kg-dr

2.0 mg/kg

2.0 mg/kg

Contract Lab Program	Sediment Result	Units
Cyanide	REQ	CLP

*Exceeds MTEA Cleanup Standards
exceedances of " " likely
inadequate of standards based on protection of surface waters likely
(Sample Complete)*

Project: DOE-4.1V AZURITE MINE
Laboratory: Ecology, Manchester

Officer: NDP

Account: J1A04

Sample No: 92 31805; Description: AZMIN 02 Oxidized Tailings; Source: Soil (Spill/Contaminated Area)

Begin Date: 92/07/24

Metals - Specified	Sediment Result	Units
Hg-Sedat	0.0952 *	mg/kg-wt

Metals - ICP Scan	Sediment Result	Units
Calcium	9880E*	mg/kg-dr
Magnesium	9920 *	mg/kg-dr
Sodium	410E*	mg/kg-dr
Potassium	960E*	mg/kg-dr
Arsenic	110 *	mg/kg-dr
Barium	5.00	mg/kg-dr
Beryllium	0.500	mg/kg-dr
Cadmium	1.00	mg/kg-dr
Chromium	29.5 *	mg/kg-dr
Chromium	104E*	mg/kg-dr
Cobalt	1080 *	mg/kg-dr
Copper	229 *	mg/kg-dr
Lead	575 *	mg/kg-dr
Manganese	13UE	mg/kg-dr
Molybdenum	32P*	mg/kg-dr
Nickel	1.5UN	mg/kg-dr
Silver	40.8 *	mg/kg-dr
Vanadium	115E*	mg/kg-dr
Zinc	15UN	mg/kg-dr
Antimony	13600 *	mg/kg-dr
Aluminum	60U	mg/kg-dr
Selenium	16 *	mg/kg-dr
Titanium	72900 *	mg/kg-dr
Iron	30U	mg/kg-dr
Thallium		

0.05 mg/kg

cleanup standard

20 mg/kg

250 mg/kg

Contract Lab Program	Sediment Result	Units
Cyanide		REQ CLP

(Sample Complete)

Project: DOE-414Y AZURITE MINE

Officer: NDP

Account: J1A04

Laboratory: Ecology, Manchester

Sample No: 92 318053

Description: AZMIN 04

Source: Water (General)

Begin Date: 92/07/24

Downstream
Sample

Gen Inorg/Phys-Speci	Water-Total Result Units	Metals - ICP Scan Matrix Spike #1	Water-Total Result Units
Hard-Tot CaCO3	15.4 * ug/l	Beryllium Be-Total	104 * Recov
		Cadmium Cd-Total	98 * Recov
		Chromium Cr-Total	99 * Recov
		Copper Cu-Total	102 * Recov
		Nickel Ni-Total	99 * Recov
		Silver Ag-Total	79 * Recov
		Zinc Zn-Total	100 * Recov
		Antimony Sb-Total	98 * Recov

Metals - PP	Water-Total Result Units	Metals - ICP Scan Matrix Spike #2	Water-Total Result Units
Arsenic As-Total	2.1P* ug/l	Beryllium Be-Total	105 * Recov
Lead Pb-Total	1.0U ug/l	Cadmium Cd-Total	101 * Recov
Thallium Tl-Total	2.5U ug/l	Chromium Cr-Total	99 * Recov
Selenium Se-Total	2.0U ug/l	Copper Cu-Total	103 * Recov
Mercury Hg-Total	0.050U ug/l	Nickel Ni-Total	101 * Recov
		Silver Ag-Total	79 * Recov
		Zinc Zn-Total	100 * Recov
		Antimony Sb-Total	96 * Recov

Metals - PP	Water-Total Result Units	Contract Lab Program	Water-Total Result Units
Matrix Spike #1		Cyanide	REQ CLP
Arsenic As-Total	87 * Recov		
Lead Pb-Total	89 * Recov		
Thallium Tl-Total	97 * Recov		
Selenium Se-Total	106 * Recov		

Metals - ICP Scan	Water-Total Result Units		
Beryllium Be-Total	1.0U ug/l		
Cadmium Cd-Total	2.0U ug/l		
Chromium Cr-Total	5.0U ug/l		
Copper Cu-Total	3.0U ug/l		
Nickel Ni-Total	10U ug/l		
Silver Ag-Total	3.0U ug/l		
Zinc Zn-Total	10P* ug/l		
Antimony Sb-Total	30U ug/l		

(Sample Complete)

Project: DOE-411Y AZURITE MINE

Officer: NDP

Account: J1A04

Laboratory: Ecology, Manchester

Sample No: 92 31K05, Description: AZMIN 05 *Seep below* Source: Water (General)

Begin Date: 92/07/24 ; *Tailing pile*

Gen Inorg/Phys-Spec	Water-Total Result	Units
Hard-Tot CaCO3	101 *	mg/l
Metals - PP		
Arsenic As-Total	118 *	ug/l
Lead Pb-Total	73.7 *	ug/l
Thallium Tl-Total	2.5U	ug/l
Selenium Se-Total	2.0U	ug/l
Mercury Hg-Total	0.050U	ug/l

C.V. result 0.28 at hardness of receiving water 3.18 at hardness of sample

Metals - ICP Scat	Water-Total Result	Units
Beryllium Be-Total	1.0U	ug/l
Cadmium Cd-Total	9.5P*	ug/l
Chromium Cr-Total	114 *	ug/l
Copper Cu-Total	952 *	ug/l
Nickel Ni-Total	101 *	ug/l
Silver Ag-Total	3.0U	ug/l
Zinc Zn-Total	1310 *	ug/l
Antimony Sb-Total	30U	ug/l

*Receiving water
Criteria 0.26 at 15.4 hardness, 1.13 at 101 hardness
44 at 207 at 118 at 11
Criteria 11 at 207 at 118 at 11
Criteria 11 at 207 at 118 at 11
Criteria 21 pph at receiving water 106 at seep hardness*

Contract Lab Program	Water-Total Result	Units
Cyanide		REQ CLP

(Sample Complete)

Project: DOE-411Y AZURITE MINE
Laboratory: Ecology, Manchester

Officer: NDP
Account: J1A04

Sample No: 92 318053 Description: AZMIN 06 *Upper Triassic* Source: Water (General)

Begin Date: 92/07/24

Gen Inorg/Phys-Speci	Water-Total Result	Units
Hard-Tot CaCO3	14.1	* mg/l

Metals - PP	Water-Total Result	Units
Arsenic As-Total	3.3P*	ug/l
Lead Pb-Total	1.0U	ug/l
Thallium Tl-Total	2.5U	ug/l
Selenium Se-Total	2.0U	ug/l
Mercury Hg-Total	0.18P*	ug/l

*(C. samsun, OR) (Fish Tot over 100 ug/L)
p.p.l.z., Q.C.W./C.C., Freshwater, Marine Toxicity*

Metals - PP	Water-Total Result	Units
Matrix Spike #1		
Mercury Hg-Total	89	% Recov

Metals - PP	Water-Total Result	Units
Matrix Spike #2		
Mercury Hg-Total	94	% Recov

Metals - ICP Scan	Water-Total Result	Units
Beryllium Be-Total	1.0U	ug/l
Cadmium Cd-Total	2.0U	ug/l
Chromium Cr-Total	5.0U	ug/l
Copper Cu-Total	4.6P*	ug/l
Nickel Ni-Total	10U	ug/l
Silver Ag-Total	3.0U	ug/l
Zinc Zn-Total	22 *	ug/l
Antimony Sb-Total	30U	ug/l

Contract Lab Program	Water-Total Result	Units
Cyanide		REQ CLP

(Sample Complete)

Project: DOE-411Y AZURITE MINE
Blank ID: ESPB 32.32

Officer: NDP
Account: JIA04

Metals - ICP Scan	Sediment	Units
Blank #1	Result	
Calcium	Ca-Sedmt	5.30 * mg/kg-dr
Magnesium	Mg-Sedmt	0.81P* mg/kg-dr
Sodium	Na-Sedmt	17.2 * mg/kg-dr
Potassium	K -Sedmt	200U mg/kg-dr
Arsenic	As-Sedmt	3.0U mg/kg-dr
Barium	Ba-Sedmt	0.10U mg/kg-dr
Beryllium	Be-Sedmt	0.10U mg/kg-dr
Cadmium	Cd-Sedmt	0.20U mg/kg-dr
Chromium	Cr-Sedmt	0.50U mg/kg-dr
Cobalt	Co-Sedmt	0.30U mg/kg-dr
Copper	Cu-Sedmt	0.30U mg/kg-dr
Lead	Pb-Sedmt	2.0U mg/kg-dr
Manganese	Mn-Sedmt	0.17P* mg/kg-dr
Molybdenum	Mo-Sedmt	0.50U mg/kg-dr
Nickel	Ni-Sedmt	1.0U mg/kg-dr
Silver	Ag-Sedmt	0.30U mg/kg-dr
Vanadium	V -Sedmt	0.20U mg/kg-dr
Zinc	Zn-Sedmt	2.8 * mg/kg-dr
Antimony	Sb-Sedmt	3.0U mg/kg-dr
Aluminum	Al-Sedmt	10U mg/kg-dr
Selenium	Se-Sedmt	5.0U mg/kg-dr
Titanium	Ti-Sedmt	0.50U mg/kg-dr
Iron	Fe-Sedmt	1.8P* mg/kg-dr
Thallium	Tl-Sedmt	5.0U mg/kg-dr

(Sample Complete)

Project: DOE-411Y AZURITE MINE

Officer: NDP

Account: JIA04

Blank ID: EWPB 52.22

Metals - PP		Water-Total
Blank #1	Result	Units
Arsenic	1.50	ug/l
Lead	1.00	ug/l
Thallium	2.50	ug/l
Selenium	2.00	ug/l

Metals - ICP Scan		Water-Total
Blank #1	Result	Units
Beryllium	1.00	ug/l
Cadmium	2.00	ug/l
Chromium	5.00	ug/l
Copper	3.00	ug/l
Nickel	100	ug/l
Silver	3.00	ug/l
Zinc	4.00	ug/l
Antimony	300	ug/l

(Sample Complete)

WASHINGTON STATE DEPARTMENT OF ECOLOGY
ENVIRONMENTAL INVESTIGATIONS AND LABORATORY SERVICES
MANCHESTER LABORATORY

RECEIVED

SEP 17 1992

DEPT. OF ECOLOGY

September 15, 1992

TO: Project Officer
FROM: David A. Thomson *DAT*
SUBJECT: Azurite Mine Cyanide Results

SAMPLE RECEIPT:

The samples from Azurite Mine project were received by the Manchester Laboratory on 7/28/92. These samples had not been preserved since collection on 7/24/92.

HOLDING TIMES:

The Total Cyanide analyses were performed by Sound Analytical Services within the specified holding times using EPA Method 9010 for the soil samples and EPA method 335.2 for the water samples.

PROCEDURAL BLANKS:

All blanks are within the method guideline.

PRECISION DATA:

The % RPD for all the dilutions was well within the +/- 10% window for duplicate analysis.

STANDARD REFERENCE MATERIAL:

Standard reference material was within the windows established for Total Cyanide.

SUMMARY:

The data generated by the analysis of the Azurite Mine samples can be used with the qualification that the samples had been unpreserved for four(4) days.

If you have any questions about the results or the methods used to obtain these results please call me at (206) 871-8823.

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: WA State Dept. of Ecology

Date: August 21, 1992

Revised: September 10, 1992

Report On: Analysis of Soil & Water

Lab No.: 25991

IDENTIFICATION:

Samples received on 07-29-92

Project: Azurite Mine Tailings

ANALYSIS:

Lab No. 25991-1

Client ID: 318050 (soil)

Mine Dump

Cyanide, mg/kg

3.2

Lab No. 25991-2d

Client ID: 318051 (soil)

Tailings, oxidized

Cyanide, mg/kg

5.6

Lab No. 25991-3

Client ID: 318052 (soil)

Tailings, unoxidized

Cyanide, mg/kg

~~19~~

5.2 mg/l. Freshwater cyanide toxicity
Q.C.W./CG

Continued

SOUND ANALYTICAL SERVICES, INC.

Wa State Dept. of Ecology
Project: Azurite Mine Tailings
Page 2 of 2
Lab No. 25991
August 21, 1992

Lab No. 25991-4

Client ID: 318053 (water)

Cyanide, mg/l

< 0.10

Lab No. 25991-5

Client ID: 318054 (water)

Cyanide, mg/l

0.45

TCP std. based on Quality
Criteria for Water, 1984
.2

Lab No. 25991-6

Client ID: 318055 (water)

Cyanide, mg/l

< 0.13

SOUND ANALYTICAL SERVICES


THOMAS BOYDEN

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047

QUALITY CONTROL REPORT

Client: Dept. of Ecology
Project: Azurite Mine Tailings
Lab No: 25991qc
Date: August 21, 1992

DUPLICATES

Parameter	Lab Sample Number	Sample Result (S)	Duplicate Sample Result (D)	RPD
Cyanide	25991-6	< 0.05	< 0.05	0.0

RPD = Relative Percent Difference
= $[(S - D) / ((S + D) / 2)] \times 100$

Q.C. CHECK SAMPLE

PARAMETER	TRUE VALUE (TV)	RESULT (R)	%D
Cyanide	0.347	0.324	6.6

%D = % Difference
= $(TV - R) / TV \times 100$

Check sample is a Setpoint Standard from Analytical Products Group.

METHOD BLANK

PARAMETER	RESULT
Cyanide	0.01

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

DISCUSSION

Client: WA State Dept. of Ecology
Project: Azurite Mine Tailings
Lab No. 25991n
Date: August 21, 1992
Revised: September 10, 1992

Cyanide:

Three soil samples were distilled per EPA Method 9010. Three water samples were distilled per EPA Method 335.2. All samples had lead acetate added to the scrubber absorbant with the exception of 25991-2 which had did have lead acetate added toin the absorbant. All samples were quantified per EPA Method 335.3 and Alpkem Method A303-S110. See RFA worksheet for weights & dilutions.

The original analysis of 25991-2 was performed without lead acetate and it is believed that the results was errantly high due to sulfide interference. Therefore, the result of the duplicate analysis of that sample was reported. Lead acetate was added to the absorbant solution for the duplicate analysis.