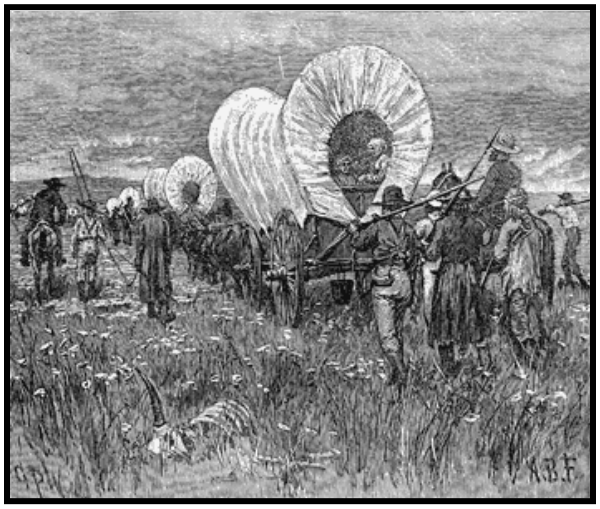
JOSEPH A. PAKOOTAS , ET AL V. TECK COMINCO METALS, LTD. CIVIL ACTION NO CV-04-0256-LRS

A Rebuttal Report to: Fredric Quivik, Terence McNulty, Adrian Brown, and Rex Bull

Jennifer Stevens, Ph.D.

5/13/2011



SHRA StevensHistoricalResearchAssociates

Expert Witness Testimony

In the past four years, I have provided deposition testimony in the case of Ada County Highway District v. Settlers Irrigation District (CV-OC-0605904) in July 2009, as well as affidavit testimony in Pioneer Irrigation District v. City of Caldwell (CV-08-556-C) and Corn, et al. v. Boise City Canal Company (CV-OC 0916479).

Expert Witness Compensation

I am the principal of Stevens Historical Research Associates (SHRA), which has been hired by the Confederated Tribes of the Colville Reservation and the State of Washington in the matter of Joseph A. Pakootas, et al. v. Teck Cominco Metals, Ltd. (CV-04-0256-LRS). My hourly rate in this case is $110/hour for research and project work, and $175/hour for deposition and testimony.

Expert Witness Qualifications

I have been working as a historical research consultant since 1995.

In 1995, I began working as an associate historian on water rights and mining history litigation. The cases on which I worked involved the history of water rights and land use throughout the West, including New Mexico, Arizona, California, Colorado, and Idaho. The projects included the history of Indian reserved rights, disputes over riparian and prior appropriation laws, the intent and administration of federal wildlife refuges, the history of western mining and Superfund administration, and myriad other topics, all related to land use and water law in the West. All projects required the use of federal land records as well as federal records of the Bureau of Reclamation, among many other federal, state, and local sources related to natural resource policy.

In 2003, I began my own historical consulting business, and received my Ph.D. in History (with an emphasis on environmental history) from the University of California, Davis in 2008. Since the founding of Stevens Historical Research Associates (SHRA), my specialty in the areas of land and water use has continued. In addition to the topics recognized above, I have also worked on the history of land use for conservation and recreation, the history of Carey and Reclamation Act projects, irrigation district history, and forest history.

As both an associate historian and as the principal in my own historical consulting firm, much of my career has focused on mining disputes. I have been involved in seven such cases since 1996. I have extensive archival experience, ranging from National Archives facilities around the country to state, local, and academic facilities.

Additionally, I have a book under contract with the University of California Press, and contributed to a volume of essays entitled, *Breaking the Wave*, published in fall 2010 by Routledge Press. My essay in the collection relates to the history of Portland, Oregon, and efforts there to preserve open space and create the well-known Urban Growth Boundary. Finally, I am an adjunct professor of History at Boise

State University, where I recently taught an upper division environmental history course, and a mayor-appointed member of Boise City's Planning and Zoning Commission.

My Curriculum Vitae is included as an appendix to my report.

Purpose and Organization of This Report

My report provides rebuttal opinions to the reports of Dr. Fredric Quivik, Dr. Rex Bull, Dr. Terence McNulty and Adrian Brown. I analyzed these reports by examining the authors' conclusions, their foundations and sources considered and relied upon. As part of my analysis, I conducted sufficient original research to determine the existing universe of primary source material relevant to these reports. Based on my original work, I compared sources and data relied upon by the Teck Resources, Ltd.'s (Teck) experts I was asked to rebut regarding ore production, mill processing, or metals recovery with data provided by primary source documents. In some cases, the primary source data that I researched indicated that less ore was produced or processed than reported in the government documents. My report will explain that in most cases, these experts did not conduct adequate research to obtain the correct numbers, and have made assumptions with no basis.

For the purposes of this report, I relied upon and considered a variety of sources. The documents I considered included documents provided by Teck Cominco's experts, such as historical reports, archival documents, government reports, and historic newspaper articles, maps and photographs. I also examined some of Teck's expert reports, including Drs. Fredric Quivik, Rex Bull, and Terence McNulty, as well as Wayne Grip, John Higginson, and Adrian Brown. I also examined the consulting reports provided by Teck, including Dr. Bull's and HAI's reports. I also considered some of the Plaintiffs' expert reports, including Paul Queneau and Ray Lasmanis. Additionally, I considered telephone conversations with other experts. All of these items were provided by counsel.

I also conducted independent research. This research included some library and internet research, as well as a visit to the archives and special collections at the University of Idaho in Moscow, Idaho. Documents obtained on this trip included materials from mining collections held at that archive.

I believe I obtained sufficient information I needed to form the opinions expressed in this report.

I have organized my report into two main sections. First, I provide opinions related to methodology employed by Dr. Quivik and Dr. McNulty in developing their opinions. Second, I examine and analyze the experts' conclusions related to specific mines and mills. This latter section is organized by County, and thereunder by mine and/or mill and smelter. Within each County sub-section, I provide a brief introduction to the subject matter, and then provide quotes from the various experts' reports and my responses. The names of Teck's experts are stated in *italics*, and my responses are <u>underlined</u>.

Opinions Regarding Methodology

Summary of Opinions Related to Expert Reports Submitted by Dr. Fredric Quivik, Dr. Rex Bull, Dr. Terence McNulty, and Adrian Brown

A Note on Sources and Methodology

Professional historians actively utilize both primary and secondary sources in their methodology. It is critically important to use both types of sources to reconstruct and narrate any type of history. Most historians begin research on any given topic with a survey of existing literature to determine a number of factors: 1) what questions remain unanswered about the subject at hand; 2) what original research is still needed; 3) what is the prevailing interpretation of events?

For large-scale topics such as the history of the American Civil War, there is a "history of the history" because historians' interpretations of such events change over time, although their recounting of specific facts typically does not. Thus, in the case of the Civil War, historians in the years immediately after the War tended to argue that an intellectual debate over the merits of states' rights caused the conflict. In part, this interpretation was dictated by the sources available to, and used by, these historians that consisted primarily of federal records. As time marched on and the events grew more distant, historians who examined new documents and were influenced by the events in their own lifetimes argued that the Civil War was caused by slavery and racism. In more recent times, historians have examined the War from the perspective of regional and local histories to continue to buttress our knowledge and understanding of what happened during that critical period in American history and provide us with more nuanced views of the event.

While historians' interpretation of the Civil War's *cause and effects* may differ (sometimes vehemently), they all can agree that the Gettysburg Address was given on November 19, 1863, and that the Union won the War. In other words, historians often criticize secondary sources (which all history books would be considered) because of the interpretations they offer, but not necessarily the facts that they contain. Professional historians are trained to read such books or reports critically, with an eye toward uncovering interpretations that rely on scant facts, or which take liberties with the facts they do offer. Professional historians know that *facts offered in secondary sources should be challenged or confirmed by primary evidence when such evidence is available.*

Practicing history is akin to being a detective, and professional historians simultaneously probe existing bodies of literature (secondary sources) at the same time that they dig through primary documents in archival facilities. Primary sources are documents or other evidence produced at the time of the event or events in question, created by the people involved in the events. In the case of the Civil War, a primary source might be a soldier's diary, or a collection of letters written between people separated by the conflict. Newspapers are a unique source in that they are written from a third person perspective, putting them in the secondary source category. However, newspapers also can provide clues as to how contemporaries viewed the events taking place, making them a useful primary source subject to the usual professional critique. A more easily categorized secondary source might be a historian's or

journalist's account of the battle of Antietam. As a professional historian is researching his or her book or article, he would undoubtedly be using all types of sources in order to set out his own unique argument and clearly place it in the range of material already published.

With specific regard to secondary sources, it is important to emphasize the role they play in a professional historian's methodology. The quality of secondary sources varies, ranging from scholarly histories to accounts written by amateur historians that do not follow professional standards. Although secondary sources are not all equal, they should not be dismissed simply because they are secondary sources. However, they should always be bolstered by primary source documents whenever possible. What historians are trained to do is critique such sources based on a number of things: the author's perspective,[1] the sources used, and the purpose of the work.

In the case of Drs. Quivik, McNulty, Bull and Adrian Brown, the consequence of not confirming secondary source numbers with primary source evidence or relying upon untenable numbers which originate in these secondary sources has resulted in Drs. Quivik, McNulty, Bull and Adrian Brown making a significant number of assumptions based on estimates or averages. Therefore, the reports and the conclusions they draw are inherently unreliable.

Methodology

1. Opinion 1: It is my opinion that Dr. Quivik did not employ professional historical methodology in the preparation of his report because of the report's heavy reliance upon secondary sources and overall failure to consult readily available primary sources, resulting in an inherently unreliable report.
2. Opinion 2: It is my opinion that Dr. Quivik, Dr. Bull, Adrian Brown and Dr. Terence McNulty rely too heavily on secondary sources such as government reports and other government documents in their history of mining in Northeast Washington and to establish production numbers. The overreliance on secondary sources has led to conclusions and assumptions that create unreliable reports.
3. Opinion 3: It is my opinion that because Dr. McNulty and Dr. Bull improperly relied upon federal records, including the United States Bureau of Mines Mineral Yearbooks and Canada's Minister Of Mines Annual Reports, they calculated incorrect amounts of byproducts such as slag from the Northport Smelter.

Opinion 1

It is my opinion that Dr. Quivik did not employ professional historical methodology in the preparation of his report because of Dr. Quivik's report's heavy reliance upon secondary sources and overall failure to consult readily available primary sources, resulting in an inherently unreliable report.

Although it is common to utilize research assistants in the historical profession, it is imperative that a historian conduct or at least direct his or her own research. Conducting one's own research is critical to

[1] Peter Novick, That Noble Dream: The "Objectivity Question" and the American Historical Profession (Cambridge: Cambridge University Press, 1988).

being able to render an accurate and thorough opinion about the history of any given topic. If a professional historian does not conduct his or her own research, then he has not employed his own professional judgment as to which documents are important in the universe of what is available. It is the *fundamental job* of a professional historian to determine which documents are important and which ones are not.

In this case, another research firm – History Associates Incorporated (HAI) – appears to have conducted all of the research for Dr. Quivik's report (with perhaps the exception of journal articles). It is my opinion that Dr. Quivik did not direct his own research and was overly reliant upon documents that unrelated parties found to be significant. The fact that he does not cite the readily available ore records is indicative of this error; it is my opinion that Dr. Quivik would have utilized those records and provided those to the other experts had he conducted or directed the research considering the nature of the defense put forth by his client.

Because Dr. Quivik did not conduct his own research, it is my opinion that he did not employ his own professional judgment as to the accuracy of the numbers provided in the government documents. Therefore, the numbers he provides should be deemed unreliable for the purposes of other experts who render opinions about the precise amount of ore, waste rock, or tailings generated from these mines, mills, and/or smelters.

Opinion 2

It is my opinion that Dr. Quivik, Dr. Bull, Adrian Brown, and Dr. McNulty rely too heavily on secondary sources such as government reports and other government documents in their history of mining in Northeast Washington and to establish production numbers. The overreliance on secondary sources has led to conclusions and assumptions that create unreliable reports.

Drs. Quivik, Bull, and McNulty, and Adrian Brown have relied heavily on Annual Minerals Yearbooks compiled and published by the United States Bureau of Mines and Permanent Individual Mine Records (also compiled by the Bureau of Mines). Several significant issues exist with these sources:

1. PIMRs. The Permanent Individual Mine Records (hereafter, PIMR) were generated through forms/surveys sent by the Bureau of Mines annually to mining companies across the country. Those numbers were then published in the U.S. Bureau of Mines Annual Mineral Yearbooks. Because there was no law compelling mining companies to respond to the surveys, some companies opted out of the questionnaires. In years where a company opted out of the survey, the Bureau of Mines estimated the figures that were reported on these documents. How the Bureau of Mines arrived at these estimates is unknown, but in the face of primary record availability, it is clear that the PIMRs are – in these cases at the very least – unreliable. Although the years in which any company did in fact report production numbers would be more reliable than years in which they did not, even then the PIMRs provide only a very high-level view of any particular mine's operations. Because most mills processed ore from more than one mine and because we often do not have the full information on all feeder mines, complex calculations would need to be written to take into account a number of factors, the least of which would be

the amount of ore from any given mine on a monthly basis and averages for the metals values for *each mine's* ore. Primary source documents showing ore purchased or ore processed as well as values are critical for providing this information and subsequently providing the metals value in tailings.

2. Mineral Resources of the United States/Mineral Yearbooks. The annual reports of mining in the United States represent a compilation of information about mining in the United States each year. Generally dependent upon the generosity of individual mining companies' willingness to provide and/or share information and data (see PIMR section above), the Bureau's staff often included information from some of the mining industry's most important trade journals, as well. The reports are useful for reconstructing a general narrative of mining in a certain area or trends related to a certain district or mine. However, because they are simply a recording of other entities' information, they cannot be relied upon for the reconstructing of ore numbers, waste rock, tailings, tailings disposal or location, or other precise data.

My knowledge on these points is based upon many years of archival research in corporate mining collections and other mining research. Often, mine owners simply did not respond to government requests. Therefore, the improper reliance on government sources can lead to incorrect numbers, generalities and assumptions, and in the case of Adrian Brown's and Drs. Quivik, Bull, and McNulty's reports, lead to generally unreliable reports. Many significant archival collections exist that contain primary documents that are critical to constructing a history of 20th century mining in Northeast Washington. These collections include the Northport Smelting and Refining Company (University of Idaho, Manuscript Group 234), Aurum Mining Group (University of Idaho, Manuscript Group 235), Bunker Hill Mining Company (Manuscript Group 367), American Zinc, Lead and Smelting Company (R010 at the State Historical Society of Missouri). These archival collections, available to historians, provide more reliable information about waste disposal practices and ore and waste rock production. Teck's experts did not access these collections, choosing instead to rely on secondary sources. This results in production figures that are inherently unreliable.

There is no compelling reason to utilize the government figures except in situations where there is no surviving primary source material available. Such primary source material is inherently more reliable for the establishment of such important figures as ore milled, waste rock, tailings production, and the metal contents of them all because this material is created by the very companies whose bottom lines depend on the preservation of precise records. The U.S. Bureau of Mines, on the other hand, was simply a recorder and collector of information. To cite just one example where the government agency simply was not knowledgeable about the inner workings of one of these companies, one need only examine the section of my report below that discusses the history of the Last Chance Mine. (See page 37 below.) Because Drs. Quivik Bull, McNulty, and Adrian Brown primarily used secondary sources that have significant reliability questions, their opinions as to volume of ore produced, ore milled, ore smelted, tailings produced, tailings discharges and locations, slag produced or slag discharge and locations, are themselves unreliable.

Opinion 3

It is my opinion that because Dr. McNulty and Dr. Bull improperly relied upon federal records, including the United States Bureau of Mines Mineral Yearbooks and Canada's Minister Of Mines Annual Reports, they calculated incorrect amounts of byproducts such as slag from the Northport Smelter.

Drs. McNulty and Bull rely upon the same government documents used by Dr. Quivik. Their failure to utilize the precise figures available in archival collections such as the Northport Smelting and Refining Company (University of Idaho, Manuscript Group 234), Aurum Mining Group (University of Idaho, Manuscript Group 235), Bunker Hill Mining Company (Manuscript Group 367), American Zinc, Lead and Smelting Company (R010 at the State Historical Society of Missouri) has a significant impact on the issues examined by those experts and is not simply theoretical in nature. For instance, examination of the original records for the Northport Smelter would provide specific information about the metal content in the flux being used between 1898-1910, obviating the need for Dr. McNulty to estimate the content of the flux based on a single sentence about Hunter V ore making "desirable" flux. (See Section beginning on page 24 below). Another specific example is, when reporting on the Northport Smelter, McNulty claims that no information was available for 1905 and he therefore estimates both the tons of ore smelted for that year as well as the tons of matte produced. However, documents in Manuscript Group 234, Records of Northport Smelter & Refining Company, provide the information he would need for the exact amount of ore produced as well as matte. Thorough examination of primary source documents would also have revealed the fact that slag at the Northport Smelter was utilized for purposes such as building houses and that not all slag was granulated.[2] Dr. McNulty and Dr. Bull failed to use these documents. Therefore, neither Dr. McNulty nor Dr. Bull employed sufficient diligence in his research to support his report, which leads to errors in his calculations.

Opinions Related to Specific Mines and Mills

Overview

In this section, I will rebut specific points on the mines and mills reported upon by Teck's experts. There are five general arguments that run through this part of my report.

1. Discharge to the Watershed of the Upper Columbia River.
   Throughout his report, Dr. Quivik erroneously implies that the many mines and mills he examined all discharged tailings and waste rock to what he calls (with some variations) the "watershed of the upper Columbia River basin." In most instances, however, he fails to actually connect waste discharge directly to the Columbia River. In only one case – the Northport Smelter – does Dr. Quivik make a direct argument based on historical documents that these materials were directly discharged to the Columbia River. In the specific rebuttal section below, my report demonstrates that Dr. Quivik disregarded the evidence on this point (See page 24

[2] See Expert Rebuttal Report of Allen J. Medine, Ph.D.,P.E., BCEE

below). In all other cases, the evidence Dr. Quivik relies upon shows only that tailings were discharged to the land, or in one case only, the Pend Oreille mill, to a *tributary* of the Columbia River. Furthermore, he draws conclusions regarding what he terms, "releases or threatened releases of hazardous substances" from waste rock, slag, and tailings that are unsubstantiated by the historic documents. In this section, I will demonstrate that many of the claims made by Dr. Quivik and Teck's other experts are unsubstantiated.

2. Processing of Waste Rock and Dump Ore.
   Dr. Quivik argues that "mining of any magnitude did not develop in northeast Washington until mine developers could also build mills."[3] He often makes the point in his expert report that waste rock remained on the land and released or threatened to release hazardous substances to the environment. Although in the late 19th and early 20th centuries, many mines in Northeast Washington shipped raw 1st class ore to smelters with no additional treatment, primary documents demonstrate that dump ore (ore that is of a lower grade) was later (after extraction or when technology improved enough to obtain better recovery rates) shipped by mines either to mills nearby or to the various regional smelters.[4] Gradually, as the technology for recovering metals out of lower grade ore improved, mine owners sent dump ore and waste rock to mills and the amount of these materials on the land diminished, a fact that is ignored by Dr. Quivik and Adrian Brown. An examination of my rebuttal to Dr. Quivik's history of the Last Chance Mill (See Last Chance Mine and Mill, page 37) demonstrates how overreliance on government sources when primary sources are available leads to unreliable conclusions.
3. Unsubstantiated Conclusions Regarding "Release or Threatened Release."
   In addition to Dr. Quivik's failure *to* utilize critical historical documents that would assist other experts in calculating waste rock and dump ore remaining on the land and other important figures, in many cases, he also takes the historic documents he does examine too far, reaching unsubstantiated conclusions that his sources cannot support. One example of this is Dr. Quivik's rote statement he uses to conclude each section of his report:

   > "In addition to tailings discharged into tributaries of the Columbia River, *mine xyz* extracted waste rock and low-grade materials which were piled near the mine and which may have released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances such as lead or zinc."

   As I will demonstrate below, there are many cases in which Dr. Quivik makes this statement with no reference to any historic documents whatever. As just one example of this, the Knob Hill mill, Dr. Quivik repeats this statement,[5] yet even Teck expert Dr. Rex Bull admits that in the case

[3] Frederic L. Quivik, Ph.D. *History of Mining, Milling, and Smelting in NE Washington, Expert Report, November 19, 2010*, 16.
[4] K.H. Fairweather to Henry L. Day, June 17, 1933, folder 7, Box 2, Records of the Aurum Mining Company, Manuscript Group 235, University of Idaho Special Collections, Moscow, Idaho.
[5] Quivik, 52.

of Knob Hill, "no indication about where [waste rock] was dumped has yet been found."[6] In addition to this statement being unsupported by evidence, it is also my opinion that a historian is likely not qualified to state – based on historical documents – whether waste rock or tailings "release or threaten a release of hazardous substances."

4. Mill Capacities.
   Dr. Quivik also makes a point to report on the many mills' processing capacities and the increases in those capacities over time. However, it is misleading to leave the impression that a mill's maximum capacity translates to the mill's actual production. Whether a mill operated at capacity depended upon many things, but most of all, the availability of ore. I demonstrate this point for a few specific mills to point out when a mill's capacity was above the level at which the mill was actually producing.
5. Errors and Estimates.
   There are many instances in which Drs. McNulty and Bull made errors, as well as providing estimates with little or no explanation of their bases. Dr. McNulty's report makes many calculation errors even in transcribing numbers from the sources he used. Furthermore, he provides his own *estimates* of ore smelted at the Northport when specific figures were available. My report demonstrates those specific errors. However, the cumulative effect of the many errors he makes calls into question the intrinsic reliability of his report. Dr. Bull's report also makes similar errors and assumptions, calling into question the reliability of his report as well.

Pend Oreille County

Metaline Mining District

Josephine Mills /Pend Oreille Mill

Introduction

The Josephine and Pend Oreille Mills were situated on opposite sides of the Pend Oreille River, a tributary to the Columbia River, and primarily processed ore from the Josephine Mine. The mills only overlapped in operation for a short period between 1950 and 1952, and during that time, the new mill (east side mill) was being tested and not processing a great deal of ore.[7] The key periods of production

[6] Rex Bull, Exhibit 5, Operation of the Knob Hill Mill, Republic District, Ferry County, Washington, 1937-1995, Consulting Report, Nov. 2010, no pagination (last page). Dr. Rex Bull prepared a number of Consulting Reports separate from the expert report he submitted for Teck. These Consulting Reports were produced through Adrian Brown, who presumably utilized them in forming his conclusions regarding waste rock.

[7] Minerals Yearbook, 1951 (U.S. Bureau of Mines), 1615 (TECK_0015000); Minerals Yearbook, 1952, Volume III (U.S. Bureau of Mines), 963-964 (TECK_0015011); "Pend Oreille Output Mounting Steadily," *Wallace Miner,* May 15, 1952. (WADNR-HQ-10-08-09-019182)

for the entire operation then were 1915-1952 (west side), and 1952-1977 (east side), both marked with periodic and lengthy interruptions caused by labor shortages and low metal prices.[8]

The Josephine (west side) Mills operated during a period of history that was characterized by significant changes in mining technology. There is a great deal of evidence to demonstrate that the original Josephine Mill (Josephine #1 – 1915-1934) and its successor (Josephine #2 – 1936-1952) re-processed tailings generated by the original gravity concentration mill.[9] When flotation was introduced at the site in 1927, those tailings were re-processed for a greater recovery of metal.[10]

The discharge of tailings from these three mills must be separated into eras and locations that must be described individually. It is a mischaracterization of the historical record to imply that all tailings from these mills were discharged to the Pend Oreille River or its tributary, Flume Creek.

Josephine #1 (1915-1934)

The original Josephine Mill was constructed in 1915 as a gravity concentrator.[11] When the *Mining and Scientific Press* reported on the operation in November 1916, the author noted that five Overstrom sand tables produced a lead heading, a zinc middling, and "a tailing that descends to the settling pond." The mill also sent the tailings from the 11 Overstrom slime tables to the same settling pond.[12] Other sources reported that tailings were washed away to tailings piles on site.[13] There is no indication that any of the tailings from this mill – even following its remodel in 1927 – were ever deposited directly into Flume Creek. In fact, Dr. Quivik provided no evidence to suggest that the mill's tailings were not stored in a settling pond during the mill's entire run and no basis to presume they were not.

There *is* evidence that the tailings were gradually re-processed. The mill's early operators fully intended to re-treat the mill's tailings, as the *Mining and Scientific Press* reported in 1916: "It is later planned to erect a flotation plant to re-treat the tailings now being stored in the settling pond."[14] Tailings were treated at the remodeled simple flotation mill beginning in 1927.[15] Further evidence shows that the

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[8] See Annual Minerals Yearbooks for these years, including, for example, Minerals Yearbook, 1934 (Washington, D.C.: Government Printing Office (hereafter GPO, 1936), 297, (TECK_0014790) and Minerals Yearbook, 1937 (Washington, D.C.: GPO, 1937), 552; and also the Permanent Individual Mine Records on the Josephine and Pend Oreille for these years (PIMR).

[9] Robert B. Brinsmade, "Two Washington Mining Districts," *Mining and Scientific Press* (Nov. 18, 1916): 743-744 (TECK_1547053); PIMR Pend Oreille (Josephine), 1927.

[10] PIMR Pend Oreille (Josephine), 1927.

[11] Robert B. Brinsmade, "Two Washington Mining Districts," *Mining and Scientific Press* (Nov. 18, 1916): 743-744. (TECK_1547053); Mineral Resources of the United States, 1917 (Washington, D.C.: GPO, 1921), 503.

[12] Robert B. Brinsmade, "Two Washington Mining Districts," *Mining and Scientific Press* (Nov. 18, 1916): 743-744. (TECK_1547053)

[13] Grechen Schmidt, *Josephine Mill/Mine Removal Action, Pend Oreille County, Washington*, Office of Environmental Assessment, EPA, 5. (2004) (CCT1-020510; CCT1-020514).

[14] Robert B. Brinsmade, "Two Washington Mining Districts," *Mining and Scientific Press* (Nov. 18, 1916): 743-744. (TECK_1547053).

[15] PIMR, Pend Oreille-Josephine, 1927; Mineral Resources of the United States, 1927 (Washington, D.C.: GPO, 1928), 595-596; W.L. Bell, Mineral Investigations Project, C.W.A. – 1934 – W.E.R.A., 6. (Plaintiff _00043210)

tailings were not discharged into Flume Creek. A 2002 Trip Report authored by EPA's START-2 observed a tailings pile measuring 50 feet long by 50 feet wide "*adjacent*" to Flume Creek.[16] The depth of the pile was unknown. A waste rock pile was mixed into the tailings pile, and measured 15 feet long by 10 feet wide by 50 feet high. The historical documents allow a reasonable inference that tailings remaining on the surface at the time of this 2002 report were not discharged to the creek.[17]

Josephine #2 (1936-1952)

As mining of the ore body continued into the 1930s, transporting the ore underground to the Josephine #1 site became more difficult and costly on the incline hoists. Pend Oreille Mines & Metals Company decided in 1934 to construct another mill closer to the main working tunnel to reduce costs.[18] The location choice was also related to the need for power. Power was not available for the expansion of the existing mill, but a new plant could be built at Metaline Falls on the Clark Fork River that would supply the new plant.[19] The flotation unit took advantage of the Josephine ore's relative absence of pyrite, making a simple separation of zinc and lead possible and resulting in high-grade concentrates for each. The mill, which was situated closer to the Pend Oreille River than the Josephine #1, began operations in 1936, and continued on and off through 1952.[20] Although the new mill initially had the capacity to mill 300 tons per day, it was not able to function at that capacity because of the hardness of the ore.[21] Reports from the EPA's 2002 START-2 team showed a waste rock pile from the Josephine #2 mill. The drawings from the report show the waste rock piles atop a 150-foot hill above Flume Creek. There are no indications as to its size or metallurgical makeup, and no indications of tailings remnants in the drawings.[22] However, surface tailings were sampled at this mill site in 2003.[23]

Pend Oreille Mill (1952-1977)

The Pend Oreille Mill, which was situated on the east side of the Pend Oreille River, was the last of the company's three mills to be constructed. The site selection was again related to the location of the ore coming out of the ground, as the company worked on an approach to the ore body from the east side.[24]

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[16] Grandview, Josephine, and Pend Oreille Mines/Mills Trip Report, Metaline Falls, Washington." (Region 10 START-2, Sept. 2002): 2-4. (CTRL091787-091886)

[17] "Grandview, Josephine, and Pend Oreille Mines/Mills Trip Report, Metaline Falls, Washington." (Region 10 START-2, Sept. 2002): p. 2-4. (CTRL091787-091886)

[18] W.L. Bell, Mineral Investigations Project, C.W.A. – 1934 – W.E.R.A., p. 6. (Plaintiff _00043210); J.C. Crampton, Pend Oreille Mines & Metals Co., Latest Mill Reflects Changes Over Four Decades of Mining," *Mining Engineering* (Sept. 1955), 846-849.

[19] W.L. Ziegler, "Pend Oreille, New Development," *Mining World* (June 1949). (TECK_1547021); Charles A.R. Lamby, "Pend Oreille Solves Power Problem in Unique Manner," E*ngineering and Mining Journal* (Vol. 139, No. 3), 40. (TECK_1547029)

[20] See Annual Mineral Yearbooks for this date range.

[21] *The Mining Journal*, Jan. 30, 1937. (WADNR-HQ-10-08-09-019191)

[22] "Grandview, Josephine, and Pend Oreille Mines/Mills Trip Report, Metaline Falls, Washington." (Region 10 START-2, Sept. 2002): p. 2-4. (CTRL091787-091886)

[23] *Grandview and Josephine Mines Removal Assessment Report*, START-2, Nov. 2003, p. 1-8. (CTRL091887-091938)

[24] J.C. Crampton, Pend Oreille Mines & Metals Co., Latest Mill Reflects Changes Over Four Decades of Mining," *Mining Engineering* (Sept. 1955), 846-849; W.L. Ziegler, "The Metaline Mining District," *Engineering and Mining Journal* (Vol. 150, No. 7), 102. (TECK_1547025)

The mill was constructed in 1950, and began full operations in 1952.[25] From 1952 to 1968, the company apparently discharged some of its tailings to the Pend Oreille River. Discussions with the Washington Pollution Control Commission suggest that the State was discussing alternative options with the company as early as 1950 and 1956.[26] Finally, the State required that the company impound its tailings beginning in 1968, which it did.

Specific Opinions

Quivik: "The company started discharging its tailings into Flume Creek a relatively short distance from its mouth on the Pend Oreille River. A 2003 report by the Superfund Technical Assessment and Response Team noted that at the Old Josephine mill site, 2.5 acres of tailings piles remained, extending into Flume Creek. The Josephine Mills discharged hundreds of thousands of tons of tailings into tributaries of the Columbia River prior to closing."[27]

Stevens: Disagree.

Many piles of tailings still existed on both the Josephine #1 and Josephine #2 sites early in the 21st century, as noted by the 2002 and 2003 START reports written on the subject. Those documents report large tailings piles still on the Josephine #1 site as well as tailings on the Josephine #2 site, demonstrating that at least some of the tailings produced were not in fact discharged to Flume Creek.[28] The 2003 report notes that at the Josephine #1 site, "Flume Creek runs along the toe of the tailings pile,"[29] and also that "roughly 25 feet from the north bank of Flume Creek on the east and west sides of the main tailings area, are large piles of tailings." The same document reported testing surface tailings at the Josephine #2 site, as well.[30]

Finally, one of Teck's own experts, Wayne Grip, demonstrates with historic aerial photos that tailings existed in a field on the "edge of Flume Creek" in aerial photos from 1943.[31]

The majority of tailings from the Josephine #1 were stored in settling ponds or piled on the land. The method of disposing tailings from the Josephine #2 mill is less clear. Although the 1950 Orlob and Saxton report states the following: "Flume Creek, running near the [Josephine #2] mill receives tailings discharge, about 500,000 gallons daily at 20-25 percent solids by weight, and carries it to the river,"[32] it

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[25] Minerals Yearbook, 1952 (U.S. Bureau of Mines), 964.
[26] D.L. Hansen to Files, c. April 1950. (WAARCH0003536); John E. Hogan to Alfred T. Neale, George H. Hansen, May 15, 1956. (WAARCH0003530)
[27] Quivik, 30.
[28] "Grandview, Josephine, and Pend Oreille Mines/Mills Trip Report, Metaline Falls, Washington." (Region 10 START-2, Sept. 2002). (CTRL091787-091886); Grandview and Josephine Mines Removal Assessment Report, START-2, Nov. 2003. (CTRL091887-091938).
[29] *Grandview and Josephine Mines Removal Assessment Report*, START-2, Nov. 2003, p. 1-6. (CTRL091887-091938)
[30] *Grandview and Josephine Mines Removal Assessment Report*, START-2, Nov. 2003, p. 2-2. (CTRL091887-091938)
[31] Statement of Opinions, Wayne M. Grip, Nov. 2010, 4.
[32] Gerald T. Orlob and Walter W. Saxton, *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 (1950), 9. (TECK 0025219)

is difficult to reconcile the presence of surface tailings on the land in the early 2000's with Dr. Quivik's contention that "hundreds of thousands of tons of tailings" were discharged from the Josephine Mills into the tributaries of the Columbia River. The START reports from 2002 and 2003 are less certain about the discharge into Flume Creek than Orlob and Saxton were, speculating that, "remnants of a tailings flume in the creek near the New Josephine Mill indicate that Flume Creek may have been used to discharge tailings from the milling process,"[33] but also noted that "the terrain is flat in the area where the mill buildings are situated," possibly providing a place for tailings discharge there as well.[34] Additionally, surface tailings were found and sampled at the Josephine #2 site early in the 21st century, as reported in the 2003 START report.[35]

Therefore, while Dr. Quivik implies that all of the tailings from these two mills – to the degree of "hundreds of thousands of tons" – were discharged to the tributaries of the Columbia River, the historical record does not support that implication. The evidence for Josephine #1 suggests that: 1) settling ponds were utilized in the mill's early history; and 2) tailings pilings still exist on the land.

With regard to Josephine #2, there is enough evidence of surface tailings near the Josephine #2 site to indicate that not all of the tailings were discharged to Flume Creek from this second operation, either.

Dr. Rex Bull, Exhibit 7

Dr. Rex Bull's Exhibit 7 provides ore production figures for the Pend Oreille mines (including the Josephine). The exhibit relies entirely on the Permanent Individual Mine Record to record ore from the feeder mines to the Josephine Mills (both east and west mills) for the period between 1916 and 1977.

However, Dr. Bull's report includes a number of inaccuracies.[36]

Bull: Dr. Bull's Exhibit 7, Pend Oreille Mine-Mill Data, 1929 figure for ore from the Josephine Mill shows 320 tons.

Stevens: Disagree. The PIMR from which the figure is taken specifies that the number is an "estimate," suggesting that the company did not report it ore figures for this year. Therefore, Dr. Bull should have highlighted the cell in red (as he did in other Exhibits) to demonstrate that this figure is an estimate, per the PIMR. Any resulting calculations should be taken as estimates, as well.

Bull: On Exhibit 7, Pend Oreille Mine-Mill Data, Dr. Bull shows that 232,729 tons of ore was milled from the Josephine mine in 1970.

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[33] *Grandview and Josephine Mines Removal Assessment Report*, START-2, Nov. 2003, p. 3-2. (CTRL091887-091938)
[34] *Grandview and Josephine Mines Removal Assessment Report*, START-2, Nov. 2003, p. 1-6. (CTRL091887-091938)
[35] "At the New Josephine Mill, the BLM analyzed waste rock, unprocessed ore, tailings, and soil using the XRF." *Grandview and Josephine Mines Removal Assessment Report*, START-2, Nov. 2003, p. 1-8. (CTRL091887-091938)
[36] In Dr. Bull's other exhibits, he uses a red color in the cells where the numbers from the PIMR were noted to be "estimates."

Stevens: Disagree. Dr. Bull overstates the data from the Josephine Mine for this year. The PIMR reported production to be 223,729.[37]

Bull: Bull's Exhibit 7 provides only his own estimates (highlighted in yellow) for the years 1969-1976 with regard to metals recovery, tailings produced, and metal content of the tailings produced.

Stevens: Disagree as to methodology and values.

From 1969 forward, Dr. Bull estimates that copper recovery in the ore was *a third less than the final year* for which reliable numbers from the PIMRs are available (1968). He makes similarly low estimates for lead and zinc recovery during this period. Bull does not explain why his estimates are so low for metals recovery for this period of operation.

As noted above in my opinions regarding methodology, the failure of Teck's experts to examine available primary source material has led to incorrect assumptions and values in many instances. In the case of Bull's estimates for these highlighted years, primary source material is available and provides *specific metals contents for this same time period*. As just a single example, Dr. Bull provides an *estimated value* of 92.7% for recovery of lead in 1972. However, primary sources, including a report for the East Mill for December 1972 shows values much higher (96% in the case of this report).[38] Dr. Bull's failure to utilize specific primary source evidence results in him estimating *lower lead recovery and therefore, higher metal contents in the tailings.*

Furthermore, the evidence demonstrates that the State of Washington required the Pend Oreille Mines & Metals Company to construct a tailings impoundment and discharge only clear effluent to the river after 1968, and therefore, the post-1968 tailings cannot be assumed to have been discharged to the river.[39]

Quivik: "In addition to tailings discharged into tributaries of the Columbia River, Pend Oreille Mines & Metals extracted waste rock and low-grade materials which were piled near the mine and which may have released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances, such as zinc or lead."[40]

Brown: Adrian Brown claims to have computed the waste rock produced for underground mines by using a "relationship developed from 56 mines in the Tri-County area of varying sizes where the waste rock produced was known or could be reasonably estimated."[41]

Stevens: Disagree. As noted above, Dr. Quivik did not demonstrate that tailings were discharged during the entire operational run of this mill. Additionally, evidence from the Bunker Hill & Sullivan records

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[37] PIMR, Pend Oreille-Josephine 1965-1977.
[38] Bull, Exhibit 7; Pend Oreille Mines & Metals Co., East Mill Report, 12-12/14, 1972. (1972 U_Idaho-02-17-10-009028)
[39] See Quivik, 32-33 as well as all documents cited in Dr. Quivik's footnotes on these pages.
[40] Quivik, 33.
[41] Expert Report of Adrian Brown, Jan. 14, 2011, p. 7.

stored at the University of Idaho show that by at least the 1950s, Pend Oreille Mines & Metals had constructed waste ore bins to store low-grade materials,[42] implying that they were not merely piled on the ground. Other primary source records are available and should have been consulted in Missouri, as well, where the corporate papers of the American Zinc, Lead, and Smelting Company are stored. There are multiple boxes of documents specifically related to the Pend Oreille Mines & Metals Co.[43] This omission represents yet another example of primary source documents being critical to reconstructing the history of mining in this region.

Furthermore, a 2002 START-2 report on the area reported that in the early operations of the Pend Oreille and Josephine Mills, "waste rock … was stored underground." Later, between 1950 and 1977, some waste rock from the Josephine Mine was stored in a waste rock pile 150 feet south and west of the mill. Some of the waste rock that was brought to the surface "was sold and used locally as road material or in construction from at least the mid-1970s until the early 1990s. The waste rock was used as a road construction base, subbase, and surface material; for private driveways; as parking lot material at Gardner Cave State Park; and as backfill by the county."[44] Measurements of the existing rock pile were made available in 2002 studies. It is clear from Adrian Brown's report that he does not take into account the various uses spelled out in this report and that he fails to make the necessary corrections to his generic calculations.

Grandview Mill

Introduction

The Grandview Mill was constructed in 1925 by the Grandview Mining Company.[45] It began as a 50 ton per day flotation mill that produced lead concentrates. Just two years after it was completed, the company acquired the Z-Canyon property in the district and constructed a new 200 or 250-ton flotation mill in 1929.[46] It only operated for ten (10) months, however, before shutting down due to low metals prices.[47]

The mill's primary period of operation was between 1945 and 1964.[48] The evidence suggests that at least some and perhaps much of the material was discharged to the land and was not dumped into the

[42] "Summaries Showing New and Depreciated Values," Folder 520, Box 30, Records of Bunker Hill Mining Company, Manuscript Group 367, University of Idaho Special Collections and Archives, Moscow, Idaho.
[43] Records of Bunker Hill Mining Company, Manuscript Group 367, University of Idaho Special Collections and Archives, Moscow, Idaho; Records of the American Zinc, Lead, and Smelting Company, 1901-1965 (154 boxes), State Historical Society of Missouri, Manuscript Group R10, Rolla, Missouri.
[44] "Grandview, Josephine, and Pend Oreille Mines/Mills Trip Report, Metaline Falls, Washington." (Region 10 START-2, Sept. 2002): p. 1-8. (CTRL091787-091886)
[45] Mineral Resources of the United States, 1925 (Washington, D.C.: Government Printing Office, 1928): 559.
[46] PIMR, Z Canyon Group, 1926. (Plaintiff -00043921)
[47] Mineral Resources of the United States, 1930 (Washington, D.C.: GPO, 1933): 673.
[48] "Grandview Mine, Preliminary Assessment/Site Inspection, Metaline Falls, Washington." (Region 10 START-2, June 2001): 2-2. (CTRL082335-082658)

Pend Oreille River.[49] The details of the tailings discharge method must be accounted for in calculating the volume of material discharged, which Teck's experts did not do. Furthermore, from the 1920s to the 1950s, Grandview Mines sent its concentrates alternately to the Bunker Hill Smelter in Idaho as well the American Zinc, Lead, and Smelting Company smelter in Illinois for further refining. Records of both companies are available to the public, the former at the University of Idaho and the latter at the State Historical Society of Missouri – and should have been consulted in order to provide precise amounts of ore sent to the smelter and to obtain exact assay values. The Missouri collection contains no fewer than seven (7) boxes of documentation related specifically to the Grandview and Pend Oreille mills, including monthly "process maps" and other items.[50] Without examining those records, the numbers provided by Teck's experts as to metals recovery and tailings generation are inherently unreliable.

Specific Rebuttal

Quivik: "With a capacity to treat 50 tons of ore daily, the new mill saw limited operation in 1925 and 1926."[51]

Stevens: Disagree. The mill was constructed in 1925, but did not begin operating until 1926. Additionally, Dr. Quivik does not mention that the first mill on this property was a flotation mill, the technology of which resulted in better metals recovery than gravity concentrators.[52]

Quivik: "The mill went into operation in March 1929 and that year treated about 50,000 tons of ore, yielding mostly zinc."[53]

Bull: Dr. Bull's Exhibit 4, Grandview Mill Data, shows 50,600 tons of ore processed at this mill in 1929.[54]

Stevens: Disagree. Although the Mineral Resources of the United States for 1929 does report 50,000 tons of ore treated that year, it stated that the ore "*contain[ed]* chiefly zinc," not that it *yielded* mostly zinc. Quivik's alteration of the original language might mislead a reader into thinking that the milling process left the lead behind in the tailings. Instead, the government report noted that "*combined lead and zinc* concentrates" were shipped to the Kellogg, Idaho smelter.[55] [Emphasis added.] The PIMR for 1929 also shows that lead concentrates were produced.[56]

There is some disagreement regarding the amount of ore milled during this early period at the Grandview Mill. Although the government documents both show approximately 50,000 tons of ore,

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[49] "Grandview Mine, Preliminary Assessment/Site Inspection, Metaline Falls, Washington." (Region 10 START-2, June 2001): 2-4. (CTRL082335-082658)
[50] Records of Bunker Hill Mining Company, Manuscript Group 367, University of Idaho Special Collections and Archives, Moscow, Idaho; Records of the American Zinc, Lead, and Smelting Company, 1901-1965 (154 boxes), State Historical Society of Missouri, Manuscript Group R10, Rolla, Missouri.
[51] Quivik, 34.
[52] Mineral Resources of the United States, 1925 (Washington, D.C.: Government Printing Office, 1928): 559.
[53] Quivik, 34.
[54] Bull, Exhibit 4, Grandview Mill data.
[55] Mineral Resources of the United States (Washington, D.C.: GPO, 1931): 427.
[56] PIMR, Grandview, 1929-1930. (Plaintiff-00043832)

three other publications report that only 15,000 tons of ore were milled during this time.[57] The sources for these numbers are both what I would consider to be secondary sources.

Because concentrates were sent to the Bunker Hill and Sullivan smelter during this period, that company's records (Manuscript Group 367) – a voluminous collection totaling 169 cubic feet and including ledger sheets, ore information, etc. and archived at the University of Idaho – would yield a more definitive answer regarding ore processed and concentrates produced and should be checked before relying on either of these numbers to calculate tailings for the year.[58] The failure to examine the records means that the calculations they made are not dependable.

Quivik: "In the early 1960s, the State of Washington was issuing one-year permits for the Grandview mill's tailings discharges while at the same time urging American Zinc to build a settling pond to remove fine solids before waste water discharged to the river. American Zinc's resident manger, in turn, asked for a five-year permit."[59]

Stevens: Disagree as to implication. The record is clear that the facility remained subject to annual permitting and therefore it cannot be assumed that all tailings continued to be discharged to the river for the ensuing five year period. Because the State of Washington was very concerned about ceasing disposal of mill waste into the Pend Oreille River, it is likely that the company began to pile the waste on land in the latest periods of their operations. A START-2 Preliminary Assessment/Site Inspection report completed in 2001 reported on samples taken from a suspected surface tailings pile located on "the flat area described previously" over which the flume traveled; if all tailings were discharged to the river, no tailings pile would remain.[60]

Quivik: "Two sources described the Grandview mill's tailings disposal practice in about 1950. Orlob and Saxton wrote that the mill used a flume to convey tailings to the Pend Oreille River, and the solids assayed at about 0.3% zinc and 0.1% lead. Hansen's description was about the same."

Stevens: Disagree. Hansen's letter states: "This mine is about 10 years old; its discharge is carried by a wood flume from the mill to the *east bank of the Pend Oreille River*. About an acre of land with light brush is available for ponding alongside the present position of the flume."[61] [Emphasis added.] Hansen's statement does not state that the tailings were discharged to the river; his words could be interpreted to suggest that tailings were being deposited *on land* as well as into the water. And, an

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[57] W.L. Bell, Mineral Investigations Report, C.W.A. – 1934 – W.E.R.A., 4. (Plaintiff-00043217); Metaline Zinc-Lead Mining District, Pend Oreille County, Washington, 3. (WADNR-HQ-10-08-09-019296); "Grandview Mine, Preliminary Assessment/Site Inspection, Metaline Falls, Washington." (Region 10 START-2, June 2001): 2-2. (CTRL082335-082658)

[58] In particular, records of this nature are located in Series VI, "Operations, 1906-1984," Records of Bunker Hill Mining Company, Manuscript Group 367, University of Idaho Special Collections and Archives, Moscow, Idaho.

[59] Quivik, 36.

[60] "Grandview Mine Preliminary Assessment/Site Inspection, Metaline Falls, Washington." (Region 10 START-2, June 2001): 2-4, 6-1. (CTRL082335-82658)

[61] D.L. Hansen to Files, memorandum dated Aug. 28, 1950. (WAARCH0003340)

examination of a November 1956 map suggests the possibility that the mill was disposing its tailings waste in the canyon adjacent to the proposed tailings pond location.[62]

Additionally, modern reports describe tailings disposal, as well, and state that some of this mill's tailings were disposed on land. A 2001 START-2 report on this site includes a site map which shows a "suspected tailings pile" on the riverside bluff more than 300 feet away from the river, also indicating that at least some portion of the tailings was being deposited on land.[63] In 2003, the START-2 team explained the tailings disposal process this way:

> Tailings from the milling process were discharged to a drainage ditch that empties into a well-vegetated canyon (E&E 2002). Approximately 0.5 mile down the canyon, the flume discharged the tailings to the ground (E&E 2002). Drainage from the canyon empties over a bluff, known as Riverside Bluff, directly into the Pend Oreille River.[64]

Bull/Brown: Dr. Bull has provided figures on Exhibit 4, Grandview Mill Data, for all of the ore that was ever processed at the Grandview mill, including an extremely large number of his own estimates (as indicated by yellow highlights). Brown has then taken those figures and calculated tailings and waste rock disposition.

Stevens: Disagree with conclusions. There are two issues that call Dr. Bull's conclusions and calculations into question.

First, a large number of Dr. Bull's figures on Exhibit 4 are only his own estimates, as indicated by the yellow highlights, *especially* for many of the highest producing years at the mill (1950s). Many of the precise figures could and should be obtained through examination of the American Zinc, Lead, and Smelting Company records which owned this mine and mill during the 1950s, as well as the Bunker Hill Mining Records, whose smelter processed some of the concentrates.[65] Dr. Bull's and Mr. Brown's failure to examine available primary source documents means that the estimated numbers they provide are inherently unreliable and cannot be depended upon for calculations of tailings, metal content, or production.

Second, Dr. Bull's Exhibit 4 spreadsheet does not indicate or take into consideration the fact that the tailings were not all deposited into the Pend Oreille River. In fact, Dr. Bull made the following statement in a consulting report written for Teck Cominco that Mr. Brown produced with his report:

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[62] Grandview Mill, Waste Disposal Preliminary Survey, Nov. 1, 1956. (WAARCH0000586)
[63] "Grandview Mine Preliminary Assessment/Site Inspection, Metaline Falls, Washington." (Region 10 START-2, June 2001): 2-11. (CTRL082335-82658)
[64] "Grandview and Josephine Mines Removal Assessment Report, Metaline Falls, Washington (Region 10 START-2, Nov. 2003): 1-4. (CTRL091887-091938)
[65] In particular, records of this nature are located in Series VI, "Operations, 1906-1984," Records of Bunker Hill Mining Company, Manuscript Group 367, University of Idaho Special Collections and Archives, Moscow, Idaho; and Records of the American Zinc, Lead, and Smelting Company, 1901-1965 (154 boxes), State Historical Society of Missouri, Manuscript Group R10, Rolla, Missouri.

> The writer's personal observation indicated that the above-mentioned [tailings] flume must have collapsed at some time, and tailings were deposited on the flat, where they accumulated, but certainly not to the extent of four million tons. The above suggests that the tailings were never impounded, but that they flowed onto the flat and thence to the river via a gully at the downslope end of the flat.[66]

Dr. Bull's own statement that at least some of the tailings produced at the Grandview mill were discharged onto land should have been – but was not - accounted for in Mr. Brown's report. .

Stevens County

Stevens County, Washington historically has been the site of a great deal of mining activity. Activity in the early 20th century focused on metals such as gold, silver, and copper as well as lead, but by the middle of the 20th century, the area produced zinc, tungsten, and uranium ores as well. In the early decades of the century, mine operators did not use mills or concentrators; thus the great majority of extracted ore was shipped directly to smelters. Therefore, there were few mills or concentrators producing tailings for the first 15 or so years of the 20th century. For example, in 1910, more than 96% of the ore mined in the state of Washington ("nearly all" of which was mined in Ferry and Stevens counties) was shipped to smelters without any prior treatment.[67] For ore mined in Stevens County that same year, 100% was shipped with no prior treatment.[68] Gradually, concentration methods modernized and became more widely used in order to treat lower grade ore. But the process took many years. In 1911 only 108 tons were concentrated in Stevens County, while another $_{+/-}$ 10,000 tons were cyanided or amalgamated. The rest of the ore from Stevens County was shipped directly to smelters.[69] Over the years, those percentages gradually increased; as the ore extracted was lower grade and unprofitable to ship direct to smelters, the amount of milling increased. Additionally, the increasing presence of mills also translated into more dump ore being processed and taken off the land.

Stevens County had six mining districts of relevance during the period in question for my report: Northport, Orient, Bossburg, Deer Trail, Colville and Kettle Falls.

Northport Mining District

Dr. Quivik provides a history of five facilities in the Northport District, and claims that this district was "the one district covered in this report which directly produced significant volumes of slag discharges to the environment."[70]

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[66] Rex Bull, "Operations of the Grandview Mill, Metaline District, Pend Oreille County, Washington," Draft, Nov. 6, 2010, p. 7.
[67] C.N. Gerry/U.S. Geological Survey, Mineral Resources of the United States, Calendar Year 1910 (Washington: GPO, 1911), 598.
[68] Ibid, p. 605.
[69] C.N. Gerry/U.S. Geological Survey, Mineral Resources of the United States, Calendar Year 1911 (Washington: GPO, 1912), 778.
[70] Quivik, 37.

The Le Roi/Northport Smelter

Introduction

The Northport Smelter operated from 1897 to 1908 as a copper smelter, and from 1916 to 1921 as a lead smelter. It was constructed on the East Bank of the Columbia River next to the town of Northport, Washington.[71]

There are a number of inaccuracies in the expert reports of Dr. Quivik and Dr. McNulty as they relate to their discussions of the Northport Smelter. Both experts greatly oversimplified the history of this facility. Because Quivik and McNulty rely on government documents and only a few archival sources to reconstruct the smelter's history and ore production, both Dr. Quivik and Dr. McNulty miss the nuances of the operations, the many varied ore sources and treatment methods, and therefore, significant details that *alter the overarching history of the Northport operations*. Dr. Quivik argued that the Northport Smelter discharged all of the slag produced at this site into the Columbia River; however, a vast amount of significant publicly available information demonstrates otherwise. Archival documents demonstrate conclusively that not all the slag was being discharged into the river in the first period of operation. Additionally, there is enough evidence to call into question the final disposal of slag in the second period of operation, as well. Dr. Quivik's omissions dramatically alter the conclusions about this facility that have been drawn by the other experts in this case, as well. Teck's experts have not utilized the publicly available materials that would provide the detailed information necessary to construct a thorough history of waste disposal at this facility. Instead, Teck's experts leave their readers with the impression that all of the slag produced at this facility was discharged to the river, ignoring the evidence in the primary sources that say otherwise. My own primary research leads me to conclude that all of the slag produced at the Northport smelter was *not* discharged to the river. Therefore, their failure to examine and/or cite these sources creates a history of this facility that is inherently unreliable.

Specific Opinions

Quivik: "The Le Roi ore was rich in sulfur, and before being smelted it was roasted in open heaps adjacent to the smelter for thirty to forty days in order to drive off more than half of the sulfur."[72]

Stevens: Disagree as to implication. Archival records stored at the University of Idaho's Special Collections (MG234) demonstrate that a great deal of ore from the Le Roi Mine was smelted raw and not roasted. One specific example demonstrates that the Northport Smelter smelted more than 2,579 tons of raw ore from the Le Roi mine in just a two-week period from June 15, 1902-June 30, 1902.[73] A closer look at these corporate records at the University of Idaho would have provided necessary details on the operations of the smelter.

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[71] Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.
[72] Quivik, 22.
[73] Roast Heaps and Raw Ore Bins, 1901-1903, Box/Volume 36, Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.

Additionally, there were many mines feeding ore to the Northport Smelter, while Dr. Quivik only discusses the Le Roi. Because Dr. McNulty calculates total volume of slag based on certain assumptions regarding ore content,[74] any effort to calculate volume of slag *must take into consideration the metal content of the other crude ore as well as the concentrates being processed at the Northport Smelter*.[75] Without taking those factors into consideration, Dr. McNulty cannot provide reliable data about volumes of Northport slag.xxxx

Quivik: "The first treatment produced a matte of 25-30% copper, which was cooled and broken before charging to a second blast furnace. The second treatment produced a matte of about 40% copper, which was suitable to be shipped to a refinery elsewhere."[76]

McNulty: "For the fiscal year ending June, 30, 1904, the smelter treated 160,109 dry tons of first class ore…yielding about 4,750,000 pounds of find copper in a 50 percent Cu matte."[77]

Stevens: Disagree as to figures. Dr. Quivik provides no source information or footnotes for the 40% figure. Additionally, Dr. McNulty reports that the matte achieved was much higher.

There are two documents produced by Teck that refer to 40% for copper matte figure: 1) a letter dated November 13, 1907; and 2) Census of Manufacturing for 1909. The first document was a letter from the Northport's Superintendent to the Tacoma Smelting Company requesting a reconsideration of the penalties Tacoma had imposed for a low copper matte – around 36% -- shipped by Northport in July and August 1907. The Northport Superintendent shows in this document that Northport's matte values varied over time, and provided values for monthly shipments each month during 1907 in order to plead that the average value had been above 40%. There is every reason to believe that the matte could have contained a higher percentage at other times, since the letter showed that the September shipment contained more than 44%. In fact, the letter suggests that 40% was the lowest percentage that Tacoma would accept without imposing penalties.[78] Therefore, Northport certainly would have wanted to achieve higher than 40% most of the time. It is also likely that the matte percentage achieved varied with the ore and concentrates that were fed into the smelter. Therefore, the information about those variations needs to be taken into account. The result of Dr. Quivik providing this average without explaining where it originated is that we do not know if it takes into account the different ore and concentrates that were processed month by month and year by year. Without knowing that it was done, we end up with an incorrect figure for the metal remaining in the slag. ***If the average matte percentage was 44%, for instance, or the 50% reported by McNulty, instead of the 40% Dr. Quivik states, metal content in the slag would be less.***[79] Therefore, Dr. Quivik's sources do not support his

[74] See Expert Rebuttal Report of Allen J. Medine, Ph.D.,P.E., BCEE.
[75] Ores Purchased and Contents, Jan. 1901 to Feb. 1904, Box/Volume 34, Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.
[76] Quivik, 22-23.
[77] McNulty, 10.
[78] Albert I. Goodell to Tacoma Smelting Company, Nov. 13, 1907. (UI4207)
[79] See Expert Rebuttal Report of Allen J. Medine, Ph.D.,P.E., BCEE..

opinion. Without sources provided to verify his figures, we must assume that Dr. Quivik did not use the archival sources available to establish them and the number must be considered unreliable.

The second document that refers to a 40% matte was a Census form from 1909, pertaining only to 1909, during which time the Northport Smelter processed very little ore and closed permanently on April 28. Therefore, even if the figure is correct, it cannot be considered a representative sample for the entire 10-year operation.[80]

However, archival Matte Records for the early period of the smelter's operations are stored and available to the public at the University of Idaho's Special Collections (MG234). These records would have provided more specific data and details on the matte record for the Northport Smelter.[81] *Without examining these records, the average matte figure stated by Dr. Quivik and any numbers that were calculated using that average should be deemed unreliable as they relate to conclusions about Northport production or discharge of slag*. Again, this is another example of inadequate research leading to unreliable numbers.

Quivik: "On the other hand, the discharge of slag went largely unnoticed. The blast furnaces discharged their slag into launders flowing with water. Upon hitting the cool water in the launders, the slag quickly cooled and fractured into granules the size of sand. The flowing water in the launders conveyed the granulated slag to the nearby Columbia River, which carried the slag downstream to locations unknown."[82]

Stevens: Disagree. Evidence demonstrates that not all slag was granulated.[83] Dr. Quivik has oversimplified the Northport's treatment and disposal of slag, and has provided slim evidence for the company's treatment of slag during the smelter's initial period of operations between 1897 and 1909. Quivik has relied exclusively on a set of Sanborn Maps from 1901 and 1908 that show flumes from the blast furnace rooms to the Columbia River. However, he has no evidence to quantify how much material was discharged to the river. Further, he disregards evidence demonstrating other uses for the slag which demonstrates that not all slag was discharged to the river. Additionally, the Sanborn maps from 1918 and 1929 show that the underground flumes were no longer present, calling into question their use in this later era and the smelter's second period of operation.

The company's archival records at the University of Idaho demonstrate conclusively that slag was reutilized on site, reprocessed, and even sent to other smelters for further treatment. Therefore, to the extent that Dr. Quivik implies that all slag produced was discharged to the river, such an implication is wrong.

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[80] Census of Manufactures, 1909, Northport Smelting and Refining Co. (UI6788)
[81] Matte Record (including 1902), Box (Volume) 41, Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.
[82] Quivik, 23.
[83] See Expert Rebuttal Report of Allen J. Medine, Ph.D.,P.E., BCEE.

To begin with, records from 1897 show that the company purchased 24 15x24" slag pots on roller bearings as well as a "wheeled slag and matte fork," suggesting that the company intended to save at least some of the slag produced, either for shipping elsewhere or for other on-site uses.[84] Slag pots were typically used for cooling slag so that it could be broken up and sorted by hand. According to a technical handbook of the era, approximately 12 slag pots were needed for each furnace smelting 40 tons per day. The Le Roi (Northport) Smelter opened in 1898 with two furnaces, so according to this source, the 24 purchased slag pots would have accommodated the smelter's early capacity.[85] A 1907 decision in the case of *Northport Smelting & Refining Company v. Twitchell* also shows that the slag pots were continually used during the smelter's copper period. The case, which went to the 9th Circuit Court of Appeals, discusses in great detail the use of pots for slag.[86]

As further evidence that the company did not granulate all of its slag, a volume marked "Matte Record" in the Northport archival collection shows that on December 30, 1902, the company sent 382 tons of slag (likely from the reverberatory furnace bottom) to the Selby Smelting Lead Company. The same page states that "reverberatory bottom not granulated."[87] Northport also sent similar material ("shipped as matte") to Nichols C. Co. in New York. Together, the material netted proceeds of more than $126,000 for this one shipment alone.[88] It's likely that this sort of transaction happened frequently, on a monthly or even a weekly basis considering the profitability. Close examination of the records through proper historical research would yield a tonnage of slag that was produced through the smelting process but not granulated and not discharged to the river. This additional example of a failure to utilize primary documents points again to the unreliability of the expert reports of Dr. Quivik, Dr. Bull, and Dr. McNulty. In examining such records, they would likely have found that a large amount of slag was sent to smelters each and every month. By not subtracting out these figures and others like them from their overall slag production figures, the experts are providing inherently unreliable numbers.

Furthermore, Sanborn Maps from 1901, 1908, 1918, and 1929 all show that multiple buildings on the site were constructed on "slag blocks," demonstrating that the slag was definitively *not* all discharged to the river. The buildings themselves were approximately 50 feet square and approximately 18 feet

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[84] 1897 Equipment list, Le Roi Mining and Smelting Company, Dec. 3, 1897. (UI6810); Allis Furnace and Equipment Order, Dec. 3, 1897. (UI6822)

[85] Henry Frances Collins, *The Metallurgy of Lead and Silver: Lead* (London: Charles Griffin and Company, Limited, 1899), 165.

[86] *Northport Smelting & Refining Co. v. Twitchell*, 156 F. 643 (9th Cir. 1907).

[87] This is a reference to the build-up of material left in the bottom of a special reverberatory furnace that could not be removed through the regular process. A reverberatory furnace was a type of furnace used in smelters that kept the processed materials away from the fuel being used to process them. These furnaces were often used for smelting calcined ores. *Transactions of the American Institute of Mining Engineers, Volume 33, Containing the Papers and Discussions of 1902* (New York: Institute of Mining Engineers), 656.

[88] Matte Record (including 1902), Box (Volume) 41, Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.

high.[89] A 1993 Site Inspection report by URS Consultants, Inc. also noted the presence of "slag brick platforms" in the early operations of the smelter, used for the initial roasting of ore.[90]

Finally, multiple pages from the Records of Ore Treatment in the company's archival collection at the University of Idaho demonstrate that slag was regularly being re-processed during the smelter's early period when it operated as a copper smelter, at times utilizing up to 32,000 tons of re-processed slag in a single day.[91] The 1993 URS Site Inspection Report also acknowledged the use of slag in the smelter's early operations:

> Tap holes were located at different levels in the furnace to filter the minerals rocks (including iron, copper, and *slag rock*. The tap hole for the iron and *slag rock* was located higher than the copper tap hole. The iron and slag rock collected from this filtration was considered waste….the method used to dispose of this waste material is unknown.[92] [Emphasis added.]

During the later period of operation, 1916-1921, when Northport operated as a lead smelter under new ownership, Dr. Quivik has failed to conclusively demonstrate that slag was discharged to the river. The documents from March 14, 1916 and others produced by Teck suggest that the new owners – the Day interests – *intended* to construct flumes and obtained the necessary permits from the Great Northern Railway Company for a new flume to be built.[93] However, a letter written by the rail company in October that year indicates that the rail company had discovered one of the old flumes that had been constructed during the smelter's copper period, and that it was not covered by any permits. He states: "I am attaching a blue print which shows the encroachment of a slag flume [likely one of the earlier flumes] constructed by the Northport Smelting & Refining Co. This flume is located 100 ft. south of the flume which has already been covered by a permit."[94] It is unclear from this letter whether the flume already covered by the permit was constructed. Dr. Quivik and Teck's other experts *do not provide any evidence that these flumes were in fact constructed.*

Importantly, Sanborn Fire Insurance maps from 1918 and 1929 no longer show the flumes in use and suggest that they were never constructed at all.[95] The 1993 URS Site Inspection Report states:

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[89] Sanborn Fire Insurance Map for Northport, WA, 1901, sheet 5; Sanborn Fire Insurance Map for Northport, WA, 1908, sheet 5; Sanborn Fire Insurance Map for Northport, WA, 1918, sheet 7; Sanborn Fire Insurance Map for Northport, WA, 1929, sheet 7.
[90] URS Consultants, Inc., "Site Inspection Report, Le Roi Company Smelter," Oct. 15, 1993, 2-7. (CCT1-007699)
[91] Aug. 28, 1902, Records of Ore Treatment and Metal Production, Daily Reports of Smelter Operations, September 6, 1902-May 5, 1903, Box (Volume) 39, Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.
[92] URS Consultants, Inc., Site Inspection Report, Le Roi Company Smelter," Oct. 15, 1993, 2-7. (CCT1-007699)
[93] Agreement Between Great Northern Railway Company and the Northport Smelting and Refining Company, Dec. 20, 1915 (UI6916); Superintendent to L.F. Mills, Oct. 14, 1916 (UI3419); Legal Department of Great Northern Railway Company to Tamarack & Custer Consolidated Mining Company, March 24, 1916 (UI3415).
[94] Superintendent to L.F. Mills, Oct. 14, 1916 (UI3419).
[95] Sanborn Fire Insurance Map for Northport, WA, 1918, sheet 7; Sanborn Fire Insurance Map for Northport, WA, 1929, sheet 7.

> The slag was usually *placed in piles near the smelter* for temporary or permanent disposal. Historical photographs (1914-1921) indicate possible tailings piles located on the northeast portion of the Le Roi property.[96] [Emphasis added.]

Although the site manager at the time this 1993 report was written suggested that the slag "*may* have been deposited directly in the river," Konrad Hartbauer, a longtime resident whose tenure in Northport was longer and who seemed to have direct knowledge about the smelter's historic operations, reported that "the smelter slag was used for bricks in residents' homes…The slag was broken into blocks approximately 9 by 12 inches."[97] Again, Teck's experts failed to incorporate these uses of slag in the numbers provided for slag production and discharge. Therefore, their reports cannot be relied upon.

Quivik: "During the years 1916-1921…the lead smelter continued to discharge its granulated slag directly to the *bank* of the Columbia River."[98] [Emphasis added.]

Stevens: Disagree as to implication. It is critical to note the difference in language here between Dr. Quivik's description of slag discharge in the smelter's first period of operation and his description of the discharge in the second. His language in this statement *implies* that the company continued to discharge slag directly into the river. However, as noted above, the evidence shows that the flumes were no longer in use in this period, and Dr. Quivik notes that the slag is being discharged to the *bank* of the river, not directly to it. Again, it is critical to point out that these experts' (Dr. Quivik, Dr. McNulty) reports do not take into account that at least some of the slag was *not* discharged to the river, making them inherently unreliable.

Furthermore, the EPA's START-2 team report from 2002 on Upper Columbia River Mines and Mines made reference to an area south of the Northport smelter operations where *slag brick had been deposited*. It reported on tests it ran on sample soils "west of the former *tailings area underneath slag bricks*, sediment area along the Columbia River adjacent to the smelter…and sediment in the western portion of the recently constructed ditch where the former *tailings pile was located*."[99] [Emphasis added.]

Dr. Quivik himself recognizes that a person in 1936 observed remnants of an "old slag pile along the river."[100]

Based on this modern information, it is clear that not all waste was discharged to the river, since some was re-processed, some was used as building materials for several structures, and at least some was disposed in upland piles. The failure to account for this volume of slag that was not discharged to the river is problematic to the degree that the reports all leave the reader with the impression that all of the

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[96] URS Consultants, Inc., "Site Inspection Report, Le Roi Company Smelter," Oct. 15, 1993, 2-9. (CCT1-007699)
[97] URS Consultants, Inc., "Site Inspection Report, Le Roi Company Smelter," Oct. 15, 1993, 2-10. (CCT1-007699)
[98] Quivik, 25.
[99] START-2, Preliminary Assessments and Site Inspection Report, Upper Columbia River Mines and Mills, Stevens County, Washington, Oct. 2002, 8-4.
[100] Quivik, 26.

slag from this operation was discharged to the Columbia River. Failure to account for the different uses and the different areas of disposal make the reports unreliable.

Quivik: "The Le Roi company shipped only its first-class ore…to the smelter at Northport. The company accumulated its second-class ore…on a dump near its mine at Rossland." [101]

Stevens: Disagree. Again, an examination of the ore records left by the company in its archive at the University of Idaho would reveal the detailed picture of ore sources, amounts, and metals content. The Le Roi mine shipped both 2nd class/dump ore and 1st class ore to Northport during the early period of the smelter's operations.[102] This provides another example of the importance of utilizing primary source documents whenever possible. The information in the archive tells a different story about ore shipments from this mine than the published record, demonstrating again that such heavy reliance on government reports creates an inherently unreliable history.

According to mining consultant R.J. Frecheville's report to the Directors of the Le Roi Mining Company dated December 4, 1901, Le Roi's Second Class Ore Dump was taken over when the mine was purchased by the Northport Company. He continued: "Just how much of this dump remains it is impossible to say, owing to the irregularities of the ground occupied by it, and by the fact that it merges into, and is partially covered by, a dump of waste, but it may be taken as an asset representing about $100,000 net." (p. 1045)[103] We know from the archival records that the Northport Smelter processed this ore regularly after this time.[104]

McNulty: "In 1897, the Le Roi company erected a copper smelter at Northport for 'custom work.'"[105]

Stevens: Disagree. The 1897 Minister of Mines Annual Report does not support this assertion. It mentions that the 75,000 ton-contract with Heinze's smelter (later Trail) had been completed, and that ore from the Le Roi mine was since being shipped directly from the mine to the Northport smelter via the Red Mountain Railroad. The document states that Northport had "the best methods of handling this [Le Roi] and other Rossland ores, as this smelter will do custom work." The document, however, does *not* state that the smelter was *constructed* for said ores, but only that it was prepared to take them.[106]

McNulty: "In 1898, the new Le Roi company was capitalized with $5 million and the smelter's capacity at the time was 450 TPD, 'which capacity may soon be doubled.'"[107]

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[101] Quivik, 23.
[102] Ores Purchased and Contents, Jan. 1901 to Feb. 1904, Box (Volume) 34, Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.
[103] "The Le Roi Mine," *The Engineering and Mining Journal,* Jan. 18, 1902.
[104] Ores Purchased and Contents, Jan. 1901 to Feb. 1904, Box (Volume) 34, Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.
[105] Terence P. McNulty, Expert Report, January 24, 2011, 9.
[106] *Minister of Mines, British Columbia Annual Report for 1897*. (TECK_1354344)
[107] McNulty, 9.

Stevens: Disagree. While the quote is accurate, McNulty does not provide any information on whether the smelter was in fact enlarged or how much its capacity changed. According to McNulty's own figures, the largest amount of ore sent annually to the Northport smelter was 265,761 tons in 1902 which amounted to 555 tons per day (tpd). Additionally, the *Minister of Mines Annual Report* for Calendar 1902 reported that 155,765 tons were shipped that year from the Le Roi Mine, but this represented only nine (9) months of ore due to a strike that year that shut the mine down for three (3) months. Therefore, the average tpd smelted from Le Roi ore in 1902 was 568. For all other years up until 1902, the daily figure hovered around the 450 tpd figure, so it is difficult to state with any certainty what the capacity of the plant was during this era.[108]

McNulty: "In 1902, ores smelted totaled 265,761 tons, of which 56,074 tons were purchased from Le Roi Number Two and Rossland Great Western."[109]

Stevens: There is a minor discrepancy in the numbers McNulty uses for 1902. McNulty's figure came from an *Engineering and Mining Journal* article from which the Minister of Mines Annual Report for Calendar Year 1902 quotes. Figures provided independently by the Minister of Mines (not from the *Engineering & Mining Journal*) for ores shipped from these two mines amounts to 54,319 tons, a difference of 1755 tons.[110] Additionally, ore and concentrates were being shipped from other mines, as well, which McNulty does not take into consideration.[111] The failure to utilize primary documents regarding ores purchased for the smelter leads to unreliable figures when examining slag production numbers and metal content. Without full information regarding metal content of the various ores feeding into the smelter, any numbers produced regarding slag are inherently unreliable.

McNulty: "For the fiscal year ending June, 30, 1904 [sic], the smelter treated 160,109 dry tons of first class ore and 19,013 dry tons of second class ore yielding about 4,750,000 pounds of fine copper in a 50 percent Cu matte."[112]

Stevens: Disagree. For the year 1904, McNulty's figures are problematic. This is another example where the failure to employ standard historical methodology resulted in inaccurate and undependable figures. A thorough examination of publicly available archival records would have provided the specific and accurate numbers he sought.[113]

For each year up to 1904, McNulty's production figures come from the Minister of Mines Annual Reports, which report on a Calendar Year basis. However, the source he uses for 1904 – the Copper

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[108] *Minister of Mines, British Columbia Annual Report for 1902*.
[109] McNulty, 9.
[110] *Minister of Mines, British Columbia Annual Report for 1902*.
[111] Ores Purchased, 1901-1904 (Box/Volume 32), Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.
[112] McNulty, 10.
[113] Daily Smelter Operations (Volumes 39 and 40), Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.

Handbook, Volume VI [114]– reports on a fiscal year basis with a fiscal year ending June 30. Therefore, the 1904 figure he provides actually includes six (6) months of production figures for calendar year 1903, and overlaps with the 1903 number he provides. While the 1904 Minister of Mines Annual Report[115] does not provide a figure for tons of ore smelted at Northport for 1904, examination of records at University of Idaho would have provided the specific numbers necessary for calculations, as well as assays of the various ores from the many mines. However, he failed to do so.

McNulty: "A small indeterminate amount of either copper slag or later lead slag was poured onto the ground and/or chipped from vessels and launders."[116]

Stevens: Disagree as to volume. It is unclear exactly how much slag was left in piles or how much was made into bricks. McNulty provides no evidence for his characterization of this as "small."[117]

McNulty: "Information was not available for 1905."[118] Table 1, 1905 shows McNulty's estimate of 179,122 tons of ore smelted.[119]

Stevens: Disagree. Entire volumes of corporate information are stored in Moscow, Idaho that provide specific data to determine slag produced.[120] Dr. McNulty failed to review that data. Furthermore, in his Table 1, he provides an estimate of ore smelted that is exactly the amount smelted in 1904. The company was going through a great deal of turmoil between 1904-1905, including the ouster of its corporate director, a temporary closing of the Northport Smelter, and a contract to send all ores to the Trail Smelter.[121] These changes undoubtedly impacted the smelter's operations and productivity. To assume that the ore smelted in 1905 was the same as 1904 fails to take into account this major shakeup in the corporation. *Without examining the primary source records, McNulty's numbers are inherently unreliable, and should not be utilized in drawing any conclusions about Northport production or discharge of slag*.

McNulty: "For 1906, the Minister of Mines Report is missing and Mineral Resources of the United States (Teck_1354329) gives no statistics for Northport, stating that it was…'essentially a Canadian smelter.)"[122] [sic]

Stevens: Disagree. The 1906 version of the Minister of Mines report notes the overall decline in the metal market for the year, and from some districts, the shipments were extremely small. [123] McNulty is

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[114] *The Copper Handbook, Volume VI* (Houghton, MI: Horace J. Stevens, 1906). (TECK_1354325)
[115] *Minister of Mines, British Columbia Annual Report for 1904*. (TECK_1557419)
[116] McNulty, 10.
[117] McNulty, 10.
[118] McNulty, 10.
[119] McNulty, 11.
[120] Record of Ores Treated, 1903-1909, Box/Volume 38, Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.
[121] *The Copper Handbook, Volume VI* (Houghton, MI: Horace J. Stevens, 1906), 633. (TECK_1354327)
[122] McNulty, 10.
[123] *Annual Report of the Minister of Mines Report for the Year Ending Dec. 31, 1906*. (TECK 1558052.)

correct that neither the Canadian nor the American Annual Reports for 1906 discuss the Northport Smelter. However, entire volumes of corporate information are stored in Moscow, Idaho that provide specific data to determine slag produced which Dr. McNulty failed to consult.[124]

McNulty: "In 1907, the Le Roi shipped 119,410 tons of ore, about 30,000 of that to the Trail Smelter, leaving about 90,000 tons to Northport."

Stevens: Disagree. The Minister of Mines Report for Calendar Year 1907 reported that the Le Roi and Black Bear shipped 110,410 (*not* 119,410 tons as reported by McNulty) tons of ore, 20,000 tons (*not* 30,000 reported by McNulty) of which was shipped to Trail with the remainder being treated at Northport.[125]

McNulty: "The Hunter V ore was being used as flux and assayed 43% CaO and 19% SiO2."[126]

Stevens: Disagree as to implication. The *Hunter V.*, which McNulty claims was providing ore as flux for Northport, shipped only 3,961 tons in 1907, which the Minister of Mines reported was "distributed among the Northport, Trail and Nelson smelters." The report does not provide exact figures for how much ore was shipped to each smelter, but describes the ore from the *Hunter V.* as having a high percentage of lime, which made it a "*desirable* flux" (not a "good" flux as quoted by McNulty on p. 11). [Emphasis added.] It is unclear where McNulty obtained the assay figures. Assay values for Hunter V. ore were available at the University of Idaho for at least 1904 and likely for other years as well.[127]

Further, the Copper Yearbook for 1906 states that the company was utilizing limestone for flux from its own quarry four miles away from the smelter, so it is unlikely that Hunter V. ore made up more than a small percentage of the ore used for flux in the smelter's operations.[128]

McNulty: "During 1908, the United Copper Mining Company at Chewelah shipped crude copper/silver ores to the Northport and Granby smelters."[129]

Stevens: While Dr. McNulty cites no documents for his paragraph related to events of 1908, the information comes from the Mineral Resources of the United States for Calendar Year 1908.[130] However, the Mineral Resources report he uses does not offer any information regarding tons of ore that were shipped to either Northport or Granby, making the information impossible to utilize for Dr. McNulty's calculations related to slag production. The same Mineral Resources report noted that some ore (the report does not specify an amount) was being shipped to the Northport from the Bucher Mine

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[124] Record of Ores Treated, 1903-1909, Box/Volume 38, Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.
[125] *Report of the Minister of Mines Report for the Year Ending Dec. 31, 1907*. (TECK_1558359)
[126] McNulty, 10.
[127] Ores Purchased, 1901-1904, Box/Volume 34, Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.
[128] *The Copper Handbook, Volume VI* (Houghton, MI: Horace J. Stevens, 1906), 632. (TECK_1354326)
[129] McNulty, 10.
[130] Mineral Resources of the United States, 1908 (Washington, D.C.: GPO, 1909), 581.

near Pierre Lake in Stevens County, Washington. McNulty does not mention this, nor does he report on figures for ore being fed from other mines, information that is available in the company's archival collection in Moscow, Idaho.[131] *Without examining these records, none of these numbers should be used in drawing any conclusions about Northport production or discharge of slag*. The failure to examine primary source records requires assumptions and estimates that are inherently unreliable when precise figures are available.

McNulty: "The Department of Commerce and Labor Report for 1909 (UI6788) stated that the Northport smelter treated 15,042 tons of its own ore, 3,785 tons of purchased material (likely ore), 128 tons of concentrates, and 2,455 tons of U.S. ores. It shipped 840 tons of matte containing 329,567 pounds of copper."[132] In McNulty's Table 1, he added all of these figures up and reported 21,410 tons of ore smelted for 1909.[133]

Stevens: Disagree. Dr. McNulty over-reports the tons smelted for 1909. He reports 3,785 tons of crude ore purchased and 128 tons of concentrates, numbers which came from a 1909 Bureau of the Census report for Copper Smelters and particularly for the Northport smelter.[134] However, McNulty *also* reports an *additional* 2455 tons of U.S. ores, which actually form *a portion* of the 3785 tons noted above and are *not in addition* to them. All together, the smelter treated a total of 18,828 tons of material in 1909 according to this document, not 21,410 tons.

Finally, the same document states clearly that the Northport smelter permanently closed in April 1909. Therefore, any effort to utilize 1909 as a normal year of production for the purposes of estimating production in other years would clearly be invalid.[135]

McNulty: "A 'good flux' contained 43% CaO and 19% SiO2, equating to 76.8% CaCO3."[136]

Stevens: Disagree.

Dr. McNulty makes the assumption that the properties present in the small amount of ore (an unknown portion of 3,961 tons, see above) sent by the *Hunter V.* in a single year – 1907 – were representative of the flux utilized by Northport during the duration of Northport copper smelter operation (12 years). The Minister of Mines Annual Report for Calendar Year 1907 reports:

> The *Hunter V.* mine, at Ymir, was operated during the greater part of the year by the Hall Mining and Smelting Co….The total shipments were 3,961 tons, which were distributed among the Northport, Trail and Nelson smelters. The high percentage of lime in the *Hunter V.* ores makes it

[131] Box 38, Record of Ores Treated, 1903-1909, Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho.
[132] McNulty, 10.
[133] McNulty, 11.
[134] Copper Smelters, 1909, Supplemental Schedule, Northport Smelting and Refining Co. (UI6776)
[135] 1909, Northport Smelting and Refining Co. (UI6788)
[136] McNulty, 11.

> a desirable [*not "good" as quoted by McNulty*] flux, the average per cent of lime in the year's output being 43, with 19 per cent silica.[137]

The report does not specify: 1) how many tons specifically were shipped to Northport from the *Hunter V.* during 1907 or any other year; 2) what percentage of ore used as flux was represented by *Hunter V.* ores; 3) whether the *Hunter V.* ore's properties were representative of Northport's other flux ore. Therefore, McNulty's assumption that the flux used by the copper smelter contained 43% CaO and 19% SiO2 is very flawed. The implications of this unjustified assumption matter a great deal to the calculations of metals in the slag, and therefore all such numbers should be considered unreliable.

Detailed information about the ores fed to the Northport Smelter during this period are available at the University of Idaho. The failure to examine these documents have resulted in experts such as Dr. McNulty making unjustified assumptions and then making calculations which affect the details of this case. Calculations regarding the metal content of the slag, then, are inherently unreliable.

McNulty: Table 1, p. 11.

Stevens: Disagree. In Table 1, presented on page 11 of Dr. McNulty's report, twelve (12) of the 24 cells that are used to calculate slag amounts are Dr. McNulty's estimates based on faulty assumptions, some of which have been detailed above. Validity of results should be questioned when 50% of the data is uncertain. Many precise numbers are available in the records at the University of Idaho (see above). Taking into consideration the errors noted above, as well as the fact that precise figures are available, we must consider the table unreliable. *Without examining these records, none of these numbers should be used in drawing any conclusions about Northport production or discharge of slag*. The numbers he uses are inherently undependable.

McNulty: "Thus far, little information for ore treatment rates is available…We also have Daily Blast Furnace Reports from February 1918 through February 24, 1919 and for May 1-26, 1919. On the basis of this information, estimates have been made of slag produced by the lead blast furnaces."[138]

Stevens: Disagree. In Box/Volume 45 of the Northport Smelting and Refining Company records at the University of Idaho, there is a "record of ores treated, 1916-1922."[139] The volume provides information about the ore smelted at the Northport, including ore origin and assay values, as well as byproducts. Therefore, no estimates should be utilized when specific information is readily available. *Without examining these records, none of these numbers should be used in drawing any conclusions about Northport production or discharge of slag*. The resulting numbers he calculates are therefore untrustworthy.

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[137] *Report of the Minister of Mines Report for the Year Ending Dec. 31, 1907,* L104. (TECK_1354372)
[138] McNulty, 13.
[139] Box/Volume 45, Record of Ores Treated, 1916-1922, Records of Northport Smelting and Refining Company, Manuscript Group 234, University of Idaho Special Collections and Archives, Moscow, Idaho

Sierra Zinc Mill

Introduction

The Sierra Zinc Mill in Stevens County was built as a 50-ton flotation mill in 1941, enlarged in 1943 to process 90 tpd,[140] enlarged again to 260 tpd in 1948,[141] and again in 1951 to 300 tpd.[142] The mill primarily treated ore from the Blue Ridge and Deep Creek Mines and *purchased land for tailings disposal in 1942*, one year after the mill was opened.[143] Despite the consistently increasing capacity of the mill, the records do not demonstrate that the mill ever processed up to its full capacity for any sustained length of time. In 1942, the average daily amount of ore processed was 33 tpd despite a capacity of 50 tpd,[144] and in 1943 the average amount of ore milled was 52 tpd despite a capacity of 90 tpd.[145] In 1949-1950, when the mill's capacity was 260 tpd, the mill processed an average of only 126 tpd.[146] Although the mill's capacity was reported to be 300 tons per day by 1951, it never worked at capacity. That year, the mill averaged 285 tpd. The mill only operated with its increased capacity for a short period between 1951 and 1952, but the Minerals Yearbook for 1952 does not report total ore processed and therefore no reliable estimates can be made of tailings or waste rock generated.[147] The owner closed the mill in fall 1953, and it operated only intermittently after that time until its closing in 1956.[148]

Specific Rebuttal

Quivik: "In addition to tailings discharged from the Sierra mill into the watershed of the Columbia River, Goldfield Consolidated extracted waste rock and low-grade materials which were piled near the mine and which may have released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances."[149]

Stevens: Disagree. There is no evidence to support Dr. Quivik's assertion that tailings from the Sierra Zinc mill entered the Upper Columbia River Watershed. In the case of the Sierra Zinc Mill, the company purchased land for tailings storage immediately upon constructing the mill. According to Dr. Bull's Consulting Report on the mill, tailings flowed to two ponds below the mill, with a great deal of room for expansion. According to Dr. Quivik's report, the dikes never failed, and *therefore, tailings were never sent to any stream in the history of this mill's operation.* In 1965, a member of the Washington State Pollution Control Commission (WPCC) recognized that "the existing tailings disposal is completely retained within dikes that were built at the time of operation, and these are entirely satisfactory with no chance of loss to Deep Creek unless a major catastrophe occurs."[150] Teck's own aerial photo expert

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[140] Minerals Yearbook, 1943 (Washington, D.C.: GPO, 1945), 494. (TECK_1528749)
[141] Minerals Yearbook, 1948 (U.S. Bureau of Mines), 1625. (TECK_1528810)
[142] Minerals Yearbook, Area Reports, 1951 (U.S. Bureau of Mines), 1616. (TECK_1528844)
[143] Minerals Yearbook, 1942, (Washington, D.C.: GPO, 1943), 515. (INT0053003-0053017)
[144] Total amount of ore reported on PIMR for Blue Ridge Mine for 1942 divided by 365.
[145] Total amount of ore reported on PIMR for Blue Ridge Mine for 1943 divided by 365.
[146] According to the figures used by Quivik of 45,000 and 47,000 total tons and dividing those amounts by 365 days.
[147] Minerals Yearbook, Area Reports, Volume III, 1952 (U.S. Bureau of Mines). (INT0053216-INT0053250)
[148] Minerals Yearbook, Area Reports, Volume III, 1953 (U.S. Bureau of Mines). (INT0053151-INT0053181)
[149] Quivik, 39-40.
[150] E. W. Asselstine to Files, April 20, 1965 (WAECY-HQ-10-07-09-000995).

noted the presence of a tailings pond on this site in 1943.[151] Finally, it is important to recognize that a historian cannot draw a conclusion regarding releases from the historical documents produced here.

Bull: In Exhibit 2, Bull estimates the tailings produced by ore from Anderson Mine milled by Sierra Zinc. He states: "if we assume that the recoveries of zinc and lead from the Anderson ore were the same as the overall recoveries achieved on the Deep Creek plus Anderson ores, then the total zinc and lead (in the sulfide minerals) recovered in the separate zinc and lead concentrates were 3078 tons of zinc and 687 tons of lead. If we also assume that the assays of the zinc and lead concentrates (which can be calculated from the PIMR data for 1966-1968, but not from Waddell's data for 1948-1952) were 50.7% zinc and 37.5% lead respectively, then the weights of the zinc and lead concentrates can be calculated as 6,071 and 1,832 tons respectively, and the tailings as 134,597 tons. Waddell gives the tailings assays as 0.43% zinc and 0.07% lead. Those tailings therefore contained about 579 tons of zinc as zinc sulfide and 94 tons of lead as lead sulfide."[152]

Stevens: Dr. Bull fails to provide any basis or explanation for the assumptions that he makes. The Deep Creek and Anderson mines were different properties, and he provides no information to suggest that their ore characteristics were similar and that their combined metallurgical properties had any bearing on either *individual* mine's metallurgical properties. He provides no documentary evidence to support his assumptions.

Likewise, he provides no justification for utilizing assay numbers for three years (1966-1968) to represent the entire run at the mill, particularly when the ore from the Anderson Mine was being sent elsewhere (the Anderson Calhoun mill).

Bull: On Exhibit 10, Dr. Bull lists the Lead Trust Mine as feeding 2,183 tons of ore to the Sierra Zinc mill in 1955.

Stevens: There is a discrepancy between the number of tons provided in a 1962 publication by Galen Waddell and the Permanent Independent Mine Record. Bull opted to utilize the higher number and failed to discuss the discrepancy or state the lower number. Therefore, it is possible the number he utilized is incorrect.[153]

Last Chance Mine and Mill

Introduction

The Last Chance mine and mill were located in Stevens County along Deep Creek, a Columbia River tributary. While the mine had been producing on and off for decades beginning in 1903, it is unclear exactly when the mill was constructed. However, many sources point to 1940 as the date of construction, including a 1941 Bonneville Power Administration report and numerous journal and press

[151] Grip, 4.
[152] Rex Bull, Exhibit 2, "Operations of the Anderson-Calhoun Mine, Northport Mining District, Stevens County, Washington, 1910-1968," Consulting Report, November 1910, p. 4-5.
[153] Galen G. Waddell, *Mining Methods and Costs, Deep Creek Zinc-Lead Mine, Goldfield Consolidated Mines Co., Stevens County, Wash* (1962), p. 39. (CRTL-90322-90357)

reports. Those same sources claim that the mill was processing ore from the mine dump.[154] These accounts provide another example of the various mine dumps of lower grade ore being regularly re-processed as technology either improved or came into closer proximity to the mine itself. Therefore, any attempt to draw conclusions about releases from mine dumps requires reliable data from primary sources wherever possible not simply generic statements about possible releases from waste dumps.

In spite of these reports, Dr. Quivik claims that the Last Chance Mine was "idle" between 1939 and 1945, and assumes that because the government-created documents (Permanent Individual Mine Record and Annual Mineral Yearbook) did not recognize the milling or mining activity, the other reports such as the 1941 BPA document must have been incorrect.[155] However, archival documentation demonstrates otherwise. [See below.]

In fact, Dr. Quivik's history of the Last Chance Mine and Mill demonstrates the risks involved in relying strictly on government reports to author history when primary sources are available as discussed below.

Specific Rebuttal

Quivik: "In 1938 and 1939, the mine sent less than fifty tons of lead ore total to the Bunker Hill smelter. The mine then sat idle through the end of World War II."[156]

Stevens: Disagree. The Last Chance mine had been producing for some years prior, as evidenced by the records available in Manuscript Group 235, Records of the Aurum Mining Group at the University of Idaho. In particular, records show that ore was being produced from this mine during the war years and being sent for treatment to the Tacoma smelter.[157] Clearly, the company opted not to send annual reports to the government during that time and a reliance on government reports to write the history of this operation leads to incorrect conclusions about the mine's activity during this era.

Quivik: "If that was the case [that there was a mill operating in 1940], the U.S. Bureau of Mines was unaware of the production; the activity was not reported on the PIMR forms for the Last Chance mine, nor was it reported in *Minerals Yearbook* for that year."[158]

Stevens: Disagree. The brief history provided in the 1941 Bonneville Power Administration document and the related journals from 1940 suggest that there *was* a mill erected in 1940.[159] The preponderance and specificity of evidence is too great to dismiss simply because the government documents do not

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[154] H.L. Gage, Some Foreign and Domestic Zinc-Lead Mines That Could Supply Zinc Concentrates to a Pacific Northwest Electrolytic Zinc Industry, (December 1941), 90. (TECK_0254983); various articles from *Engineering and Mining Journal*, *Mining World*, *The Mining Journal*, and *Northwest Mining*, 1940. (WADNR-HQ-10-08-09-014874)
[155] Quivik, 40.
[156] Quivik, 40.
[157] Volume 17, Manuscript Group 235, Records of the Aurum Mining Group, University of Idaho Special Collections.
[158] Quivik, 40.
[159] HAI, *Last Chance Mill Site Report*, 2; H.L. Gage, Some Foreign and Domestic Zinc-Lead Mines That Could Supply Zinc Concentrates to a Pacific Northwest Electrolytic Zinc Industry, (Dec. 1941).

include the information.[160] As stated above, there was no law compelling mine owners to report such information. Therefore, a complete reliance upon such federal documents does not provide us with a thorough history of this or other property.

Quivik: "A 1950 environmental survey reported that drainage for the Last Chance mill was 'to the Columbia river.'"[161]

Stevens: Disagree as to significance. Gerald Orlob and Walter Saxton's 1950 "environmental survey" was a preliminary examination of the area in which the authors made a number of recommendations in the preface of the report. One of those recommendations was as follows: "It should be determined *whether or not tailings from the various mills in the area actually reach the headwaters of Lake Roosevelt* and whether fisheries resources in the lake or its tributaries may be adversely affected by the wastes." [Emphasis added.] Therefore, this report cannot be used to draw conclusions about the deposition of tailings in Lake Roosevelt from any of the mines and mills in this document.[162] The authors of this 1950 report had not drawn such conclusions themselves..

With regard to the Last Chance Mill, the 1950 Orlob and Saxton report never claims or infers that tailings from the mill were dumped into the Columbia or any of its tributaries, in this case Deep Creek.

Quivik: "A 2000 START report noted that evidence existed that tailings and waste rock were disposed of in or near an unnamed creek approximately ten yards from the mill."[163]

Stevens: Disagree. The language used by Dr. Quivik suggests that the tailings were dumped into a creek. The 2000 START report does not state or suggest that. Instead, the report states the following:

- "There was a large tailing pile surrounding the mill and two waste rock deposits below the adit and shafts."
- "An unnamed creek was observed to run through the middle of the tailing pile for approximately 600 feet…the creek water flowing through both piles did not appear discolored, showed no signs of a precipitate, and did not show evidence of an overabundance of algal growth."[164]

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[160] Citing four journal or newspaper articles, HAI's *Last Chance Mill Site Report* states the following: "According to the *Mining Journal* article, 'present mill feed is coming from the mine dump.'" Although the documents were not (as far as we could find) produced to us during discovery, the citation for HAI's report includes the following documents: *Mining World*, July 1940; *The Mining Journal*, July 15, 1940; *The Mining Journal*, September 15, 1940 (WADNR-HQ-10-08-09-014874); "Last Chance Mill on Three Shifts," *Spokesman-Review*, August 7, 1940 (WADNR-HQ-10-08-09-014878).

[161] Quivik, 41.

[162] Gerald T. Orlob and Walter W. Saxton, 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 (1950), 1. (TECK 0025219)

[163] Quivik, 41.

[164] Region 10 START-2, Last Chance Mine Preliminary Assessment Report, Stevens County, Washington (July 2000), 2-2. (Plaintiff-00008467)

Therefore, the report's language was misconstrued to imply that the Last Chance intentionally dumped tailings into this unnamed creek. This is a mischaracterization of the report's intent.

Quivik: "In addition to tailings discharged from the Last Chance mill into the Columbia River Watershed, operators of the Last Chance mine extracted waste rock and low-grade materials which were piled near the mine and which may have released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances, such as zinc or lead."[165]

Stevens: Disagree. Dr. Quivik provides no evidence in his report to support his assertion that tailings from the Last Chance mill entered the Upper Columbia River Watershed. A July 1940 article in *Mining World* reports that a 5-acre parcel "adjacent to the mill site" was purchased by the operators for tailings disposal.[166] Quivik provides no evidence to suggest that the tailings from this parcel were ever discharged into Deep Creek.

Additionally, it is beyond the scope of the historical documents Dr. Quivik cites to be able to draw a conclusion regarding hazardous releases.

Bull: Dr. Bull relied on the information provided in the Permanent Individual Mine Record to create the spreadsheet in his Exhibit 6, Last Chance Mill Performance.

Stevens: As noted above, the reliability of the PIMR records is questionable. Dr. Bull made a variety of assumptions in his spreadsheet without basis, but there were records that would have provided more specific information. Last Chance Mine was owned by the Aurum Mining Company in the 1930s, and this company left a large collection of records, including records of ore produced, as well as records of ore settlement up through 1942.[167] The estimates provided by Dr. Bull and based on government documents upon which he relied provide only a very high level view of the history of any particular mine or mill. No fewer than eight folders are specifically related to the Last Chance property in this archival collection.[168] Therefore, the estimates Dr. Bull provides on Exhibit 6 are inherently unreliable due to the failure to examine primary sources related to this property.

Additionally, it is clear that the tailings from this mill were impounded on a parcel adjacent to the site, and were not discharged.

Van Stone Mine and Mill

Introduction

The Van Stone mine, which had been staked some years earlier, began producing at its highest historic level after it was acquired by American Smelting & Refining Co. (Asarco) in 1950. Following the

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[165] Quivik, 41.
[166] July 1940, *Mining World*. (WADNR-HQ-10-08-09-014874)
[167] Records of the Aurum Mining Company 1916-1953, Manuscript Group 235, University of Idaho Special Collections, Moscow, Idaho.
[168] Finding Aid to the Aurum Mining Company Records, 1916-1953, Manuscript Group 235, University of Idaho Special Collections, Moscow, Idaho.

acquisition, Asarco constructed a large, state-of-the-art mill to process ore.[169] The mill operated for approximately five years in the 1950s and another three years in the 1960s, separated by a seven-year cessation of operations.[170]

Dr. Quivik's description fails to include important information regarding the efficiency of the mill and the low metal content of its tailings. This information is available from Teck's own historical research firm, HAI. In April 1953, the *Spokane Daily Chronicle* reported on a recent *Mining World* journal article that had showcased this Northeast Washington property. The *Chronicle* reported that the mill was:

> the last word in modern efficiency and low-cost operation. Three separate types of flotation machines are said to be among the mill's unique features. Their use is reported to obtain the highest grade concentrates, the *lowest possible zinc tailing and optimum recovery of the less than .5 per cent lead content of the ore*.[171]

Dr. Quivik thus fails to mention that the tailings from this mill had low metal content. Another relevant fact not mentioned by Dr. Quivik is Asarco's efforts to limit any tailings discharges by the mill. The general superintendent at the time, P.A. Lewis, assured the public that "there will be no chance of contamination from the tailings."[172] To ensure that tailings remained on site, Asarco built tailings impoundments that were in operation by 1953 approximately 8000 feet away from the mill to store its solid wastes and prevent it from contaminating nearby Onion Creek.[173] A thickener plant was used to contend with the water pollution issue and separate the water from the solids.[174] The water was then recycled over and over in the plant.

Asarco closed the mill in 1957. In April of that year, the Bureau of Mines sent two employees to visit the property and report on it. They reported that tailings from the mill flowed by gravity through a pipeline several miles down hill to an impoundment. The impoundment(s) remained after the mill closed.[175]

The impoundment consisted of two basins: the east basin and the west basin. The east basin impoundment, used by Asarco during its ownership of the mine and mill *and never breached*, was found by a 2005 study to be lined with black polyethylene. Although the liner was found to be cracked in places, there is no indication that tailings have ever escaped this impoundment.[176]

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[169] Minerals Yearbook, Area Reports, Volume III, 1952 (U.S. Bureau of Mines), 967.
[170] See Minerals Yearbooks from 1952-1967.
[171] "Van Stone Mine Gains Publicity," *Spokane Daily Chronicle* (April 3, 1953). This article appears to have been retrieved from Record Group 70, U.S. Bureau of Mines National Archives, Rocky Mountain Region. (00008610)
[172] "Mill to Start Operating Soon," *Spokesman-Review* (Aug. 9, 1952). (WADNR-HQ-10-08-09-021833)
[173] Duane E. Blunt to Walt Saxton, Dec. 7, 1953. (WAARCH0003457)
[174] "Mill to Start Operating Soon," *Spokesman-Review* (Aug. 9, 1952); "Van Stone Operation to be Producing Soon," *Spokesman-Review* (Aug. 10, 1952). (WADNR-HQ-10-08-09-021833)
[175] John West and M. R. Lickes, Van Stone Inspection Report, April 3, 1957, Record Group 70, U.S. Bureau of Mines, Accession 8NS-070-96-0434, Box 190, File 053-065-0434, National Archives, Rocky Mountain Region. (00008648)
[176] Cunningham Engineers, *Revised Final Reclamation Plan for Van Stone Mine Tailings*, July 2005. (WAARCH-ERO-10-05-09-011559); Fritz E. Wolff, Donald J. McKay, Jr., and David K. Norman, Washington State Department of

In 1961, the dam for the west basin impoundment failed, and sent "a wall of water down Onion Creek." In his report, Dr. Quivik recounts the 1961 failure of the west basin's tailings dam. Although there is no dispute that the dam failed, the impact of that failure is not known. The same 2005 study stated the following about their findings related to the 1961 failure: "Oddly, we found little evidence of erosion or rilling downslope from the breach. The channel supports a rigorous stand of pine and fir." Asarco apparently abandoned this tailings impoundment soon after the failure, choosing an 80-acre site two mile away instead.[177]

Specific Rebuttal

Quivik: "Despite being a relatively modern operation, the tailings disposal system for the Van Stone mill encountered problems during its first decade. Shortly after the mill went into operation, there was a fish kill in Onion Creek downstream of the tailings, apparently caused by a release from the mill."[178]

Stevens: Disagree as to implication. Because water and fish samples were lost, there was never any definitive explanation for the fish kill that occurred in 1952. However, *none of the evidence implies or suggests that tailings escaped from the site*. Instead, there was speculation that cyanide in the mill's brief release of effluent combined with extremely low flows in the creek made dilution less likely and caused this one-time incident.[179] No conclusive evidence was ever provided.

*Quivik: "*Then in April 1961, the tailings impoundment failed, sending a large volume of slurry down Onion Creek causing damage both to the stream itself and to built structures along it."[180]

Stevens: Disagree as to implication. None of the sources related to the 1961 tailings impoundment failure say anything at all about what, if any, damage the tailings did. The documents cited by Dr. Quivik do not discuss any environmental damage that was done by the tailings, but instead explain that the flood caused a debris dam to form further downstream and hurt structures. Furthermore, none of the evidence provides information about the volume of tailings that was discharged in 1961. There is no indication that the tailings caused any damage, or any indication of where they were transported. Further, there is no indication that any other tailings from this mill were discharged to Onion Creek. All sources support the fact that tailings were impounded at this facility.

Quivik: "In addition to tailings discharged from the Van Stone mill into the Columbia River watershed, Asarco extracted waste rock and low-grade materials which were piled near the mine and which may

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Natural Resources. *Inactive and Abandoned Mine Lands – Van Stone Mine, Northport Mining District, Stevens County, Washington (December 2005)*, 9. (Plaintiff-00053586)

[177] Fritz E. Wolff, Donald J. McKay, Jr., and David K. Norman, Washington State Department of Natural Resources. *Inactive and Abandoned Mine Lands – Van Stone Mine, Northport Mining District, Stevens County, Washington (December 2005)*, 9. (Plaintiff-00053586)

[178] Quivik, 42.

[179] Walter W. Saxton, Feb. 27, 1953 Memo Re: Onion Creek Fish Kill, Dec. 7, 1952. (WAARCH-0003458)

[180] Quivik, 42.

have released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances, such a zinc or lead."[181]

Stevens: Disagree. There is no evidence that waste rock from this facility was ever discharged to any water body. Furthermore, none of the evidence provides information about the volume of waste rock that was extracted. There is also evidence that Asarco sorted the waste carefully, intending to mill its dump ore at a later time.[182] Dr. Quivik's conclusions regarding potential releases of hazardous substances take the information in these historical documents further than they allow.

Bull: In Exhibit 11, Dr. Bull reports that the Van Stone Mill produced 3,459,000 tons of tailings.

Stevens: Other than the 1961 incident, there is no evidence suggesting that any of the tailings from this mill were discharged.

Admiral Consolidated Mill

Introduction

The Admiral Consolidated Mining Company constructed the Admiral Consolidated Mill in 1947 and operated it for approximately 10 years.[183] Depending on which source is consulted, the mill was either a 75-ton or a 100-ton mill. Regardless of its size the only time the mill came close to operating at full capacity was for a six-month period in 1950, when it reportedly milled 15,000 tons of zinc ore.[184] Other than that anomalous period, the most ore the mill ever processed in a year was 785 tons of ore in 1954.

Because of the variety of ore being fed to this mill – from Admiral Mine, Red Top, Lead Trust and possibly others – and the lack of information on specific tonnage from each, this mill's output is impossible to quantify. Dr. Bull, in his consulting report dated November 1, 2010, came to similar conclusions when he stated: "No reliable estimate can be made of the tonnage of development rock extracted."[185]

Specific Rebuttal

Quivik: "In 1948, the Admiral mine produce [sic] 364 tons of ore, some of which was treated at the company's mill, now reported to have a capacity of 75 tons/day, and some of which was shipped to a concentrator in Utah."[186]

Bull: In Exhibit 1 of his expert report, Dr. Bull reports that 364 tons of ore were milled at the Admiral Mill in 1948. This 364 figure comes from the PIMR and from the Annual Minerals Yearbook for 1948.[187]

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[181] Quivik, 43.
[182] John West and M. R. Lickes, Van Stone Inspection Report, April 3, 1957, Record Group 70, U.S. Bureau of Mines, Accession 8NS-070-96-0434, Box 190, File 053-065-0434, National Archives, Rocky Mountain Region. (00008648)
[183] Minerals Yearbook, 1947 (Washington, D.C.: GPO, 1947), 1534. (TECK0014956)
[184] Minerals Yearbook, 1950 (U.S. Bureau of Mines), 1612. (TECK_1528832)
[185] "The Operation of the Admiral Mill, Northport District, Stevens County, Washington, 1947-1956," Consulting Report by Rex Bull, Ph.D., Draft 11/1/2010.
[186] Quivik, 44; Minerals Yearbook, 1948, 1626. (TECK_1528811)

Stevens: Disagree. Even though Dr. Quivik reports that some of the ore produced by the Admiral mine in 1948 was shipped to Utah, Dr. Bull assigns the full 364 tons to the Admiral Mill, which overstates the amount of ore milled there that year. Because the sources do not provide details about how much ore was milled at the Admiral Consolidated and how much was shipped to Utah, it is impossible to calculate wastes in the form of tailings. The figures he provides are therefore unreliable.

Bull: In Exhibit 1, the spreadsheet cells for 1949, 1950, and 1951 are all in red, which indicated that those figures were PIMR estimates, as noted on those documents. Bull also states: "To give some idea of the sensitivity of the estimates – if the lead and zinc contents of the feed in 1952 are increased by 20%, then the total tons of lead and zinc in the tailings increase to 6.6 and 158.9 respectively, with assays of 0.03% lead and 0.76% zinc; a 20% decrease in the original estimates results in total tonnages of 4.6 lead and 108.9 zinc, and assays of 0.02% lead and 0.52% zinc."[188]

Stevens: By Bull's own analysis, the three (3) years of estimates create a huge degree of variability. With three years of PIMR "estimates," and one year in which there is no reliable figure available at all, (1948, discussed above) only four (4) years out of nine (9) have anything approaching reliable figures of production for the Admiral Mill. Four years out of nine amounts to less than 50%, which does not provide statistically reliable information. *These estimates of production should not be relied upon to quantify tailings.*

Quivik: "Although little evidence exists in available sources regarding historical waste streams at the Admiral mill, waste discharge permits filed in 1956 and 1961 indicate its proximity to Hartbauer Creek. Additionally, a 1981 survey and later investigations noted a tailings dump near the old mill site."[189]

Stevens: The waste discharge permit application referred to by Dr. Quivik indicates that tailings were to be disposed of in a "tailings pond."[190] There is no evidence to suggest that this had not also been the previous method of disposal. In 1961, another discharge application stated, "tailings, none." [191] As Dr. Quivik notes, there is little evidence regarding historical waste streams, and therefore, the assumptions regarding release of tailings made in the reports of Quivik, Brown, and Bull should be dismissed.

Quivik: "In addition to tailings discharged into the watershed of the Columbia River, Admiral Consolidated extracted waste rock and low-grade materials which were piled near the mine and which may have released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances, such as zinc or lead."

Stevens: There is no evidence whatsoever that tailings were discharged to Hartbauer Creek (see above). In addition, Dr. Bull states unequivocally that, "No reliable estimate can be made of the tonnage

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[187] PIMR, Stevens County (Plaintiff-00043923); Minerals Yearbook, 1948 (TECK_1528811)
[188] Exhibit 1, Admiral Mill Performance, Rex Bull, Ph.D.; "The Operation of the Admiral Mill, Northport District, Stevens County, Washington, 1947-1956," Consulting Report by Rex Bull, Ph.D., Draft 11/1/2010, 4.
[189] Quivik, 46.
[190] Pollution Control Commission, Waste Discharge Permit, dated March 24, 1956. (WAECY-HQ-10-07-09-001230-229)
[191] Pollution Control Commission, Waste Discharge Permit, dated June 19, 1961. (WAECY-HQ-10-07-09-001229)

of development rock extracted," and Adrian Brown does not determine waste rock amounts in his Figure 2 due to Bull's analysis. Finally, it is important to recognize that the various mines feeding ore to the Admiral Mill were regularly processing dump ore, and therefore their waste piles were gradually diminishing. As one example, Dr. Quivik fails to note that ore processed at the Admiral Mill in 1956 came from Red Top Mine's "dump ore," suggesting that the mine's waste dump was being treated.[192] Therefore, Dr. Quivik's statement about possible releases through tailings and waste rock must necessarily be disregarded. Furthermore, the historical documents do not provide any information regarding hazardous substance releases, and historians are not qualified to draw a conclusion of this sort without historical documentation.

Anderson-Calhoun Mill

Introduction

The American Zinc, Lead, and Smelting Company constructed the Anderson-Calhoun Mill in 1966 and operated it on ore from the Anderson Mine for only two (2) years.[193] Anderson Mine ore had been treated at the Sierra Zinc Mill (see above) until as late as 1952. The mine then ceased production until the Anderson-Calhoun Mill was built.[194]

Specific Rebuttal

Quivik: "In addition to tailings discharged into the Columbia River's watershed, Goldfield Consolidated and American Zinc extracted waste rock and low-grade materials from the Anderson and Calhoun mining operations which were piled near the mine and which may have released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances, such as zinc or lead."[195]

Stevens: Dr. Quivik provided no evidence that tailings were discharged. In fact, Quivik states that American Zinc "discharged its tailings to a 40-acre impoundment adjacent to the mill and about a tenth of a mile from the North Fork of Deep Creek."[196] Additionally, a March 1966 *Engineering and Mining Journal* article quoted by Dr. Bull in his Exhibit 2 also stated that "a 40-acre tailings pond is nearly completed."[197] Finally, the Spokane Daily Chronicle ran a photograph of the tailings pond on December 16, 1965, with a caption that stated: "The pond will store up to eight years' mill waste and then another storage area will be built."[198] Neither Dr. Bull nor Dr. Quivik offers any evidence to suggest that the tailings pond failed or that tailings were released to the environment. An examination of the American Zinc corporate records at the State Historical Society in Missouri would provide information on tailings

[192] Minerals Yearbook 1956, p. 1230. (TECK_1529003)
[193] Minerals Yearbook 1966, Volume III, Area Reports: Domestic (U.S. Bureau of Mines, 833. (INT053425-INT053439
[194] PIMR, Anderson, Calhoun.
[195] Quivik, 47.
[196] Quivik, 47.
[197] Bull, Exhibit 2, 6.
[198] *Spokane Daily Chronicle*, Dec. 16, 1965.

disposal, as well, providing more reliable information.[199] Therefore, this statement and any resulting calculations of discharges of tailings must be disregarded.

Chewelah Mining District

United Copper Mill

Introduction

The United Copper Mill was one of the earliest constructed in Northeast Washington, built by United Copper Mining Company in 1911.[200] The closest stream was Chewelah Creek, from which the mine drew water through a two-mile flume for operations. The primary mine that fed the mill was the United Copper mine, which produced copper ore. In 1919, the ore body changed as the company struck a new vein that was high in silver as well as carrying 15% copper per ton.[201] From early days when the ore was shipped directly to smelters in the area to the 1920s when production virtually ceased, the owners attempted to become more and more efficient at treating the ore of the property.[202] To this point, the mill had a long history of technological alterations between 1911 and 1920, including the addition of a second mill that was integrated into the site's operations by using various methods of flotation.[203]

Importantly, the second mill was designed in 1916 in part to treat old tailings. It was built adjacent to the tailings pile that had accumulated from earlier operations. Newly processed tailings were also sent to this second mill in the post-1916 operational period.[204]

When the Washington Department of Geology and Earth Resources visited the site as part of their study of inactive and abandoned mine lands, they observed that there were two sites that held tailings. First, an upper site, consisting of approximately five acres that contained an estimated 64,500 cubic yards of material, and a so-called 10-acre lower site containing approximately 117,500 cubic yards of material. Additionally, the report noted a 900-foot area of forest that contained additional tailings.[205]

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[199] Records of the American Zinc, Lead, and Smelting Company, 1901-1965 (154 boxes), State Historical Society of Missouri, Manuscript Group R10, Rolla, Missouri.
[200] Mineral Resources of the United States, 1911 (Washington, D.C.: GPO, 1912), 788.
[201] *Colville Examiner*, March 8, 1919.
[202] See Mineral Resources of the United States, 1911-1920. The company was continually improving its mill technology to achieve higher metal recovery.
[203] Mineral Resources of the United States, 1917 (Washington, D.C.: GPO, 1921), 505.
[204] Mineral Resources of the United States, 1916 (Washington, D.C.: GPO, 1919), 615; *Mineral Resources of Stevens County*, Bulletin No. 20, Washington Geological Survey (1920), 141.
[205] Fritz E. Wolff, Donald T. McKay, Jr., and David K. Norman, Washington Division of Geology and Earth Resources Open File Report 2003-18: Inactive and Abandoned Mine Lands—United Copper Group Mines, Chewelah Mining District, Stevens County, Washington (Washington Department of Natural Resources, 2003), 4-5. (Plaintiff - 00053428).

Of the four experts I rebut in my report, only Dr. Quivik makes note of this mill in his report, and he claims without evidence that tailings from this mill were "discharged…into the watershed of the Columbia River."[206]

Specific Rebuttal

Quivik: "In addition to tailings discharged from the United Copper mill into the watershed of the Columbia River, United Copper extracted waste rock and low-grade materials which were piled near the mine and which may have released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances, such as zinc or lead."[207]

Stevens: Disagree. From Dr. Quivik's own report, it is clear that United Copper maintained at least two separate land parcels utilized for tailings disposal, *and did not dispose of any tailings into any body of water.* [208] Additionally, the company regularly re-processed tailings to recover additional metals, up to and including the end of the mill's run in the 1920s.[209] There is no evidence of any discharge, and therefore Dr. Quivik's statement has taken the historical documents further than they allow a historian to go. This repeated statement is unsubstantiated by any record produced in this section of Dr. Quivik's report.

Finally, the 2003 report done by the Washington State Division of Geology explains that the major waste rock dump for this site was located near one of the mine site's portals. The presence of at least three other waste rock dumps was noted, as well. According to the report, "none of the dumps exhibit staining or other indication of high toxic metal content."[210] The evidence is that the waste rock piles are in fact *not* releasing hazardous substances.

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[206] Quivik, 50.
[207] Quivik, 50.
[208] Fritz E. Wolff, Donald T. McKay, Jr., and David K. Norman, Washington Division of Geology and Earth Resources Open File Report 2003-18: Inactive and Abandoned Mine Lands—United Copper Group Mines, Chewelah Mining District, Stevens County, Washington (Washington Department of Natural Resources, 2003), 4-5. (Plaintiff - 00053428).
[209] L.K. Armstrong, "Geology of Chewelah District." Accession 8NS-070-96-0054, Box 188, File 053-065-0095, Records of the Bureau of Mines, Record Group 70, National Archives, Rocky Mountain Region. (0004528); *Mineral Resources of Stevens County*, Bulletin No. 20, Washington Geological Survey (1920), 141.
[210] Fritz E. Wolff, Donald T. McKay, Jr., and David K. Norman, Washington Division of Geology and Earth Resources Open File Report 2003-18: Inactive and Abandoned Mine Lands—United Copper Group Mines, Chewelah Mining District, Stevens County, Washington (Washington Department of Natural Resources, 2003), 5. (Plaintiff - 00053428).

Bossburg Mining District

Bonanza Mill

Introduction

The history of the Bonanza mine and the mill at Palmer Siding is long, dating back to the 19th century and involving myriad owners during its approximately 80-year life.[211] The mine was never one of the biggest producers in Washington, but it produced for such a long time that its cumulative production was apparently significant enough to warrant coverage by Teck's experts. Additionally, the mill that was built in 1942 to process the majority of these ores – the Bonanza Mill at Palmer Siding – processed ore from other mines, as well up until 1944, at which time it began processing only ore from the Bonanza Mine.[212] Because the Bonanza Mine was an early producer and there were no concentration mills in the area, lower grade ore was saved on the site.[213] As technology improved and better recovery methods became available, the reserved dump ore was gradually processed over time, first at a concentrator built on site in 1925, and later at a flotation plant built some distance away from the mine on the Colville River. Although the property's first mill (built at the mine site) was destroyed by fire in 1925, the new one built in 1929 continued processing the waste ore and rock on the mine site.[214]

The Bonanza Mill at Palmer Siding did not discharge its tailings into the Colville River. Notably, the owners constructed an impoundment which, in recent years, has been estimated to hold up to 70,000 cubic yards of tailings on nine acres.[215] There is disagreement about whether the impoundment berm was ever flooded, causing some tailings to overflow into the river. However, it is clear that a surface tailings impoundment existed, and that many cubic yards of tailings remain on land and not in the river. Modern reports also indicate that the tailings are of a varied enough character that they evidently came from treating multiple mines.[216]

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[211] John W. Taber, *The Bonanza Lead Mine*, Stevens County, Washington, Report of Investigations, U.S. Department of Interior Bureau of Mines, 1949.
[212] Taber, 13-14.
[213] Mineral Resources of the United States, 1925 (Washington, D.C.: GPO, 1928), 560; Mineral Resources of the United States, 1929 (Washington, D.C.: GPO, 1932), 428.
[214] Mineral Resources of the United States, 1925 (Washington, D.C.: GPO, 1928), 560 ; Mineral Resources of the United States, 1929 (Washington, D.C.: GPO, 1932), 428.
[215] Fritz E. Wolff, Matthew I. Brookshier, and David K. Normal. *Inactive and Abandoned Mine Lands – Bonanza Mine, Bossburg Mining District, Stevens County, Washington* (Washington State Department of Natural Resources. Division of Geology and Earth Resources), Information Circular 109. December 2008, 2. (WAECY-ERO-10-05-09-015900; WAECY-ERO-10-05-09-015906).
[216] Fritz E. Wolff, Matthew I. Brookshier, and David K. Normal. *Inactive and Abandoned Mine Lands – Bonanza Mine, Bossburg Mining District, Stevens County, Washington* (Washington State Department of Natural Resources. Division of Geology and Earth Resources), Information Circular 109. December 2008, 2. (WAECY-ERO-10-05-09-015900; WAECY-ERO-10-05-09-015906).

Specific Rebuttal

Quivik: "This is another example of mineralized material being excavated from a mine and stockpiled on the landscape."[217]

Stevens: Disagree as to implication. The stockpiling of ore early in this mine's history fits into the general history of mining in northeastern Washington as described by Dr. Quivik. In the case of the Bonanza mine, the dump ore was gradually processed as technology improved. For example, in 1924, the mine owner G. Vervacke constructed a flotation mill at the mine site specifically for the purposes of processing the dump ore.[218]

Quivik: "In 1930, the Northern Lead Mining & Milling Company leased the property and treated 1,350 tons of lead-silver ore."[219]

Stevens: Disagree. The Mineral Resources of the United States for 1930 reported that the leasing company treated *1300* tons of *lead* ore.[220]

Quivik: "Victory Metals, Inc…took over operations at the Bonanza mine in July 1945 and treated about 1,800 tons of ore that year at the mill at Palmer siding."[221]

Stevens: Disagree. The figure shown in the PIMR for 1945 is listed as an "estimate." The concentrates produced from this mine were sent to Bunker Hill, and historic records from that archival collection at University of Idaho would provide specific figures in terms of assay and volume.[222] Internal records such as these would therefore provide more accurate figures for determining tailings production. Failure to employ standard historical research methods has resulted in unreliable figures.

Quivik: "The Bonanza mill at Palmer discharged its tailings to an impoundment along the banks of the Colville River."[223]

Stevens: According to Orlob and Saxton's 1950 preliminary report on the mines and mills in the Upper Columbia River basin, the tailings were discharged to a lagoon near the river bank and separated from the river by a dike. Additionally, Orlob and Saxton reported that "there is no direct overflow from the lagoon."[224] At least some of the tailings produced from this mine were re-treated. According to the

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[217] Quivik, 51.
[218] Olaf P. Jenkins, "Lead Deposits of Pend Oreille and Stevens Counties, Washington," (State of Washington Department of Conservation and Development, Bulletin No. 31, 1924): 118. (00009239-0009241)
[219] Quivik, 51.
[220] Mineral Resources of the United States for 1930 (Washington, D.C.: GPO, 1933), 675.
[221] Quivik, 52.
[222] Records of Bunker Hill Mining Company, Manuscript Group 367, University of Idaho Special Collections and Archives, Moscow, Idaho.
[223] Quivik, 53.
[224] Gerald T. Orlob and Walter W. Saxton, 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 (1950), 8. (TECK 0025219)

PIMR for the Bonanza mine, the owners treated 10,586 tons of tailings in 1952.[225] Because the tailings were stored in an impoundment, it is important for Teck's experts to account for their calculations involving tailings from this site, explaining how they determined the volume of tailings – if any – that went to the river.

Quivik: "In addition to tailings discharged from the Bonanza mill into tributaries of the Columbia River, operators of the Bonanza mine extracted waste rock and low-grade materials which were piled near the mine and which may have released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances, such as zinc or lead."[226]

Stevens: There is ample evidence that waste rock from the Bonanza mine was processed at two mills beginning in 1925, the mill built at the mine site, and later, the mill at Palmer Siding.[227] It is incorrect to suggest that all of the waste rock produced at this mine was simply stockpiled on site and left there indefinitely. Additionally, the historical documents cited in Dr Quivik's report do not provide any information regarding hazardous substance release. This statement has mischaracterized the historical documents and drawn conclusions that are unsubstantiated.

Young America

Introduction

The Young America Mill primarily operated between 1947 and 1953.[228] The various companies operating the mill over time discharged the tailings to a flat property located between the mill and the Columbia River.[229]

While Dr. Quivik's operational history of the Young America mill in the period 1940-1953 is mostly accurate, his treatment of the Young America Mill draws unsubstantiated conclusions regarding the disposal of the mill's waste because he relies on a document with numerous inaccuracies. Additionally, the sources available make it clear that it is impossible to determine the amount of mine milled in the Young America mill.

It is clear that until 1947, operators of the Young America mine sent its ore to be milled in other places.[230] While Dr. Quivik is correct when he states that none of his records show where the ore was milled in 1945, it is reasonable to infer that the mine *shipped its ore elsewhere that year*, since there was no mill on site. In 1948, the U.S. Bureau of Mines completed an investigation of the Young America Lead-Zinc deposit. Its report, published in November, stated that there was a 30-ton flotation mill on the property and that ore was trucked from the mine to the mill, which sat just below the mine. Zinc concentrates were shipped to the Sullivan plant in Kellogg, Idaho, and lead concentrates were trucked to

[225] PIMR, Bonanza Mine, 1952. (Plaintiff-00043996)
[226] Quivik, 53.
[227] W.W. Ellis to E.H. Laws, Sept. 4, 1919. (U_Idaho-02-17-10-010371)
[228] Unidentified title, *Young America*, 538-539. (WADNR-HQ-10-08-09-022320) Also see Minerals Yearbooks for this time period.
[229] Orlob and Saxton, 9. (Plaintiff-00049857)
[230] PIMR, Young America; Minerals Yearbook, 1947 (Washington, D.C: GPO, no date), 1534. (INT0053081)

the Bunker Hill smelter, also in Kellogg.[231] An article published in the *Spokesman Review* in March 1949 explained that Gregor Mines, Inc. recently had taken over this property, and that it had erected a 30-ton mill on the site. [232]

As stated in the introduction of my report, it is nearly impossible to determine the exact amount of ore produced at any given mine. That principle is especially true in the case of the Young America Mine and Mill. A 1949 letter from the Bureau of Mines collection in Denver demonstrates this. Writing to the chief of the Albany, Oregon branch of the Bureau of Mines, the supervising engineer of the same agency in Salt Lake City stated with regard to this mill: "A search this morning through our old cards turned up one that was overlooked when we prepared our first table…Although this gives a slight increase in tonnage from the mine, it still falls far short of the 7,000 tons estimated by you." The total provided by the letter's author: 2,178 tons, a difference of approximately 5,000 tons for the period 1935-1947.[233] That number – 2,178 – eventually was used in the published report of the Bureau of Mines investigation on the property.[234] The author of this letter also pointed out that the Bureau had no idea how much ore had been produced at this mine in the early part of the century.

These sources demonstrate that the federal government had a difficult job in trying to maintain the records of the myriad mines and mills across the United States. When no other records are available, the government reports are certainly a good place to conduct research. However, such documents are clearly unreliable when it comes to providing exact figures for ore and tailings production. By relying on such documents, the calculations made for these mills are necessarily unreliable, too.

Specific Rebuttal

Quivik: "The flat area [onto which the Young America discharged tailings] was separated from the Columbia River by the railroad embankment, but there was a culvert beneath the embankment, and a report from 1950 indicated that tailings had likely flowed through the culvert and down to the river."[235]

Stevens: Disagree. Dr. Quivik misconstrued the 1950 Orlob and Saxton report he relies on for this statement. The report states that:

> 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 (probably limestone which is abundant in the mine area) indicating that dikes were not properly

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[231] Robert J. Hundhausen, *Investigation of the Young America Lead-Zinc Deposit, Stevens County, Wash.* (Report of Investigations 4556: U.S. Department of Interior, Nov. 1949). (TECK_1555777-782)
[232] "Sorenson Group to Run 3 Mines," *Spokesman Review*, March 2, 1949. (TECK_1555766)
[233] C.E. Needham to S.H. Lorain, Jan. 17, 1949. File #053-065-0435, Box 190, Accession # 8NS-070-96-0054, National Archives, Rocky Mountain Region, Denver, CO. Bates 00009207.
[234] Hundhausen, 5. (TECK_1555777-782)
[235] Quivik, 55.

maintained during milling operations. Sufficient ground is available for use as tailings ponds for future operation.[236]

Nowhere in this 1950 report do the authors state that tailings were in the river or state definitively what the nature of the sludge was or how it got there.

Furthermore, this report, written by Gerald Orlob and Walter Saxton, was a *preliminary* report that made a number of recommendations in the preface of the report. The authors' prime recommendation was: "It *should be determined whether or not tailings from the various mills in the area actually reach the headwaters of Lake Roosevelt* and whether fisheries resources in the lake or its tributaries may be adversely affected by the wastes." [Emphasis added.] The authors did not conclude that tailings had in any case reached Lake Roosevelt, and therefore, the attempt to utilize this report to draw conclusions about the deposition of tailings in Lake Roosevelt is premature.[237] The authors themselves had not yet drawn such conclusions regarding the presence of tailings in Lake Roosevelt.

Additionally, Teck's own aerial photograph expert noted that the tailings pond was visible in aerial photographs dating to 1953, and also states that the culvert which Dr. Quivik references was plugged at some point and helped to create the pond.[238]

Quivik: "In addition to tailings discharged from the Young America mill into the Columbia River, United Copper extracted waste rock and low-grade materials which were piled near the mine and which may have released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances, such as zinc or lead."[239]

Stevens: Disagree.

There is no evidence of any tailings being discharged "into the Columbia River." See above.

And, it seems clear that the mine was in the habit of reprocessing dump ore. There is evidence that approximately half of the dump ore from previous years of mining was gone by 1949.[240]

As far as Dr. Quivik's statement regarding "release of hazardous substances," he cites no evidence for this claim. The historical documents do not make any suggestion regarding this point, and the statement is unsubstantiated.

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[236] Gerald T. Orlob and Walter W. Saxton, 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 (1950), 9. (TECK 0025219)
[237] Gerald T. Orlob and Walter W. Saxton, 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 (1950), 1. (TECK 0025219)
[238] Grip, 4.
[239] Quivik, 55.
[240] Robert J. Hundhausen, Investigation of the Young America Lead-Zinc Deposit, Stevens County, Washington (Report of Investigations, 1949), 4.

Bull: In Exhibit 12, Dr. Bull has produced a spreadsheet purporting to provide calculations for the amount of ore processed and tailings produced at the Young America mill.

Stevens: Disagree. In Exhibit 1, which pertains to the Admiral Mill (see section on Admiral Consolidated Mill above), Dr. Bull recognizes (by utilizing red highlighting) when the figures he cites are merely estimates from the PIMRs. However, in Exhibit 12, relating to the Young America mill, Bull does not utilize the red highlighting, *despite the fact that the figures for every year on the PIMR from 1948-1953 (the entire run of the mill and the entirety of his spreadsheet) are noted to be estimates.*[241]

In addition to ore volume being only an estimate, the PIMR also does not provide metal content for its estimated ore for 1952-1953.

Dr. Bull "assumed" that the percentage recovery of metals would be the same in 1952-1953 as it was reported to be in 1948-1951 to make his calculations in Exhibit 1. *However, the ore sources for these two periods were different, making the assumptions invalid.* In Dr. Bull's own consulting report on this mill, he notes that in the 1948-1951 period, the ore processed at Young America came from the Young America, Farmer Group, and Lucille mines;[242] but in 1952-1953, the ore processed came from Young America and Longshot.[243]

Because there are absolutely no hard numbers provided for this mill, and because there are invalid assumptions made, these estimates of production should not be relied upon to quantify tailings.

Deer Trail Mining District

Germania Mill

Introduction

The Germania mill – owned by the Germania Mining Company – was located in a District known for some rare ores, particularly tungsten and molybdenum. The tungsten industry was on the rise in the first decade of the 20th century, and the Germania mine was an early producer.[244] Owned by German interests, a mill was constructed on the site in late 1909, and milling of the ore started immediately, with the product being sent back to Germany.[245] While the property was early held by a German company, the United States government took it over during hostilities with Germany in World War I. In the early 1930s, the site was reactivated by The Tungsten Producers, Inc. who erected a 25-ton mill on the old Germania site.[246] Eventually it came to be owned by General Electric who used the tungsten in its lightbulbs. By 1939, the plant had again shut down, only to re-open in 1951.[247] When the mill re-

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[241] PIMR, Young America, 1948-1953. (Plaintiff_00044508)
[242] *Modern Prospector,* Feb. 1949, 3. (WADNR-HQ-10-08-09-015285)
[243] Minerals Yearbook, 1948 (U.S. Bureau of Mines), 1626. (INT053082-053092); Rex Bull, Consulting Report, *The Operation of the Young America Mill, Bossburg Mining District, 1948-1953*, Nov. 7, 2010, 3-4.
[244] Mineral Resources of the United States, 1909 (Washington, D.C.: GPO, 1911), 577.
[245] Mineral Resources of the United States, 1909 (Washington, D.C.: GPO, 1911), 580.
[246] Mineral Resources of the United States, 1931, Part 1 (Washington, D.C.: GPO, 1934), 44.
[247] *Mining Journal*, Sept. 30, 1937; M*ining Journal*, Jan. 15, 1939. (WADNR-HQ-10-08-09—013539)

opened, it was reported that the operators, Germania Consolidated Mines, Inc. would be able to obtain better tungsten recovery and save the molybdenum that had previously been lost in the tailings. Additionally, table concentrates from earlier millings were now being processed thanks to new technology being added at the site.[248]

Specific Rebuttal

Quivik: "In addition to tailings being discharged from the Germania Mill into the Columbia River watershed, operators of the mine extracted waste rock and low-grade materials which were piled near the mine and which may have released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances."[249]

Stevens: Disagree. According to Dr. Quivik's own report, tailings from the Germania mill were re-treated over time, beginning in the 1950s when Tungsten Mining and Milling Company of Spokane leased the property. The documents obtained from the National Archives in Denver show that the company was impounding tailings for this purpose.[250] It is clear that at least some tailings remain on the land in surface piles, demonstrating that at least some of the tailings from the production of the various mills on this site did not end up in the watershed. It is critical that Dr. Quivik address this point and account for such tailings.

Furthermore, Dr. Quivik provides no evidence that tailings from this operation were discharged to the Columbia River, and it is a mischaracterization of the historical record to suggest otherwise.

Deer Trail Monitor Mill

Introduction

The Deer Trail Monitor property was located east of Fruitland and struck its highest grade molybdenum ore around 1930.[251] It was an extremely small producer, with sources reporting that the mine produced anywhere from 3,000 – 9,000 tons of ore over its lifetime.

Like the Germania Mill, the Deer Trail Monitor mill also saw renewed activity in the 1930s. The mine's ore dump was under consideration for working in a newly reconditioned mill at the site.[252]

Specific Rebuttal

Quivik: In addition to tailings discharged into the watershed of the Columbia River, Deer Trail Monitor extracted waste rock and low-grade materials which were piled near the mine and which may have

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[248] *Mining World*, Dec. 1951; "Germania Con Improves Concentrate Product," *Wallace Miner*, Aug. 14, 1952. (WADNR-HQ-10-08-09-013446.)
[249] Quivik, 57.
[250] John D. Bardill to S.M. Shelton, June 25, 1951, Accession 8NS-070-96-0054, Box 188, Record Group 70, U.S.National Archives, Denver, CO. (00003905) Other letters from this same collection show the company's efforts to determine assay values of the jiggings and tailings. (00003998-3999)
[251] *Mining Truth*, July 16, 1931, 18.
[252] W.L. Bell, Mineral Investigations Project, C.W.A. – 1934 – W.E.P.A. (Plaintiff-00043210)

released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances."[253]

Stevens: Disagree. There was no discussion or evidence provided of tailings discharge from the Deer Trail Monitor, so this statement must be completely dismissed. Evidence demonstrates that the tailings from this operation were piled on the land and were still there in 2004. Although the documents were not produced for the Tribes, a memorandum written by HAI in August 2010 stated:

- In "Crystal Expedition October 2nd 2004" Joe Barreca noted that at the old Deer Trail Monitor Mine the team "crawled over the tailing pile looking for raw molybdenum and also found layered green and black rocks with massive deposits of garnet." They found the most molybdenum "near the bottom of the south side of the tailings pile." Barreca also reported that the government worked the mine during WWII "to supplement the war effort."[254]

Furthermore, the interests who revived the mill in the 1930s had the singular purpose in mind to treat the low-grade ore from the mine's dump.[255] A 1937 *Spokesman Review* article reported that the company had piled 2,000 tons of ore on the dump to be run through the mill.[256] Therefore, the reduction of this waste dump must be noted in any history of the Deer Trail Monitor mill.

Dr. Quivik has taken the historical documents much further than they allow with this statement.

Ferry County

Republic Mining District

The Republic Mining District was located in Ferry County, the western-most county of those discussed in my report. This district was known for its gold and silver ores. As late as 1910, virtually all of the extracted ore in the county was sent directly to smelters for treatment with the exception of 68 tons.[257] But, by 1911, as technology improved and local mills were constructed, operators began treating tailings in the Republic District in order to extract more metal.[258]

San Poil Mill

Introduction

The San Poil Mill operated early in Ferry County history and achieved a relatively high level of metals recovery. The mill only operated between June 1912 and 1916, at which time the operators deemed the

[253] Quivik, 58.
[254] As cited in Memo from WDW, KS, MM to File, Aug. 17, 2010. (TECK 0045934 (EHC Documents))
[255] Bell, no page. (Plaintiff-00043230)
[256] "Germany, Japan Bid Deer Trail," *Spokesman Review*, May 20, 1937. (WADNR-HQ-10-08-09-012455)
[257] Mineral Resources of the United States, 1910 (Washington, D.C.: GPO, 1911), 603. (TECK???)
[258] Mineral Resources of the United States, 1911 (Washington, D.C.: GPO, 1912), 785-786. (TECK???)

ore too low-grade to continue milling.[259] During the period of its operation, it milled ore from its own San Poil mine, as well as custom ore from the Ben Hur, Lone Pine, Surprise, and Knob Hill mines.[260] Importantly, those mine's dumps were later leased and presumably processed at another mill or sent to a smelter.[261]

Specific Rebuttal

Bull: "It is probable that the San Poil mill tailings were discharged into Eureka Creek."[262]

Bull: "No description of any form of tailings impoundment has been found." [263]

Stevens: Disagree. While there is no evidence of an impoundment, there is evidence of surface tailings at this mill site. Although Dr. Bull argues that tailings were discharged to the creek, documents *quoted* by Dr. Bull himself state that the tailings were discharged onto the "flat below the mill."[264] Additionally, a circa-1916 photo shows stockpiled ore, rock waste, and tailings, all of which have been removed more recently in the realignment of an adjacent road.[265] It is unclear why Dr. Bull has disregarded this evidence and concluded that the tailings were discharged to Eureka Creek. Nevertheless, his conclusions must be tempered by the evidence that clearly shows tailings on the land. It is critical to account for those tailings and waste rock correctly.

Additionally, there is evidence that tailings from the feeder mines and the mill were treated at a later date. Government records for the Lone Pine mine show that tailings were re-processed between 1933 and 1936,[266] while records for San Poil show tailings and dump ore sent for processing to the Trail Smelter in 1930 and 1934.[267]

A detailed examination of the records of the Aurum Mining Group at the University of Idaho would also provide information about these mines and their metals values.[268] Without examining the volumes of

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[259] Mineral Resources of the United States, 1912 (Washington, D.C.: GPO, 1913), 921; Mineral Resources of the United States, 1913 (Washington, D.C.: GPO, 1914), 797; Mineral Resources of the United States, 1914 (Washington, D.C.: GPO, 1915), 649; Mineral Resources of the United States, 1916 (Washington, D.C.: GPO, 1917), 611.
[260] Ibid.
[261] Boxes 18-21, Records of the Aurum Mining Company, Manuscript Group 235, University of Idaho Special Collections, Moscow, Idaho.
[262] Rex Bull, The Operation of the San Poil Mill, Republic District, Ferry County, Washington, 1912-1915, Nov. 2010, 5.
[263] Rex Bull, The Operation of the San Poil Mill, Republic District, Ferry County, Washington, 1912-1915, Nov. 2010, 5.
[264] S. Norman, "The Development of the Republic District, Washington," *Mining and Engineering World*, July 6, 1912, p. 13.
[265] Fritz E. Wolff, Donald T. McKay, David K. Norman, *Inactive and Abandoned Mine Lands – Republic Mining District, Ferry County, Washington* (Jan. 2010), 18, 36. (1615A_20100100)
[266] PIMR, Lone Pine, 1933-1936. (Plaintifff-00043478)
[267] PIMR, San Poil, 1930, 1934. (Plaintifff-00043546)
[268] Records of the Aurum Mining Company, Manuscript Group 235, University of Idaho Special Collections, Moscow, Idaho.

material related to these feeder mines, the figures presented by Drs. Bull and Quivik are necessarily unreliable.

Bull: "Mineralogically, the tailings would have contained practically all of the gangue minerals that were in the feed, with very small amounts of sulfides, mainly from the Knob Hill ore."[269]

Stevens: Disagree with assumptions. A great deal of documentation on these mines and the ore extracted from them is available at the University of Idaho Special Collections, where the records of the Aurum Mining Company are held in Manuscript Group 235 (this company owned the mines starting in the 19teens). Ore records dating to at least 1916 are available in this archive, and no assumptions about metal content in tailings should be made until these records are exhausted.[270] Any conclusions drawn from these assumptions are therefore unreliable.

Knob Hill Mill

Introduction

The Knob Hill mill, located on Eureka Creek in Ferry County, was constructed in 1937 and completed its almost 60-year span of operation in 1995. During its lifetime, it processed ores from the Knob Hill mine but also from properties nearby, including the Mountain Lion and the Quilp. One of the key things that made this mill unique was its effort to store tailings in impoundments and not discharge them to the creek. At the start of operations, the mill discharged its tailings to an impoundment held back by a dam adjacent to the mill. The impoundment suffered one serious failure in 1941, exactly four years after the mill had begun operations. Prior to the failure, approximately 500,000 tons of ore had been milled here, according to published sources.[271] After that time, the operator altered its process in order to separate its sand tailings from its finer slimes and to backfill the mine with the sands as the property continued to be worked. The slimes were sent to a tailings pond which the company took extra care to reinforce following the 1941 failure.[272] In more recent years, run off from these surface tailings impoundments has been the subject of various studies that conclude that some water comes off the various impoundments; however, no specific data regarding tailings overflow has been generated.[273]

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[269] Rex Bull, The Operation of the San Poil Mill, Republic District, Ferry County, Washington, 1912-1915, Nov. 2010, p. 5.
[270] Folder 75, "Ore Production," Box 2; Box/Volume 17, "Ore Production and Shipment Records, Ore Record, 1916-1941," Records of the Aurum Mining Company, Manuscript Group 235, University of Idaho Special Collections, Moscow, Idaho. (no bates, from UofI digitized records)
[271] Rex Bull, Operation of the Knob Hill Mill, Republic District, Ferry County, Washington, 1937-1995, Exhibit 5, Consulting Report, Nov. 2010, no page, footnote 11.
[272] Alfred T. Neale, George Hansen, May 22, 1956. (WAARCH_0003554); Orlob and Saxton, 11-12. (TECK_0025219-0025239); "Knob Hill Sand-Fill System Combats Heavy, Blocky Ground," *Engineering and Mining Journal* (Nov. 1953). (WAARCH0003544)
[273] HAI, Knob Hill Mill Site Report, (undated), 19.

Specific Rebuttal

Quivik: "The Company continued to direct its sand tailings to underground workings and to pump its finer slime tailings to the impoundment above the mill."[274]

Stevens: Agree. However, I believe that it is important to provide more detail on the nature of this disposal, and emphasize that *all of the Knob hill tailings in the post 1941 era were impounded on the surface*. It is worth quoting from the 1950 Preliminary Survey by Orlob and Saxton at length to understand the nature of tailings disposal at the Knob Hill mill:

> Tailings from the mill are presently being pumped to a pond which is located over a section of a previously mined quartz vein. The ponding area is 6 or 7 acres in extent and is surrounded by a dike whose height varies from 20 to 50 feet above the surrounding ground. As a result of the failure in 1941 of a dike in the previous tailing pond, the mine engineer now makes it a practice to reinforce the dike by allowing the discharge of tailings at various points along the periphery of the pond. The coarser materials in the tailings settle out first near the face of the dike and the fines are carried to the center of the pond. In this way the sides are built up with tailing sludge and the waste cyanide solution remains in the depression at the center of the pond. *There is no direct overflow from this pond*; water escapes only by leaching and evaporation. A test for cyanide in a small creek draining over the tailings which escaped during the 1941 dike failure did not indicate the presence of free cyanide.[275] [Emphasis added.]

In fact, a 1956 internal memo regarding the issuance of an industrial waste permit to the company stated that "the inspection of this mine and milling property today establishes that none of the mine tailings are escaping to a public waterway."[276]

Another impoundment called the Aspen Pond was constructed later (dates vary between 1956 and 1961), and modern reports (2010) by the state of Washington's Department of Natural Resources report on monitoring wells showing that "seepage from the Aspen Pond tailings are *not* impacting groundwater quality."[277] [Emphasis added.]

Quivik: "In addition to tailings discharged from the Knob Hill mill into tributaries of the Columbia River, Knob Hill and Hecla extracted waste rock and low-grade materials which were piled near the mine and which may have released contaminants to the environment, resulting in either a release or threatened release of hazardous substances."[278]

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[274] Quivik, 61.
[275] Orlob and Saxton, 11-12. (TECK_0025219-0025239)
[276] Alfred T. Neale, George Hansen, May 22, 1956. (WAARCH_0003554)
[277] Fritz E. Wolff, Donald T. McKay, David K. Norman, *Inactive and Abandoned Mine Lands – Republic Mining District, Ferry County, Washington* (Jan. 2010), 19. (1615A_20100100)
[278] Quivik, 62.

Bull: "Total development plus waste rock disposed of on the surface was therefore to the order of at least 1.2-1.4 million tons. *No indication about where it was dumped has yet been found*."[279] [Emphasis added.]

Stevens: Disagree.

After the 1941 failure of the tailings impoundment, the Knob Hill operators made every effort to impound tailings on land and as backfill to their mining operations, securing their disposal to prevent another disaster. There is no evidence that in the post-1941 era, tailings entered the watershed at all.

Dr. Bull's statement regarding the lack of waste rock location makes Dr. Quivik's statement invalid. The absence of evidence proving waste rock existence on the site makes Dr. Quivik's statement false.

Republic Mills

Rebuttal

Dr. Quivik describes the early mills in the Republic District in a brief few pages. Among the six mills he describes are the Clark Mill; Mountain Lion; Rathfon; North Washington Power & Reduction; San Poil; and Blaine.

Quivik: "In addition to tailings discharged from the Republic District mills into the watershed of the Columbia River, operators of the mines extracted waste rock and low-grade materials which were piled near the mines and which may have released contaminants to the environment, resulting in either a release or a threatened release of hazardous substances, such as zinc or lead."[280]

Stevens: Disagree. Dr. Quivik has not established that either tailings or waste rock was deposited in the watershed of the Columbia River. Additionally, the ore of the Republic District was almost uniformly prized for its gold and silver content. *Therefore, it is not established that the ores treated in these mills contained any zinc or lead to be discharged in tailings.*

Of the six mills that Dr. Quivik describes in this section of his report, two – the Rathfon and Blaine-Republic – were constructed specifically to process old tailings dumps, and one of those, the Rathfon, treated the entire tailings dump of another – the Clark.[281]

A fourth mill, the North Washington Power and Reduction Mill – also known historically as the "White" mill – operated on low-grade ore only for a year or so around 1911, and although "the total amount of ore milled is unknown," it was "small."[282]

With regard to the fifth mill, the Mountain Lion operated for only eight (8) months in 1900 and possibly another couple of months a few years later.[283] We know from examination of the Aurum Mining

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[279] Bull, *Operation of Knob Hill Mill*, Exhibit 5, unpaginated, last page.
[280] Quivik, 64-65.
[281] Mineral Resources, 1911, 786; Mineral Resources, 1914, 649-650; Mineral Resources, 1915, 570;
[282] Wolff, et al., Inactive and Abandoned…Republic Mining District, 18. (1615A_20100100); Mineral Resources, 1911, 786.

Records that Mountain Lion tailings were also processed in later years.[284] Additionally, a very recent report on the site suggest that tailings from the mill's early run are piled on a dump at the site, and therefore did not get discharged to any creek or watershed. The same report also suggests that tailings from the mill's second run were discharged to the flood plain around Swamp Creek, and that some of those tailings remain there today.[285] Without a fuller investigation into the volume of tailings and/or dump ore that was processed later, none of this information should be utilized for determining waste into the watershed.

The sixth and final mill discussed in this section is the San Poil. As noted above (in this section, which begins on page 55), the San Poil Mill discharged at least some of its tailings to the surface, and there is no evidence that this material was discharged to Eureka Creek.

At trial I may use any of the documents described above. I reserve the right to modify and/or supplement my report with additional information to the extent that any new information is obtained as the case progresses.

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[283] Wolff, et al., Inactive and Abandoned…Republic Mining District, 18. (1615A_20100100)
[284] Mountain Lion Consolidated Mines Co., Profit and Loss Statement, Dec. 31, 1938; Walter Lyman Brown to Henry L. Day, Nov. 4, 1938; Folder 150, "Mt. Lion Cons. Mines Co.," Box 3, Records of the Aurum Mining Company, Manuscript Group 235, University of Idaho Special Collections, Moscow, Idaho. (no bates, from UofI digitized records)
[285] Wolff, et al., Inactive and Abandoned…Republic Mining District, 19. (1615A_20100100)

Signature Page

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5/13/11

Date