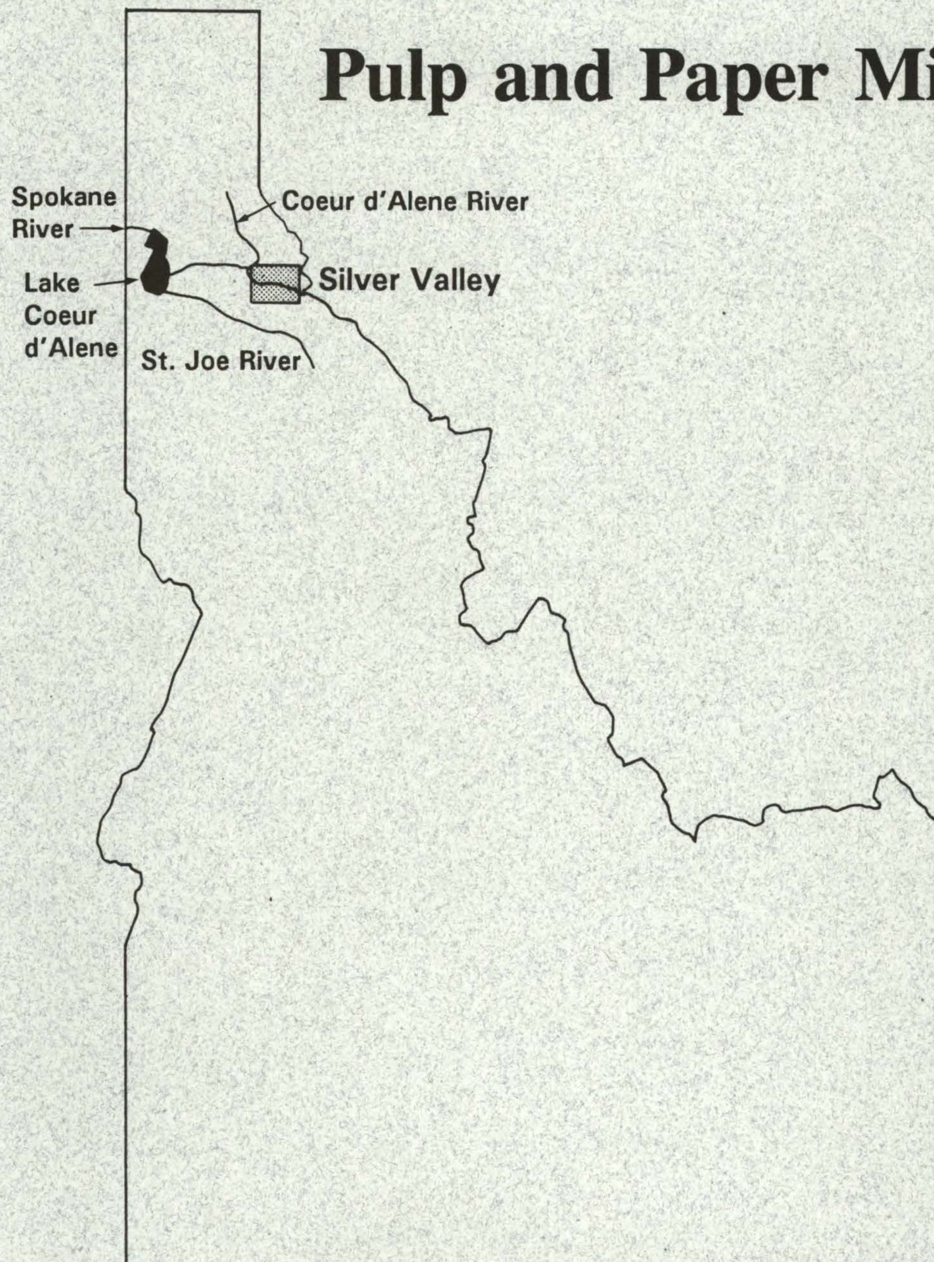
Idaho Forest, Wildlife and Range Policy Analysis Group

Report No. 6 October 1991

Silver Valley Resource Analysis For Pulp and Paper Mill Feasibility



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- The Idaho Forest, Wildlife and Range Policy Analysis Group was established by the Idaho Legislature in 1989 to provide objective analysis of the impacts of natural resource proposals (see *Idaho Code* § 38-714).

- The Policy Analysis Group is administered through the University of Idaho's College of Forestry, Wildlife and Range Sciences, John C. Hendee, Dean.

Policy Analysis Reports

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SILVER VALLEY RESOURCE ANALYSIS FOR PULP AND PAPER MILL FEASIBILITY[1]

Idaho Forest, Wildlife, and Range Policy Analysis Group
Report No. 6

edited by

James G. MacCracken and Jay O'Laughlin[2]

October 1991

[1] This report summarizes a 145-page report "Silver Valley Pulp and Paper Mill Feasibility Study" prepared in May, 1991, and authored by six University of Idaho faculty, one University of Montana faculty, one Washington State University faculty, and two University of Idaho graduate researchers. The authors are acknowledged on page iii and their work is referenced at the end of this summary report. The 145-page report is published as contribution No. 601 of the Idaho Forest, Wildlife and Range Experiment Station, Moscow, Idaho 83843.

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FOREWORD

The Idaho Forest, Wildlife and Range Policy Analysis Group (PAG) was created by the Idaho legislature in 1989 to provide Idaho decision makers with timely and objective data and analyses of pertinent natural resource issues. A standing nine-member advisory committee (see inside cover) suggests issues and priorities for the PAG. Results of each analysis are reviewed by a technical advisory committee selected separately for each inquiry (see the acknowledgements on page iii). Findings are made available in a policy analysis publication series. This is the sixth report in the series.

The Policy Analysis Group undertook this project because of the interest in a pulp and paper mill in the economically depressed and environmentally damaged Silver Valley Superfund Site. A private consulting firm had completed a proprietary pulp mill feasibility study for Western Montana and wanted to produce a similar report for Northern Idaho. It was proposed that the University of Idaho conduct the study to provide useful and objective information about the variety of renewable natural resources in the Silver Valley area. The study would then be in the public domain and would address the environmental and legal consequences in the Superfund area. We learned very quickly that there was insufficient water for a pulp and paper mill because of the need to dilute treated effluent before returning water to the South Fork of the Coeur d'Alene River. We proceeded to develop this catalog of natural resources in the Silver Valley area hoping that it will be useful in stimulating other kinds of economic development.

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EXECUTIVE SUMMARY

The Silver Valley of northern Idaho has a long history of dependence on mining. Boom and bust cycles describe the economy of this region with a decline phase in effect since the early 1980s. A century of mining and smelting activities have left the Silver Valley with heavy metal pollution problems. In 1982 the U.S. Environmental Protection Agency (EPA) placed a 21 square mile area within the Silver Valley on the National Priority List of Superfund Sites.

The building and startup of a new pulp and paper mill in northeastern Washington in late 1989 generated interest in the potential for a similar mill in the Silver Valley. A pulp and paper mill would add economic diversity and stability to the region. The Policy Analysis Group accepted the challenge of preparing a feasibility study for a pulp and paper mill in the Silver Valley. Faculty of the University of Idaho, University of Montana, and Washington State University cooperated in the study.

While conducting the feasibility study, the non-mineral natural resource base of the area was assessed and described by the study team, and reported to the funding agency by O'Laughlin (1991) in a 145 page document, plus several hundred pages of technical appendices. This report summarizes those findings. The authors cited in this report were all members of the study team and each contributed a separate chapter to the final research report.

Much of the Silver Valley still exhibits the effects of pollution associated with past mining and smelting operations. Soils in the area are acidic and contaminated with heavy metals. Vegetation is absent on hillsides as far as a mile from former smelting operations. Concentrations of metals in the water near the mining and smelting sites generally exceed Drinking Water Standards, but quickly improve at a distance from these areas. Water quality appears to have improved substantially since 1981, coinciding with the cessation of smelting activities (Falter, Bennett, and Sawle 1991).

Robison and Katzer (1991) developed an economic model of the Silver Valley that is available for use in planning and testing alternatives for economic development. The model indicated substantial interaction among the communities of the Silver Valley and demonstrated the area's continuing dependence on mining.

Campbell (1991) described the characteristics of mechanical, chemical, and hybrid pulp mills. The current situation in the industry tends to favor mechanical pulp mills. A mechanical pulp mill uses somewhere in the range of one to seven million gallons of ***process*** water daily, depending on the size of the mill. The South Fork of the Coeur d'Alene River has sufficient flow year-round to meet this need. However, mill effluent has to first be treated and then diluted before it is released back to the river. River low flow periods are not adequate to provide enough ***dilution*** water to treat mill effluent to meet water quality standards. Falter, Bennett, and Sawle (1991) stated that the construction of an artificial wetland as a final polishing of mill effluent can solve this problem. Construction of a storage reservoir to supplement low water flows may also be an option to meet dilution water requirements. However, liability questions associated with the Superfund Site complicate these options (Turner 1991).

Mill residue from the many lumber and plywood mills in the region would likely be the major source of wood fiber for a pulp and paper mill in the Silver Valley. According to work done by Keegan and Blatner (1991), at 1986-1988 sawmill and plywood production levels there would be enough residue available in the region to satisfy the needs of current users and supply a new pulp and paper mill in the Silver Valley. However, 1986-1988 production levels may not be sustainable. A drop in production of 20% from that level would necessitate using roundwood or importing mill residues from outside the region. Thus, the availability of wood fiber in the form of mill residues to operate a mill in the Silver Valley is questionable. The availability of roundwood in the region is highly uncertain, requiring regional timber market analysis, a major undertaking that goes beyond the scope of this study effort. Pressure from many sources promises to reduce national forest timber harvests substantially, and the response of other timber owners is largely unknown.

Mechanical pulp and paper mills require substantial amounts of electricity to operate. The existing utilities in the region should be able to meet this demand. Additionally, it may be feasible to construct a small power producing facility to augment the regional supply of electricity and further diversify the Silver Valley economy (Lyman 1991). The facility could burn wood chips to generate power and is therefore subject to the previously mentioned question of mill residue availability as well as air quality concerns. A feasibility study for a wood burning powerplant could be coupled with Robison and Katzer's (1991) economic model, which could be updated to reflect recent changes in the tourism sector in the Silver Valley.

A major obstacle to economic development in the Silver Valley is the potential for owners and investors to be held liable for the cleanup of the existing Superfund Site and surrounding area (Turner 1991). The laws governing the purchase of contaminated properties and activities on those properties are numerous and complex. All past, present, and future parties are potentially liable for damages and cleanup costs. However, any consideration of a role for industrial development in remediation of the Silver Valley Superfund Site needs to proceed under cooperative agreements with the EPA. The Kellogg Gondola project provides a model example of such an agreement.

In conclusion, a pulp and paper mill is not feasible for these reasons: [1] lack of water to dilute effluent during low flow periods, [2] questionable availability of wood fiber, and [3] potential liability for cleanup costs. Furthermore, the Superfund program is strictly for environmental cleanup. Any linkage with economic development would be a coincidental result of any Superfund remediation plan.

INTRODUCTION

In November 1987, ground was broken for a new pulp and paper mill near Usk, Washington. The newsprint mill employs 158 people, cost $300 million to build, and began operating in November, 1989. This new mill sparked interest in the feasibility of a similar facility in northern Idaho or western Montana. A consulting firm based in Seattle prepared a proprietary feasibility study for western Montana. The Idaho Department of Commerce was interested in a similar evaluation for northern Idaho's Silver Valley region.

Because several faculty at the University of Idaho had been involved in environmental impact studies of the Usk mill, it seemed appropriate for them to participate in the feasibility study. The Policy Analysis Group enlisted the services of a variety of experts to evaluate the feasibility of a mill in the Silver Valley. The individual reports of these authors were organized into a 145-page document plus technical appendices. The information contained in this report was condensed from that document (O'Laughlin 1991), which is available from the University of Idaho through the Policy Analysis Group.

The feasibility study had the following objectives:

[a] To assess and establish a data base on the raw material and energy resources (wood, water, and land) available to the Silver Valley that could be used in the evaluation of a pulp and paper mill and other types of industrial development projects;

[b] To assess the socioeconomic and environmental aspects of a pulp and paper mill on the Silver Valley communities; and

[c] To address the suitability of a pulp and paper mill in the Silver Valley and its likely impact on the raw material resources, water resources, and socioeconomics of the communities.

Silver Valley History

The Silver Valley is located in northern Idaho's Shoshone County along the Coeur d'Alene River. Major communities in the Silver Valley include Wallace, Kellogg, Smelterville, and Pinehurst (Figure 1).

Shoshone County originated in 1864 as a subdivision of the Washington territory. Activities associated with silver and gold mining led to the settlement of the area and continue to play a major role in it's economy (Robison and Katzer 1991).

Unlucky prospectors from the gold fields of Montana drifted over the Bitterroot Mountains into what is now northern Idaho. The valley along the North Fork of the Coeur d'Alene River was heavily prospected in the 1870s. However, it wasn't until 1883 that a substantial body of gold was discovered along Prichard Creek, a tributary of the North Fork.

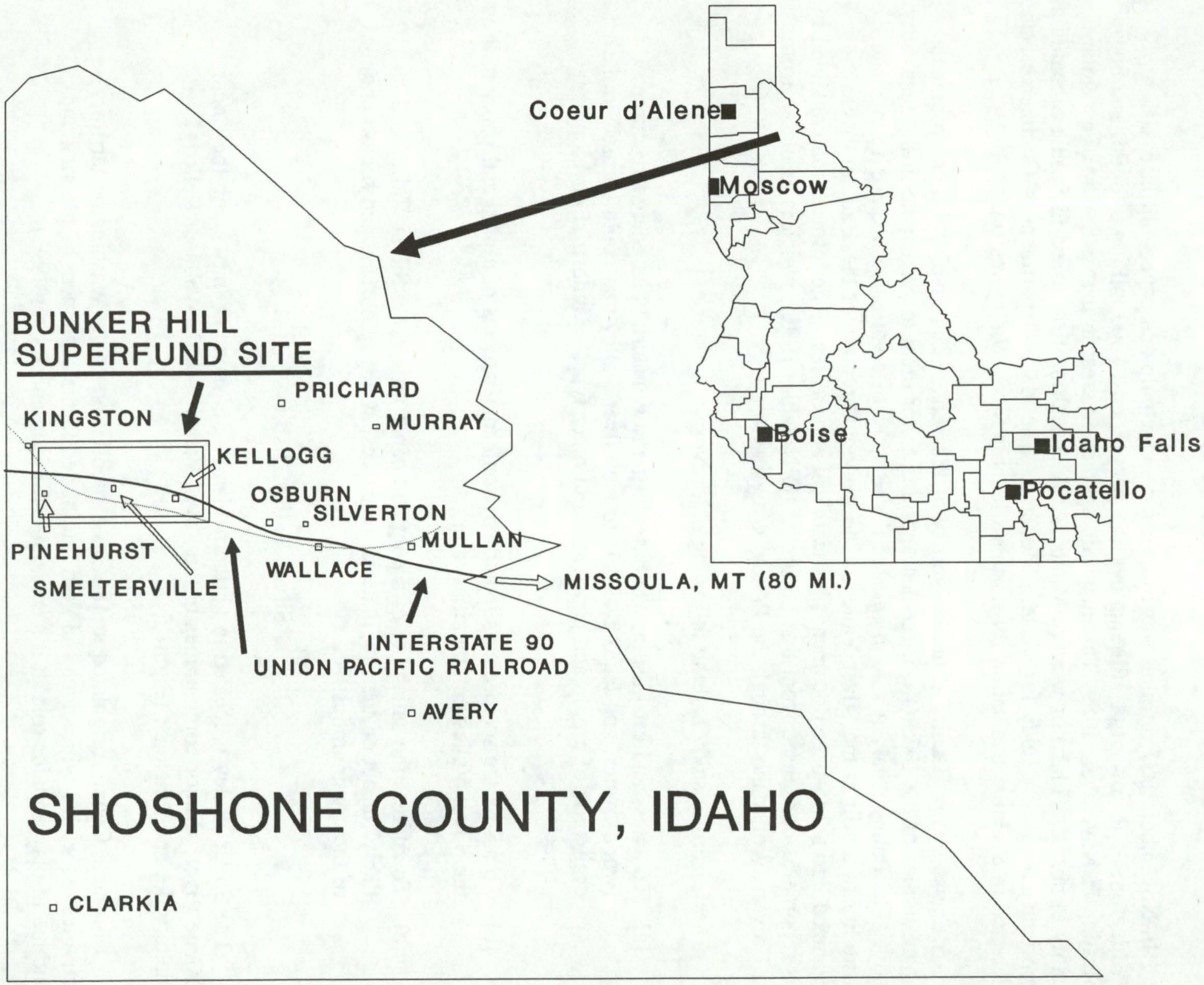

Figure 1. Shoshone County, Idaho

News of the discovery led to a gold rush at Prichard Creek. By the spring of 1884 the gold deposit was exhausted. Prospecting continued along the North Fork with little success. Prospectors soon moved into the valley of the South Fork of the Coeur d'Alene. On September 25, 1884, brothers Dennis and True Blake located the Yankee claim in Big Creek. This would become the Sunshine Mine. And almost one year later, Noah Kellogg filed the Bunker Hill claim (Robison and Katzer 1991).

As more and more mines were developed, towns began to appear. One of the first was Wallace. Originally named Placer Center, Wallace was founded in 1884 near the site where Colonel W. R. Wallace, a miner himself, built a cabin to serve as his prospecting headquarters. A town grew quickly around Wallace's cabin. Located at the confluence of five canyons, it was a natural trading center for the growing mining district (Robison and Katzer 1991).

Around 1885 the town of Jackass was laid out to the west of Wallace near the Bunker Hill mine. The name was soon changed to Milo; by 1887 it was changed to Kellogg. Other towns in the Silver Valley came to life in the late 1880s; Mullan, Murray, Wardner, and Osburn were among them (Robison and Katzer 1991).

Over the next century, mining and smelting operations increased in the Silver Valley. Record levels of lead and silver production occurred in the early 1970s. In September, 1973, a fire disabled the pollution control device for the Bunker Hill smelter. Company officials continued smelter operations for six months without any emissions control, resulting in the deposition of about 30 tons of lead per square mile on the surrounding communities. The predictable result was heavy pollution. Vegetation in most areas within a mile of the smelter was killed. Children living near the smelter had twice the concentration of lead considered toxic. For economic reasons, the smelter ceased operations in 1981. In 1982 the EPA designated a 21 square mile area in the Silver Valley for the National Priority List of Superfund Sites (Figure 1). The "Bunker Hill Site" includes the towns of Pinehurst, Smelterville, and Kellogg and presents serious obstacles to economic development in the region at a time when it is sorely needed. The voids in Figure 1 indicate the rural nature of Shoshone County, where 78 percent of the land is in the Panhandle National Forest.

The mines in Shoshone County produce nearly one-half of the silver in the United States. Over their long history, Silver Valley mines have produced more silver than any other region in the world. However, many regions dependent on mining experience boom and bust cycles and the Silver Valley, economically depressed since the early 1980s, is no exception. In late 1990 and early 1991, three mines either closed or scaled down their operations resulting in the lay-off of 475 workers (Spokane *Spokesman-Review*, 2/2/91). Those layoffs represent ten percent of all employment in Kellogg and Wallace (Robison and Katzer 1991).

THE SILVER VALLEY ENVIRONMENT

This section is condensed from the work of Falter, Bennett and Sawle (1991). The Silver Valley is located on the west slope of the Bitterroot Range in the Coeur d'Alene Mountains of northern Idaho. Major ridges and valleys trend east-west with steep slopes of 30 degrees or greater with sinuous, narrow crested ridges. Tributary canyons are generally steep-walled and V-shaped in cross section. Ridges adjacent to the valley exceed 4,000 feet elevation while the valley floor within the Superfund Site averages 2,240 feet elevation. The valley floor slopes to the west (downstream) at 23 feet per mile throughout its length. Mean annual air temperature at Kellogg is 47.2°F with a record high of 111°F and a record low of -36°F. Total annual precipitation at Kellogg varies from 30 to 38 inches, including a mean annual snowfall of 60 inches.

The Silver Valley has an excellent transportation infrastructure. Interstate 90 passes through the valley linking the population and industrial centers of Coeur d'Alene, Idaho; Spokane and Seattle, Washington to the west, with Missoula, Montana and points farther east. Furthermore, the Union Pacific Railroad currently serves the area, providing an important link to communities south of the Silver Valley. The railroad is the primary method of transport for Silver Valley mined products.

The Bunker Hill Superfund Site (hereafter the Site) is a 21 square mile area delineated by the towns of Elizabeth Park on the east and Pinehurst on the west. The Site is a rectangle aligned west to east parallel to the valley floor, approximately 7 miles long by 3 miles wide. The valley floor varies in width from 0.11 miles near Kellogg to 0.85 mile at Smelterville flats. Communities within the Site include Elizabeth Park, Kellogg, Wardner, Smelterville, Page, and Pinehurst.

Geology and Soils

The geology of the Silver Valley is very complex, forming one of the world's largest sulfide-ore mining deposits for lead, zinc, and silver. This area of northern Idaho is basically Belt series metamorphic bedrock that has been extensively folded and locally mineralized. Overlying the bedrock on the valley floor are overlapping series of fluvial (river-deposited) and lacustrine (lake-deposited) sediments with varying physical and geochemical structures. The South Fork of the Coeur d'Alene River historically meandered back and forth across the valley but has been channelized over the past 110 years and now parallels Interstate 90 from Mullan to Smelterville.

The surface deposits on the valley floor are basically two alluvial layers separated by a lacustrine layer. Mine tailings extend across the valley floor. A "metal-rich silty layer" within the tailings has been identified in some areas of the Smelterville flats.

Soils of the Silver Valley are described as being contaminated by heavy metals, acidic, and susceptible to erosion. Soil characteristics for most of the Silver Valley limit the development of housing, industry, and recreational facilities. All of the soils in the valley are limited for building site development by one or more of the following characteristics: wetness, flooding, large stones, severe slope, and frost action. All of the valley floor soils are limited for recreational development because of flooding, wetness, slope, excessively small stones, large stones, or chemical toxicity. Potential frost action is moderate to high in the area. Corrosion rates for uncoated steel and concrete are also moderate to high. The degree and type of soil limitations for construction of ponds, reservoirs, embankments, dikes, and levees are generally severe and numerous.

Groundwater Resources

Groundwater in the Silver Valley follows the same general paths as surface water drainages, i.e. predominantly east to west. Groundwater recharge results from precipitation, tributary inputs, seepage from impoundments and bedrock, and leakage from water transmission lines and sewers. Water chemistry of groundwater in the Silver Valley is related to the quality and type of recharge.

The South Fork of the Coeur d'Alene River may gain or lose water to the groundwater depending on location in the valley. Variations in the width of the river valley are associated with the gain or loss of river water to the ground water.

Seepage from water impoundments and leakage from water lines and sewers affect only the upper groundwater. Inflows from tributary recharge may affect upper or lower zones. One of the more heavily metals-loaded tributary streams, Bunker Creek, is estimated to lose an average of 80,500 cubic feet per day to the upper groundwater zone before flowing into the South Fork of the Coeur d'Alene River. Bunker Creek inputs to the groundwater are significant because this creek originates from the Central Treatment Plant.

Groundwater Quality. Chemicals move through the groundwater of the Silver Valley in three ways: 1) with the flow of groundwater, 2) through indirect pathways and chemical gradients, and 3) by adsorption or desorption of dissolved solids. The first is considered to be the most important.

Heavy metals are a problem in the Site area. Concentrations of metals in the groundwater vary among metals and locations within the Silver Valley. Zinc concentrations have been found to be the highest, followed by lead, cadmium, and arsenic. Drinking Water Standards were exceeded for zinc, lead, and cadmium in the Site area, but are within the standards downstream from Smelterville. Arsenic concentrations were within the standards in the Site area.

Surface Water Resources

Surface water flows in the South Fork of the Coeur d'Alene River are dominated by snowmelt runoff. Peak stream flows in the spring (April-June) and minimal flows in the fall (September-November) are typical. Annual flow in the South Fork at Kellogg averaged 371 cubic feet per second (cfs) from 1975-82. Recorded low and high flows during that period were 30 and 11,100 cfs, respectively. December and January snow and rain usually increase fall low flows by 100%, followed by mid-winter low flows resulting from icing conditions.

Data on total water flows in the South Fork of the Coeur d'Alene River below the Superfund Site are limited, with only one year of data available at Pinehurst. Based on a comparison of Pinehurst data with data from above the Site, a reasonable projection of Pinehurst *minimum* flows is 39.6 cfs. Pinehurst *mean annual* flows should approximate 489.7 cfs. Pinehurst 1977-89 September mean flow is estimated at 98.5 cfs. These latter figures are the best estimates of water available for industrial operations at the downstream end of the Superfund Site during flow-limited times of the year. The minimum flow of 39.6 cfs is equivalent to 25.6 million gallons per day.

***Background Surface Water Chemistry*.** The South Fork of the Coeur d'Alene River has typically been in the slightly alkaline range throughout the 1980s. All pH values fell within the Drinking Water Standard range of 6.5 to 8.5. Generally, conductance, sulfate, suspended solids, and iron increased during low streamflow and with progression through the Site, exceeding Chronic Aquatic Life Criteria within the Site.

Water hardness is an important quality constituent in situations where either industrial use or metals toxicity is an issue. The South Fork of the Coeur d'Alene River above the Site is moderately hard, increasing in low flow periods and with passage through the site.

***Heavy Metals*.** Analysis of heavy metals in the South Fork of the Coeur d'Alene River follows what might be expected after smelting in 1981. A rapid decline in most metals until 1985, followed by a more gradual decline in the late 1980s. Levels in surface streams on the Site are now approximately 50 to 70% of levels during full-scale mining and milling operations. Metals concentrations near mining operations exceed Drinking Water Standards, but decline rapidly with distance from these areas.

Low flow data indicate that in 1988, cadmium, lead, and zinc levels exceeded the Chronic Aquatic Life Criteria. However, lead levels were below the Primary Drinking Water Standards. Minor increases in suspended solids occur in the South Fork of the Coeur d'Alene River with passage through the Site during low flows. These solids appear to be either algae or flocculated iron rather than mineral sediments.

***Sediments*.** Concentrations of arsenic, lead, mercury, silver, and zinc are higher in sediments of the South Fork of the Coeur d'Alene River than in the North Fork. Metals concentrations are higher in the river sediments on the Site than in the tributaries, indicating both direct deposition into the South Fork and transport from upstream sources. During high flows, metals-laden sediments are mobilized from the stream bed and banks. Most of these sediments seem to be transported downstream off-Site. Low flow data indicate that the release of soluble metals from contaminated sediments to the water is relatively insignificant.

Vegetation Ground Cover

Smelting and mining operations over a long period of time have contaminated the soils with heavy metals, creating extreme soil acidity. This has reduced the vegetation cover in the vicinity of the smelter, giving it a barren look. Lack of vegetation has contributed to severe soil erosion in many areas. Remaining high soil acidity and heavy metals contamination from smelting activities combined with topsoil reduction has impeded revegetation of the valley. Soil acidity has been found to be neutral (pH 6.6 to 7.3) along the perimeter of mining and smelting operations but is extremely acidic (pH less than 4.5) in areas that were mined or near the smelter. Both soil acidity and metals contamination are higher near the smelter complex than elsewhere.

The lack of vegetation on the lower slopes and the valley floor is a result of four major factors: [1] repeated fires in the region between 1910 and 1936; [2] discharge of mine wastes into streams and ponds; [3] emissions from smelter operations; and [4] high intensity land use in the area. The poor water and nutrient holding capacity of the soil inhibit plant growth, as do the heavy metals present in the soil.

The lack of vegetation in the Silver Valley area has contributed to high erosion rates and siltation in the Coeur d'Alene River and Coeur d'Alene Lake, reduction of fish habitat in the South Fork of the Coeur d'Alene River, and poor aesthetic values (barren hillsides) in the vicinity of Kellogg.

Vegetation cover decreases dramatically in the vicinity of the smelter due to high soil acidity, metals contamination, and erosion. Soil conditions are so severe that few native species survive. Existing vegetation consists mostly of elderberry (*Sambucus spp.*), mosses and lichens. Conifers are nearly absent on the valley floor. Vegetation cover appears to follow a gradient created by mining activities and pollution discharge ranging from bare ground with low coverage of exotic plants, to full representation of native communities about one mile from the smelter.

Invertebrates, Fish, and Wildlife

Benthic Invertebrates. Surveys conducted from the early 1930s through the 1960s found virtually no benthic invertebrates (aquatic insects and similar organisms) throughout the impacted areas of the South Fork or mainstem Coeur d'Alene River. In the early 1970s, following installation of tailings ponds and subsequent decrease of discharge of mine slimes to the stream, more tolerant *Chironomidae* (midge larvae) became established. By 1975, EPA surveys showed the benthic fauna to consist of midges and a few mayflies. The 1986 survey showed the benthic community to consist of midges, a few stoneflies, and mayflies. Only about half of the biological diversity in the South Fork of the Coeur d'Alene upstream of the Site can be found within the Site.

Fish. Water quality problems in the South Fork of the Coeur d'Alene River have adversely affected fishes, and human consumption of fish from the Site downstream to Lake Coeur d'Alene (including the lateral lakes) should be limited to 2½ pounds per week. EPA studies in the mid-1980's, indicate that toxic conditions were present in the water in localized areas of the Silver Valley, but more recent observations indicate rapid improvement. Within the last decade, Idaho Department of Fish and Game personnel have observed fish seasonally inhabiting portions of the South Fork, especially downstream of Pinehurst, during higher flows. For example, cutthroat trout (*Oncorhynchus clarki*) and chinook salmon (*O. tshawytscha*) now migrate into the South Fork of the Coeur d'Alene River. In the past, poor water quality presented a migration barrier to these species. Consequently, the area downstream of Pinehurst required special fishing regulations due to high concentrations of cutthroat trout, presumably caused by metals-induced inhibition of further passage upstream. Also, kokanee salmon (*O. nerka*) now migrate successfully through the South Fork within the Site.

Wildlife. The Silver Valley supports a variety of game and nongame wildlife. The quality of wildlife habitat in the valley ranges from very good in the North Fork of the Coeur d'Alene River to poor along the South Fork of the Coeur d'Alene River in the Kellogg area. Wildlife populations in the South Fork area have been reduced by activities associated with past mining and milling operations. Populations are recovering on lower slopes but still are severely constrained by the near total absence of vegetation on the valley floor.

Both winter and summer habitats for elk (*Cervus elaphus*), white-tailed deer (*Odocoileus virginianus*), and mule deer (*O. hemionus*) exist in the area. A variety of upland game birds and furbearers also inhabit the Silver Valley.

THE SILVER VALLEY ECONOMY

Demographics

Shoshone County is one of the three Idaho counties that may be described as mining dependent, and the only one in north Idaho. All three of these counties lost a substantial portion of their population to out-migration in the 1980s. Shoshone County lost 27% of its population between 1980 and 1988; 14,700 people remained in 1988. In 1987, 30% of the population was less than 18 years old, and 11% was more than 65 years old; both figures are quite close to the statewide average. Per capita income was $10,127 in 1987, which is 65% of the U.S. average; the statewide average was $11,891, or 77% of the U.S. average. Between 1979 and 1988, almost 44.8% of the jobs in Shoshone County disappeared (a total of 3,398 jobs). Not surprisingly, the county has one of the states highest unemployment rates; at 11.5% in 1988, it was well above the statewide average of 5.9%. However, Shoshone County has one of the state's lowest percentages of families below the poverty level (7.9% compared to the statewide average of 9.6%). The median housing value in Shoshone County ($29,200 in 1980) was the lowest in Idaho. (All figures are from *Rural Profile of Idaho*, a cooperative publication of the Idaho Division of Financial Management, Boise, Idaho, 1990.)

Since these latest figures were published, there have been additional layoffs in Silver Valley mines. Tourism has been revitalized with the completion of the Silver Mountain gondola based in Kellogg; providing skiers, other recreation enthusiasts, and tourists access to the scenic Coeur d'Alene mountains. The gondola began operating in 1990, and use has so far exceeded projected figures. Some tourism-related jobs have been created.

Economic Base Model

This section is condensed from the work of Robison and Katzer (1991). An economic model of the Silver Valley was prepared as part of the pulp mill feasibility study. In building the model, data on the historic and current economic base of the area was compiled. The most current data available were for 1987. The model is available for planning purposes and can be used to analyze options for economic development in the Silver Valley.

Economic activity in Shoshone County is centered in Kellogg and Wallace. Environmentally, the two community economies are quite similar, with Kellogg slightly larger. In 1987, Kellogg provided 2,688 jobs, and Wallace 2,027 jobs. Kellogg provided some $55 million and Wallace some $42 million in wage, salary and proprietary income. In 1987, mining directly provided roughly a third (33%) of all Kellogg jobs, and nearly half (49%) of all Kellogg income. Comparable figures for Wallace mining activity were 36% and 52%. When all trade linkages and the respending of consumer and business income are incorporated, Kellogg mines accounted for nearly 63% of all Kellogg employment were approximately 71% of all Kellogg income. Comparable figures for Wallace mining activity were 62% and 72%.

Tourism, or more generally "visitor-serving industry," directly and indirectly accounted for approximately 8% of all Kellogg jobs and 5% of all Kellogg income in 1987.

Comparable figures for Wallace were 11% and 7%. Tourism is one of Idaho's leading growth industries and without a doubt these figures have increased significantly since 1987. Tourism will almost certainly play an important role in the future diversification of the Silver Valley economy.

The economies of Kellogg and Wallace exhibit a substantial degree of interdependence. In the case of Kellogg, 6% of all employment and income is dependent on economic activity at Wallace. For Wallace, 9% of all employment and 10% of all income is linked to economic activity at Kellogg.

PULP AND PAPER MILL RESOURCE REQUIREMENTS

This section is condensed from the work of Campbell (1991). The pulp and paper industry is one of the largest and most important industries in the world. Demand for paper is high and is projected to increase well into the future. The pulp and paper industry is capital, land, water, and energy intensive. In order to gain economies of scale and lower production costs, mills need to produce 200 to 1,000 tons of paper per day.

Numerous types of pulping processes have been developed to produce the wide range of paper products presently available. They range from simple and relatively inexpensive mechanical processes to complex and expensive chemical treatments. Mechanical processes give a high yield of 90-95%, but result in weak, off-white fibers that are difficult to bleach and undergo color reversion. An advantage of these fibers is that they have good printing characteristics and a low cost. Examples of mechanical pulping processes include the stone ground process, refiner mechanical process, and thermomechanical process, or TMP.

Hybrid pulping processes use a combination of chemical and mechanical treatments, have a yield of 55-90%, and produce an intermediate quality pulp. Examples include chemithermomechanical pulp (CTMP) which also may be bleached (BCTMP), neutral sulfite semichemical, and high yield kraft.

Chemical pulping selectively removes lignin from the fibers using chemicals and heat. They provide a low yield of 40-55% but produce strong fibers that can be bleached to high brightness. Chemical processes have several disadvantages compared to mechanical processes. These include low yield, high production costs, and environmental problems. For these reasons, most new mills being built worldwide are mechanical pulp mills (TMP or CTMP).

Mechanical Pulping Processes

Mechanical pulping processes, particularly TMP and CTMP, are in a phase of rapid expansion. New products and markets are being developed and major technical advancements are occurring. In the TMP process, chips are heated with steam to soften the lignin and then mechanically refined to fibers. In the CTMP process, the chips are impregnated with chemicals such as sodium sulfite or sodium hydroxide then steamed and refined. CTMP produces the strongest mechanical pulp with soft, flexible fibers because the chemical treatment facilitates fiber separation and reduces fines. This high yield pulp can substitute for some chemical pulps.

A typical process sequence for a BCTMP (Bleached Chemi-Thermo-Mechanical Pulp) mechanical pulp mill is as follows. First, wood chips are chemically impregnated and steamed. The softened chips are then sent to primary, pressurized refiners which produce individual fibers. Then, the fibers go to secondary, pressurized refiners which fibrillate the fiber wall and increase the surface area and ultimate strength of the pulp. The fibrillated fibers are then screened to remove oversized rejects. The rejects are further refined and then incorporated into the process flow. The fibers are cleaned, thickened, and stored. The pulp is bleached and then sent to the paper machine.

Mechanical pulps go into a variety of products including newsprint, directory paper, light weight coated grades, sanitary paper, fluff pulp for diapers, printing/writing paper, and tissue paper (towels and napkins). Mechanical pulps are being substituted more and more for expensive chemical pulps because of the advantages previously mentioned.

Economics of Mechanical Pulp Mills. The production of mechanical pulps has grown rapidly since 1982 and is projected to increase. The rapid expansion of the pulp and paper industry into mechanical pulping demonstrates an optimistic future view for mechanical pulps. With the current expansion in the mechanical pulping field and rapid capacity increases from new mills, it is difficult to project future needs and return on investment for mechanical paper products. Extensive marketing research is needed before building a mill as the market could become saturated before the planned mills come on-line.

Resource Requirements

Mechanical pulping processes typically use and discharge 1 to 7 million gallons of water per day depending on the pulping process and the size of the mill, usually measured in tons per day of output (5,000 to 7,000 gallons of water per ton). Mill wastewater or mill effluent is first clarified and then biologically treated. Untreated mechanical effluents have a high biological oxygen demand (BOD), high fines (particulate matter), and high toxic extractives (resin acids). Biologically treated effluent typically meets regulatory requirements ***but requires substantial dilution before its discharge into receiving waters***. Some water quality problems have been associated .vith mechanical pulp mills, but with appropriate biological treatment methods and dilution, the environmental effects can be minimized.

Mechanical pulping processes use large quantities of energy for mechanically fragmenting the pulp into fibers. Refining is commonly done in 1,600 kilowatts/hour (kwh) refiners in which 2,000 to 3,000 kwh/ton are consumed for TMP and CTMP. The steam produced during refining is commonly recycled to the paper machine and used to dry the paper.

The wood species or species mix must be carefully chosen and monitored to ensure the fresh, white, bright wood required for mechanical processes. Typical species include spruce, fir, pine, aspen and eucalyptus. Mechanical pulpmill production rates of 200-600 tons per day require 220-660 tons of wood per day based on a 91% average yield.

ENVIRONMENTAL ASPECTS OF A PULP AND PAPER MILL IN THE SILVER VALLEY

This section is condensed from the work of Falter, Bennett, and Sawle (1991). Environmental impacts were based on a BCTMP mill of 535 metric tons per day of pulp production output with water demand of 4.8 cfs (3.1 million gal/day), the same as the newsprint mill near Usk, Washington. This results in an effluent volume of 4.5 cfs (2.9 million gal/day) discharged to receiving waters. Standards for industrial effluent quality require that both the five-day Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS) not exceed 30 mg/l. The following projections assume a degree of treatment to achieve those standards as exhibited by the Ponderay Newsprint mill near Usk, Washington, and the Inland Empire Paper Co. mill near Spokane, Washington. These analyses also assume the following conditions in the receiving waters in September, the time of limiting water flow and therefore water quality because of the dilution requirement.

	Coeur d'Alene River	
	South Fork (Pinehurst)	North Fork
Temperature (°C)	18	18
Dissolved Oxygen	Saturation	Saturation
BOD_5 (mg/l)	2	1
TSS (mg/l)	1	1
Total Phosphorus (mg/l)	0.090	0.015
Total Resin Acids (mg/l)	0	0

Idaho Water Quality Standards consider the South Fork to be protected for agricultural water supply and secondary contact recreation. The North Fork is protected for agricultural water supply, coldwater biota rearing, and primary as well as secondary contact recreation. With respect to parameters covered in the effluent standards, the coldwater biota rearing classification is the most stringent and will be the basis for comparison of receiving waters to Idaho Water Quality Standards.

Effluent Dilution

Water demand for the pulp and paper mill operation would be 5.0% of September South Fork flow (98.5 cfs or 63.8 million gal/day) or 1.7% of the North Fork flow. The effluent would have a dilution of 22:1 (4.6%) in South Fork receiving waters and 65:1 (1.5%) in North Fork waters. ***This is probably inadequate to meet water quality standards.*** A 4.5 cfs (2.9 million gal/day) effluent (at 32°C) discharging into the South Fork of the Coeur d'Alene River would result in a temperature increase to 18.6°C. Fall and winter temperature increases would be comparable. Discharge to the North Fork would be at a 65:1 dilution in September, resulting in a temperature increase to 18.2°C. Idaho Water Quality Standards limit temperatures in streams protected for cold water biota to a daily average temperature of 19°C.

Organic load of the effluent is best expressed by BOD_5. New Source Effluent Standards for Idaho limit BOD_5 to 30 mg/l in the treated effluent. The addition of treated effluent to the receiving waters in September will result in a BOD_5 of 3.3 mg/l in the South Fork (increase of 65%) or 2.5 mg/l in the North Fork (increase of 25%). It is likely that significant oxygen depletion would occur in each stream in summer and fall from the increased organic loading at temperatures greater than 15°C. August TSS would be 2.3 mg/l in the South Fork (130% increase) or 1.5 mg/l in the North Fork (50% increase) after dilution of mill effluent. Total phosphorus concentration in the treated effluent is estimated to be 4.0 mg/l. Discharge to the South Fork would give a final concentration of 0.27 mg/l (200% increase) or 0.075 mg/l in the North Fork (408% increase). Idaho Water Quality Standards do not mandate total phosphorus concentrations, but those increases would send either receiving stream into a grossly overloaded phosphorus condition which would likely cause heavy growths of algae. Recovering metals-loaded streams (such as the South Fork and the lateral lakes along the lower Coeur d'Alene River) are characteristically prone to algae blooms because the partial metals toxicity inhibits some species, but releases others.

Although temperature and TSS standards would be met, minimum water flows in the South Fork of the Coeur d'Alene River will not provide enough water to dilute mill effluents to the recommended 100:1 standard.

BCTMP pulp effluent is potentially toxic to aquatic organisms due to a high resin acid content. Raw, untreated effluent would carry a resin acid content of 50 to 200 mg/l. A high level of secondary treatment such as that now provided by the Ponderay Newsprint mill should reduce resin acids to less than 0.5 mg/l. After dilution, measurable effects of effluent toxicity should not be detectable in the receiving stream. Toxicity of other components of treated effluent is insignificant compared to that of resin acids.

Wetland Treatment of Effluent

Organic and nutrient loading to either the South Fork or the North Fork of the Coeur d'Alene River appear to be the principal limiting factors to the discharge of pulp mill effluent. That limitation could be overcome with wetland treatment to polish mill wastewaters before returning them to the river. Artificial wetlands have been successfully used to remove suspended solids, organic toxicants, and metals from wastewaters. This approach is most successful when used as a final polishing step on secondary-treated wastewaters. Reduction of pollutants is achieved by natural wetland processes, including pollutant filtration, assimilation by plants, sedimentation, and microbial breakdown. In the anaerobic soils of wetlands, nitrogen is removed by denitrification and subsequent release of nitrogen gas. Phosphorus is removed by adsorption to soil particles, precipitation reactions, and plant uptake. Bound phosphorus may, however, be released to the water column under anaerobic conditions, causing the wetland to become a source of phosphorus. However, this can be overcome by an active program to keep wetland sediments alkaline and high in calcium and aluminum, and by operating the wetlands at low effluent loading rates. Harvesting emergent vegetation once or twice during the growing season can sustain nitrogen and phosphorus removal rates of more than 90%. Suspended solids removal will approach 100% under those conditions.

Careful control of hydraulic loading coupled with vegetation harvest is required to achieve sustained, effective operation of wastewater polishing in wetlands. Retention times of one-half day to 12 days have been tested, and optimal treatment was obtained in 5 days. Assuming a waste stream of 5 cfs, depth of 2 feet, and a 5-day retention time; a wetland of 25 surface acres would be required to efficiently treat secondary wastes. Efficiency would decline in winter months, requiring either longer retention time or storage of effluent. One-half of the winter effluent could be stored in a lagoon of 25 surface acres and 18 feet deep. Lining the wetland and storage lagoon would be required to prevent the upward migration of toxic subsurface metals. However, winter storage may not be necessary if water flows are adequate to meet effluent dilution standards at that time.

Wetland soils and emergent vegetation serve as traps for heavy metals if vegetation is harvested often enough to prevent development of anaerobic conditions. Emergent vegetation has the capability to absorb these metals from the sediment and store very high concentrations in their tissues. These plant systems represent biological pumps that can easily mobilize metals otherwise permanently stored in sediments and release them into biological systems. Better than 95% reduction of heavy metals from effluents may be achieved with vegetation harvest and removal from the wetlands. Harvested vegetation could be commercially processed to remove concentrated metals and composted. Composted vegetation would be a valuable soil amendment to restore topsoil in the Silver Valley and help trap metals in the subsoil layers.

Wetland treatment of mill effluent may have some negative aspects. Such a wetland could act as an ecological trap for migrating waterfowl. This can be mitigated through intensive management, including frequent vegetation harvest and harassment of waterfowl to discourage their use of the wetland.

Two additional items related to mill effluent need to be addressed, but both are beyond the scope of this study. First, an alternative to wetlands treatment of effluent would be the construction of a storage reservoir to supplement water flows for dilution purposes. However, many of the soils of the area are not suitable for reservoir construction. The second would be the effects of mill effluent on Lake Coeur d'Alene, approximately 20 miles downstream from Pinehurst.

WOOD RESIDUE AVAILABILITY IN THE REGION

This section is condensed from the work of Keegan and Blatner (1991). Mill residue from the lumber and plywood industry would likely be the major source of wood fiber for a pulp mill in the Silver Valley. Mill residues are also an important source of energy used to dry wood products, provide heat, generate electricity, and produce reconstituted fuel pellets. Although demand for mill residue in the region has increased greatly since 1985, considerable interest in expanding the use of mill residue still exists. Much of this interest stems from the record levels of lumber production in the late 1980s and resultant surpluses of mill residue.

Residue Availability Scenarios

Estimates of the quantity or supply of mill residue available in northeastern Washington, Idaho, and Montana were made based on various levels of lumber and plywood output. Consumption was estimated based on the projected need of facilities using wood fiber residue from lumber and plywood manufacture. Four levels of supply were examined. In the three year period from 1986 to 1988, the production of lumber and plywood reached record levels in the region. Given current timber supply constraints, it appears that future sawmill and plywood production cannot be sustained at 1986-1988 levels. For this reason, 1986-1988 levels were used as the upper bound and three additional amounts of production were analyzed: 90, 80, and 70 percent of 1986-1988 levels.

Given current demand, it appears that surpluses of mill residue would exist if lumber and plywood production can be maintained at or near the record levels achieved in 1986-1988. Much of the surplus is currently being purchased by mills outside the region. However, substantial deficits of all types of mill residues could be expected with even modest declines in lumber and plywood production:

- At 90 percent of 1986-1988 levels of lumber and plywood production, there would be an excess of mill residue over the volume needed to sustain current users of mill residues at projected use levels. The surplus would consist of an estimated 345,000 cunits (one cunit = 100 cubic feet) of chippable coarse mill residue and 229,000 cunits of fine residue (sawdust) and planer shavings and bark.

- At 80 percent of 1986-1988 production levels, the volume of mill residue available would not be adequate to meet the needs of current users in the region. The estimated deficit would be approximately 67,000 cunits of coarse mill residue and 159,000 cunits of fine residue and bark.

- At 70 percent of 1986-1988 production levels, the estimated deficit of mill residue would be even greater: approximately 126,000 cunits of coarse mill residue and 164,000 cunits of fine residue and bark.

Roundwood Source Problems

Roundwood (small diameter logs) may be an alternative source of wood fiber for a pulp mill in the Silver Valley. However, the availability of roundwood in the region is highly uncertain, requiring a regional timber market analysis that goes beyond the scope of this project. Suffice it to say that the house log market in north Idaho and western Montana uses substantial quantities of small diameter logs that might otherwise be available as pulpwood. Pressure from many sources to limit timber harvests from national forests promises to reduce roundwood availability substantially. The potential sources for additional marketable roundwood are therefore on private nonindustrial lands and tribal lands. Analysts have little information about future timber availability from either of these groups of timberland owners. All that can be said is that current market demand for their timber will increase as the availability of national forest timber decreases.

ENERGY SUPPLY ALTERNATIVES IN THE SILVER VALLEY

This section is condensed from the work of Lyman (1991). Two energy supply alternatives were considered: [1] existing electricity and natural gas supplies, and [2] the circumstances under which cogeneration or small power production facilities might be expected to emerge and contract with area utilities as part of mill development. Sources for further inquiry on either of these topics were identified.

In general, development in the Silver Valley would be expected to involve forest products and recreation/tourism industries. The energy that might be required for development of these industries would principally involve electric power and natural gas. The expected quantity of electrical consumption requirements would not present a problem. The Washington Water Power Company is the principle utility in the region and feels that it has the capacity to meet both natural gas and electric power demands easily. Alternatively, the possibility exists for municipalities to manage their own distribution systems and operate as publicly owned utilities. Such systems would have to negotiate with the Bonneville Power Administration who would then, under an existing arrangement with The Washington Water Power Co., have power "wheeled" in at a wholesale rate equivalent to what other "publicly owned" customers currently pay. Such an alternative, however, would involve a substantial undertaking and would have to be investigated carefully.

Commercial or industrial development in connection with the Superfund cleanup solution in the Silver Valley area would probably want to rely on contracts for the supply of natural gas and electricity through the Washington Water Power Company. Alternative arrangements involving the development or expansion of municipally owned and operated distribution systems with "wheeling" contracts for supply from the Bonneville Power Administration would be major undertakings requiring careful study.

Industrial or commercial development incorporating cogeneration facilities are probably an unlikely prospect at this stage. At present, recreation/tourism and forest products developments may not produce sufficient thermal output to make cogeneration feasible.

It is very possible that waste products involving biomass from sawmills (mill residues) could make feasible the construction and operation of a small power production facility that would qualify under the Public Utility Regulatory Policies Act of 1978 as a facility that could sell electricity to The Washington Water Power Company. Because the area is a major corridor for east-west traffic with destination outside of Idaho on Interstate 90, other alternatives might materialize, but it is not clear what such development might involve. The Silver Valley is not an obvious location for commercial and industrial development associated or pulled by proximity to markets. The nearest urban areas are Coeur d'Alene, Idaho, and Spokane, Washington. Small power production facilities employing biomass may be a realistic component of near-term development. If biomass or waste products from mills in the region are expected to be available in reasonable quantities, the feasibility of a qualifying facility should be a candidate for an in-depth study.

POTENTIAL LIABILITY ON HAZARDOUS WASTE PROPERTY IN THE SILVER VALLEY

This section is condensed from the work of Turner (1991), a member of the Idaho Bar. It is not intended as legal advice, but as an overview of the pitfalls of conducting any kind of activity on a Superfund Site.

Industrial growth has the potential to improve the metals toxicity situation currently stagnating Silver Valley development. Suggested activities include: the construction of surface or groundwater pre-treatment facilities for industrial process water, use of industrial waste water treatment facilities in the form of metal-binding wetlands, paving around industrial buildings to suppress dust, reclamation of marginally inhabitable land, and revegetation and soil building using industrial wood wastes.

To the extent that such activities involve corporate purchase of real estate, i.e., business property, there is a high potential for liability under federal and state environmental law. ***Contaminated property, like a tar baby, attaches liability to buyers, sellers, agents, and lenders as well as past owners regardless of guilt or innocence.*** It must be recognized that liability is not avoided by innocence or good intentions; and that environmental law is designed not to be fair, but to be effective.

In addition to the full panoply of ordinary environmental law -- both federal and state -- prospective operators on the Superfund Site must comply with the added requirements of the EPA. The following material outlines the basic environmental law as it may relate to a business decision to locate a facility on or near the Bunker Hill Site.

Liability: The Dark Cloud

Hazardous Waste Law. Modern environmental law is a complex of common law remedies -- primarily nuisance, trespass, and strict liability -- which form the basis for federal and state statutes and the rules and regulations of various administrative agencies. The law provides for pollution prevention, pollution regulation and control, and cleanup of pollutants already released into the environment.

The basic rule governing liability for hazardous wastes is "Polluters Pay." Current owners and operators of hazardous waste sites and those who have contributed to the contamination are potentially responsible parties (PRPs), liable for the costs of damages to natural resources, persons, and property as well as the costs of cleanup. Theories of recovery include common law nuisance, trespass, and strict liability as well as statutory violations of the Clean Water Act, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the 1986 Superfund Amendment and Reauthorization Act (SARA), and the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA). Additionally, state statutory counterparts such as the Idaho Waste Management Act of 1983 and the Environmental Protection and Health Act of 1972 apply. These laws may be enforced individually or in combination against past and present owners and operators of a hazardous waste site and those who transported contaminants to the site. Idaho has effectively combined statutory and common law theories to recover costs of responding to actual and threatened releases of hazardous substances and any resulting natural resource damages.

Environmental Law and the Business Location Decision. The choice of the site on which to locate a business has long been a key factor contributing to a firm's economic success. The business location decision has traditionally been based on such criteria as proximity of resources, distance to markets, characteristics of labor forces, and compliance with land use restrictions and zoning ordinances. Environmental law makes the picture more complex, and the completion of an environmental checklist involving professional environmental and legal consultants is not only prudent but also may be a prerequisite to obtain financing.

In addition, the owner of contaminated property must be concerned with potential liability for the past acts of prior owners. Under CERCLA -- the Superfund law -- the current owner and all parties in the chain of title are PRPs who may be held jointly liable for the costs of removal of hazardous wastes from the site and for natural resource damages off the site.

Business location decision makers should recognize some pertinent facts about the Superfund. First, it applies to any hazardous waste site, not just those major sites listed on the National Priorities List, such as the Bunker Hill Site in the Silver Valley. Second, the costs of cleaning up Superfund Sites are increasing because the standards are more stringent than in the past. The consequence of this for PRPs is that their liability is likely to be more costly in the future. Third, more litigation is predicted for several reasons: 1) the number of Superfund Sites is expected to increase, 2) cleanup costs are increasing, 3) EPA enforcement actions are becoming more stringent, 4) the statutory right of contribution is applied, and 5) new citizen suit provisions are being used to bring action against polluters. Finally, Superfund law (CERCLA) is narrowly interpreted.

Avoiding Liability

The dark cloud of liability cast by CERCLA overshadows the hazardous waste sites of the nation and has established a trust fund ("Superfund") for government cleanup. However, before the government will expend monies from the Superfund, it seeks to finance cleanup operations and recover expenditures from the PRPs. CERCLA is applied to real property and governs the liability for release or threatened release of hazardous substances from a facility into the environment.

It is difficult for a PRP to hide from CERCLA behind a corporate veil or partnership shield. Furthermore, there are numerous requirements for environmental disclosure promulgated by the Securities and Exchange Commission (SEC), and communication between the EPA and the SEC with respect to management's discussion and analysis of financial conditions of corporations. Environmental disclosure required under the Securities and Exchange Act is specifically to include: (1) the existence and nature of pending environmental litigation; and (2) instances in which compliance with environmental laws may necessitate significant capital outlays, may materially affect the earning power of the business, or cause material changes in the business done by the registrant.

EPA Guidance to Prospective Purchasers of Contaminated Property. The EPA has received a number of requests from prospective purchasers of contaminated property for a covenant not to sue. Any prospective purchaser agreement involving a covenant not to sue requires the concurrence of high-level EPA officials and the assistant attorney general.

The burden of proof on the landowner is that by a preponderance of the evidence it must be demonstrated or established:

(1) that the release of hazardous waste and damages were caused solely by a third party who was neither an employee, an agent, nor anyone who was in a direct or indirect contractual relationship with the defendant,
(2) that the landowner exercised due care with respect to the hazardous substance, and
(3) that the landowner took precautions against foreseeable acts or omissions of any such third party.

Under SARA the agency's position is that a real estate deed represents a contractual relationship. Therefore, the defendant who acquired a facility is required to demonstrate:

(1) that the defendant did not know and had no reason to know that there was any hazardous substance released or threatened to be released on the property or,
(2) that the defendant is a government entity which acquired the facility involuntarily or by imminent domain or,
(3) that the defendant acquired the facility by inheritance.

The EPA policy in general provides a very limited escape from liability, but opportunities to settle out of court exist. If all appropriate inquiry has been made, then the landowner may be found to not have constructive or actual knowledge and may be eligible for a *de minimis* settlement.

Thus, a wood products industry or even a wetlands experiment operating on or adjacent to the Superfund site will probably be held to the highest standard of the law because the owner or operator would have known that there is a hazard in the area. The owner or operator may be held liable for the cost of clean up; they may, however, be eligible for *de minimis* settlements if they do not hold any position of management in a facility.

Criteria for a covenant not to sue. The EPA recognizes that a covenant not to sue may provide an environmental benefit and has set forth a number of criteria that have to be met before the agency will enter into the covenant. A brief overview of the minimum standards as they apply to the Silver Valley follows:

(1) An enforcement action is anticipated by the agency at the Superfund Site. (Enforcement action is underway at Bunker Hill.)

(2) A substantial benefit, otherwise unavailable, will be received by the agency for cleanup.

(3) With the exercise of due care, the continued operation of a facility (or new site development), will not aggravate or contribute to the existing contamination, or interfere with the remedy.

(4) Due consideration must be given to the effect of continued operations, or new development, on health risks to those persons likely to be present at the site.

(5) The prospective purchaser must be financially viable.

Components of a covenant not to sue. If all the criteria outlined above are met and the agency determines that the agreement would be in the public interest, then the covenant will be embodied in an agreement executed by the regional administrator, with concurrence of the attorney general and, where appropriate, the current owner of the facility.

Components of a covenant not to sue include:

(1) The purchaser must agree not to assert any claims against the United States or the Superfund arising from contamination of the facility.

(2) The agreement also has to contain an irrevocable right of entry to the EPA, its response action contractors, and others involved in response actions under agency oversight.

(3) The EPA reserves certain rights; including the right to assert claims against the prospective purchaser for any release for which he is responsible.

(4) The agreement may not restrict the nature of the response actions that the agency can undertake.

(5) The agreement should provide that the purchaser is subject to all federal and state regulations and acknowledges the duty to exercise due care.

(6) A disclaimer must be made stating that the EPA does not declare the property fit for any particular purpose, that a facility is any way safe to occupy, or that there is no risk to human health or the environment.

Once the above criteria have been met and the agreement has been made, EPA officials must approve the action. Those officials include the assistant administrator for enforcement and compliance monitoring and the assistant administrator for solid waste and emergency response. In addition, the assistant attorney general must concur.

In August, 1989, the EPA entered into an agreement and covenant not to sue regarding the Kellogg Gondola project located within the Bunker Hill Site. The EPA determined that the construction "with the exercise of due care, will likely have a beneficial environmental effect due to encapsulation of contaminated soils, and will not likely aggravate or contribute to the existing contamination or interfere with any long-term remedial actions at the site." The gondola began operations in June, 1990.

Approaches to Developing Hazardous Waste Property

Four approaches to the development of properties containing hazardous wastes are suggested and ranked with respect to risk management. None of them could be legally construed to be a silver lining in the dark cloud of liability for hazardous waste cleanup.

(1) No Involvement, No Risk. The best approach from the standpoint of minimizing liability is to avoid any involvement in any property suspected of having hazardous wastes on it. In order to effect development in the area, the prospective purchaser should demonstrate the financial ability to pay for any cleanup that may be incident to his own operations. At the same time, the buyer and the lender should be assured of the ability of the seller to pay.

(2) The Gondola Project Approach. The second option is to conduct an operation similar to that of the gondola project previously discussed. Here the buyer must assure the government that there will be a benefit to the government; usually a cash contribution, but a cleanup operation may suffice. The risk inherent in this approach is that the owner or operator of the facility is responsible for any disturbance that results in or threatens a release of hazardous materials into the environment. In this option, the owner or operator is subject to the full range of CERCLA liability discussed earlier.

(3) PRP Pooling. This is a full risk option. Here the buyer purchases property without taking into account any potential hazards or liability that may be associated with the property. Under this approach, purchasers or others with a property interest in a project would be pooled with other potentially responsible parties. Extreme caution is required in that it is possible for any party to innocently, unknowingly, or inadvertently become liable for the costs of recovery.

(4) The Toxic Waste Disposal Site Approach. This option is to become a toxic waste treatment and disposal facility. The requirements of this option are specified under RCRA. This level of involvement would require detailed application and approval procedures under EPA rules.

CONCLUSIONS

The study team does not feel that the Silver Valley is a feasible site for a pulp and paper mill, primarily because of the lack of a sufficient quantity of water to dilute treated pulpmill effluent (Table 1). It appears to be technically feasible to construct an artificial wetlands area of at least 25 acres to provide a final polish on treated pulpmill effluent, and during the winter store treated effluent in a 25-acre lagoon. However, thorny liability questions arise with such a project, and the operator of a wetland experiment could get stuck by the Superfund liability "tar-baby" as could the operator of any activity in the Bunker Hill Site.

Questions of wood fiber availability and community acceptance are important but moot. Without a sufficient quantity of effluent ***dilution*** water, a pulp mill is not a realistic project. However, as Table 1 indicates, if mill residues are the main fiber source, the high production levels of 1986-88 would have to be maintained for adequate mill residues to be available, and there is no guarantee that those residues would stay in the region. No assessment of roundwood available for harvest in the area was made, but it is a highly competitive and uncertain market.

Table 1. Resource requirements and their estimated availability for a BCTMP (mechanical process) greenfield pulp and paper mill in the Silver Valley, Idaho.

RESOURCE	REQUIRED	AVAILABLE
Wood Fiber	660 tons/day[a]	
Mill residue availability:		
at 100% of 1986-88 level...>		1,586 tons/day[b]
at 90% of 1986-88 level...>		945 tons/day[b]
at 80% of 1986-88 level...>		***-183 tons/day***[c]
Process Water (for pulping)	3 million gal/day	64 million gal/day[d] 25 million gal/day[e]
Dilution Water (effluent treatment at 100:1)	300 million gal/day	***64 million gal/day***[d] ***25 million gal/day***[e]
Electricity	3,000 kwh/ton	available
Personnel	158	available

[a] Assuming output of 535 metric tons (600 U.S. tons) of pulp per day and 90% yield.
[b] Excess chippable coarse mill residue available for a new pulp and paper mill after all current uses of mill residues have been satisfied.
[c] Deficit unavailable to meet all current uses of mill residues.
[d] South Fork of the Coeur d'Alene River, Pinehurst *mean* annual September flows.
[e] South Fork of the Coeur d'Alene River, Pinehurst *minimum* September flow.

Recreational development focused on the Silver Mountain gondola is proceeding apace. Although this study focused on the feasibility of developing a pulp and paper mill, the economic model developed is capable of analyzing economic impacts based on recreation and tourism. These activities will undoubtedly play a key role in the future of the Silver Valley.

A wood-fired power plant may be a feasible project for the Silver Valley. However, fiber availability from mill residues depends on sustaining the high levels of lumber and plywood production of the late 1980s, and air pollution concerns would need to be carefully addressed.

Any enterprise considering a location in the Silver Valley Superfund Site must be fully aware of potential liability for cleanup of the Bunker Hill smelter and surrounding area. This liability is a dark and gloomy cloud, but it is possible to negotiate an agreement for relief from Superfund liability with the EPA, as was done for the Kellogg gondola project. The Superfund program is designed to clean up contaminated areas. Other things, such as economic development or research on experimental remediation techniques, are not part of the Superfund program.

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