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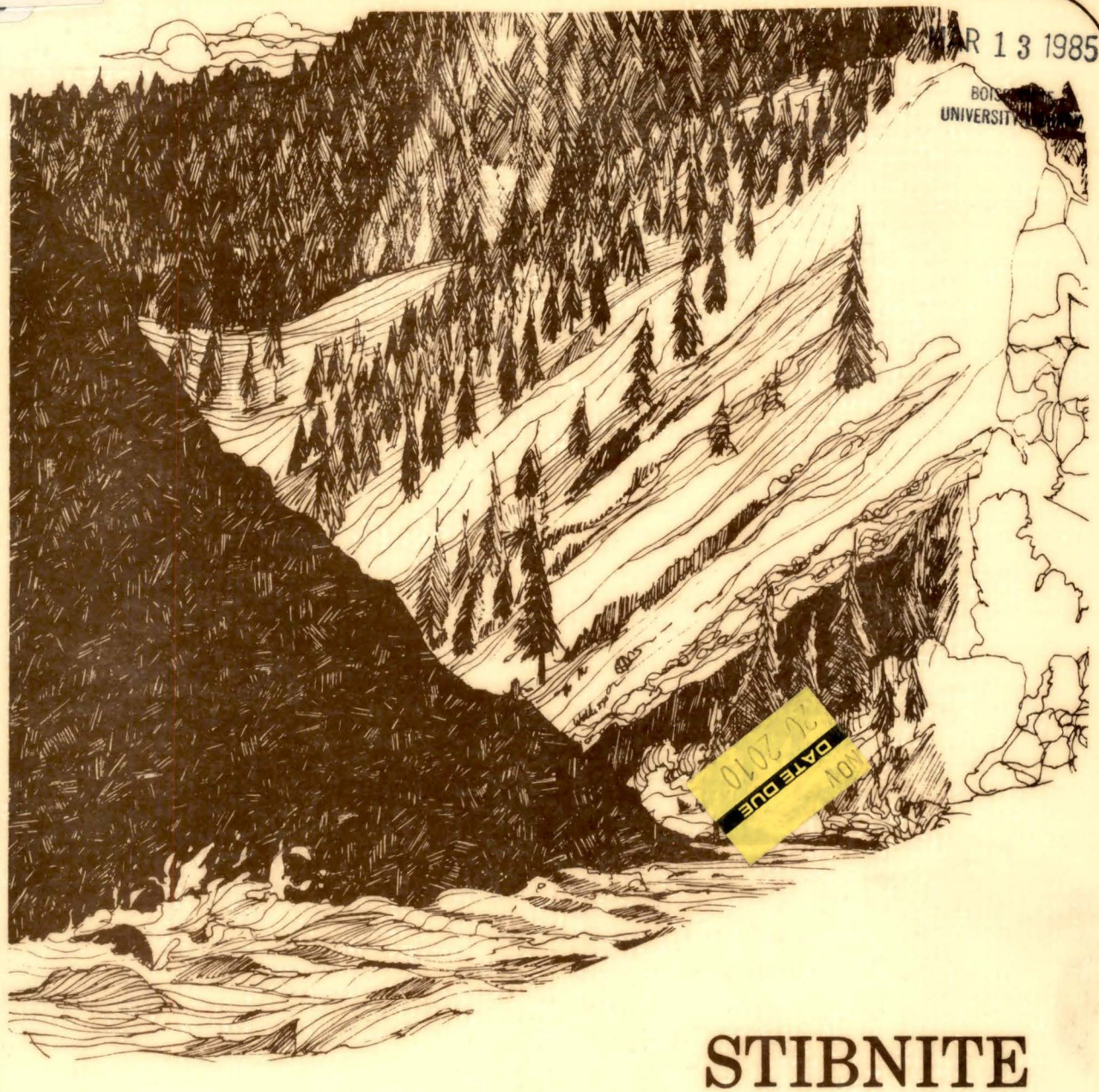
FINAL ENVIRONMENTAL IMPACT STATEMENT



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STIBNITE MINING PROJECT

GOLD MINE AND MILL

MAY, 1981

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PREPARED FOR:

PAYETTE NATIONAL FOREST
REGION FOUR
USDA FOREST SERVICE

BY JAMES M.MONTGOMERY, CONSULTING ENGINEERS

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

COMMON ABBREVIATIONS

Au	Gold
cfs	Cubic Feet Per Second
DEIS	Draft Environmental Impact Statement
DRI	Desert Research Institute
CEQ	Concil on Environmental Quality
CSM	Canadian Superior Mining (U.S.), LTD.
CSWRB	California State Water Resources Board
EFSF	East Fork of South Fork
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FS	Forest Service
JMM	James M. Montgomery, Consulting Engineers, Inc.
IDF&G	Idaho Department of Fish and Game
IDHW	Idaho Department of Health and Welfare
IDL	Idaho Department of Lands
IDWR	Idaho Department of Water Resources
IORDA	Ida-Ore Regional Development Association
IWRB	Idaho Water Resources Board
Mg/l	Milligrams Per Liter
µg/g	Micrograms Per Gram
NEPA	National Environmental Policy Act
NTL	Northern Testing Laboratories
PSD	Prevention of Significant Deterioration
RCA	Richard Carothers Associates
RVD	Recreational Visitor Days
SHPO	State Historic Preservation Officer
SPCCP	Spill Prevention Control Countermeasure Plan
TSP	Total Suspended Particulates
USGS	United States Geological Survey
V.A.C.	Visual Absorption Capability
V.Q.O.	Visual Quality Objective

Copies of all source documents and references are available for review at the following locations.

U.S. Dept. of Agriculture, Forest Service
Big Creek Ranger District Office
Payette National Forest
McCall, Idaho 83638
(208) 634-2255

James M. Montgomery,
Consulting Engineers, Inc.
1301 Vista Avenue
Boise, Idaho 83705
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RECORD OF DECISION

Stibnite Mining Project Gold Mine & Mill
Final Environmental Impact Statement
Valley County, Idaho
USDA - Forest Service
Payette National Forest

Based on the analysis and evaluation in the Final Environmental Impact Statement for the Stibnite Mining Project, it is my decision to adopt a modified version of Alternative 5 involving a reduced West End waste dump. This alternative will be used in development of the detailed final operating plan for the project.

Six alternatives were evaluated, including the No Action alternative, which would not allow development of the project. The range of alternatives considered was limited by efforts to confine the project facilities to the Stibnite area in order that potential environmental impacts would be minimized. The five action alternatives differ from each other in the location of various elements such as waste rock disposal areas, processing facilities, and haul roads, and in provisions for stabilizing the existing tailing pile.

The selected alternative is consistent with the Multiple Use Plan for the Payette National Forest, Big Creek Ranger District and will provide the best combination of physical, biological, social, and economic benefits in the affected area and comprise the most practical means to avoid or minimize environmental harm. The modification providing for a reduced West End waste dump will improve the energy efficiency of the project.

The project's Operating Plan, the Final Environmental Impact Statement, and other required permits and approvals will guide the development and operation of the project, and will provide for reasonable and specific mitigation and monitoring requirements. The following is a partial summary list of the major mitigations and monitoring measures taken from these documents and made a part of their decision. Additional stipulations are contained in the parent documents.

1. The capacity of the West End waste dump will not exceed 1.2 million cubic yards over the duration of the project. The areal limitation for the waste dump will be set at 10 acres.

2. Detailed plans and specifications for the West End waste dump will be completed by a licensed engineer and submitted to the Forest Service for review and approval prior to any construction activities.

3. CSM will develop a detailed reclamation plan, as part of the final Operating Plan, for reclamation of all areas on Forest Service guidelines and constraints described in the Environmental Impact Statement. The reclamation plan will also meet the requirements of Title 47, Chapter 15, Idaho Code, Idaho Surface Mining Act.

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4. The reclamation plan will provide for an overall reclamation program for the mine sites, disturbed areas and the existing tailing pile in order to reduce surface wind erosion, total suspended particulate concentrations and sediment production.

5. Water withdrawals for operation of the processing facilities will be coordinated with streamflows and aquatic habitat needs to minimize impacts on the aquatic system. The maximum sustained diversion for a 24 hour period will not exceed 1.2 cfs.

6. Stream channel alterations and mine tailing impoundment structures will meet State of Idaho requirements.

7. A "Spill Prevention and Control Countermeasures Plan" which addresses storage of petroleum products and contingency provisions for coping with emergency spill situations and possible leakage of cyanide compounds will be developed by CSM, as required by the U.S. Environmental Protection Agency.

8. Design criteria for the leaching pads will meet applicable state and federal requirements for no leakage and total containment.

9. The processing facilities and other portions of the mining operation will be fenced to protect humans and wildlife.

10. All hazardous or special wastes (oil and petroleum products) will be removed to an authorized sanitary landfill or approved hazardous waste disposal site. Domestic refuse will also be hauled to an approved landfill.

11. Explosives and potentially hazardous materials will be stored in a manner which conforms to the requirements of the Federal Mine Safety and Health Act.

12. Company employees and contract labor living at Stibnite will be restricted to living in CSM planned and maintained facilities.

13. Housing will meet all applicable Valley County and Health District standards for sewer and water and mobile home parks.

14. CSM will initiate a program to screen the leach pad facilities and maintenance and equipment storage areas to reduce visual impacts.

15. In the event any objects of historical or archeological interest are discovered, mining operations will be halted and the site inspected and inventoried by a qualified professional.

16. A detailed monitoring plan will be jointly prepared by responsible Forest Service officials and CSM as part of the final operating plan. The purpose of the monitoring program is to detect harmful changes in environmental conditions in time to take corrective action.

The basic elements of the required monitoring program will include:

a. Surface Water Flow by means of a gaging station established by CSM at the confluence of the EFSF Salmon River and Sugar Creek. This station will be used to determine critical streamflow measurements.

b. Water Quality measurements in keeping with schedule and sampling stations listed in Appendix C of the EIS.

c. Fish and Aquatic Habitat sampling of biological and core conditions of pre-designated areas of the EFSF Salmon River determined by Forest Service personnel to represent potential salmon spawning areas.

This decision is subject to administrative review (appeal) pursuant to 36 CFR 211.19. A Notice of Appeal must be filed with the Forest Supervisor within 45 days from the date of this Record of Decision. No action to implement this project on National Forest lands will be taken prior to the end of the 45 day period.

Kenneth D. Weyers

KENNETH D. WEYERS
Forest Supervisor
Payette National Forest
McCall, Idaho 83638

FINAL ENVIRONMENTAL IMPACT STATEMENT
STIBNITE PROJECT
GOLD MINE AND MILL
VALLEY COUNTY, IDAHO

Lead Federal Agency	USDA, Forest Service Payette National Forest McCall, Idaho 83638
Responsible Official	Mr. Kenneth D. Weyers Forest Supervisor Payette National Forest
For Further Information Contact	Mr. Earl Dodds, District Ranger Big Creek Ranger District Payette National Forest McCall, Idaho 83638 Phone: (208) 634-2255

Abstract

This Environmental Impact Statement is in response to a Preliminary Operating Plan filed with the Payette National Forest by Canadian Superior Mining, (U.S.) Ltd., to mine and process gold ore at their Stibnite mine properties. The project will include two open pit mines, waste dumps, heap leaching facilities, personnel housing and associated transportation corridors. The project is located in central Idaho near the town of Yellow Pine, and would involve approximately 190 acres of land in the Payette National Forest.

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FINAL ENVIRONMENTAL IMPACT STATEMENT
STIBNITE MINING PROJECT GOLD MINE AND MILL

SUMMARY

DESCRIPTION

This Final Environmental Impact Statement (FEIS) was prepared for the U.S. Department of Agriculture, Forest Service, under a Memorandum of Understanding between the Forest Service and Canadian Superior Mining (U.S.) Ltd. (CSM) for a gold and silver mining and milling operation on the Payette National Forest, Valley County, Idaho. The environmental analysis and resulting EIS were prepared by James M. Montgomery, Consulting Engineers, Inc., Boise, Idaho.

The proposed open pit (surface) mining operation would involve two separate mine sites located 14 miles southeast of Yellow Pine in the Stibnite-Yellow Pine Mining District. A cyanide leaching plant, mine waste dump, processed ore disposal dump, and support facilities including roads, housing complex, maintenance shops, etc. would also be part of the project.

Because of the magnitude of the proposed project, the Forest Service has determined that approval of all pending actions would be a "major federal action likely to have significant effect on the quality of the environment." A decision was made by the Forest Supervisor to prepare an EIS to meet the requirements of the National Environmental Policy Act of 1969 (NEPA) prior to approval of the Operating Plan. This FEIS was prepared in compliance with Council on Environmental Quality Regulations for Implementing Procedural Provisions of NEPA (November 29, 1978); and the Forest Service National Environmental Policy Act Process, Final Implementation Procedures (July 30, 1979).

A number of issues and concerns were raised by private and public individuals, agencies, and organizations during public meetings, scoping sessions, and throughout the course of the project. Canadian Superior Mining, the Forest Service, and resource managers and organizations have also identified positive opportunities associated with implementation of the proposed project. Major issues and concerns raised by the public and governmental agencies include effects of the proposed project on:

- Instream water quality (particularly the potential for increased sediment associated with mining and road construction activities).
- Water quality (the potential for accidental discharge of toxic materials).

- Anadromous and resident fish spawning and rearing habitat (potential increased sediment and flow reductions).
- Toxic substances in fish flesh.
- Soil erosion and mass failure potential.
- Reclamation considerations.
- Availability of public services and utilities at the community of Yellow Pine.

Positive opportunities associated with the project include:

- Stabilization and reclamation of the existing tailing pile.
- Re-establishment of the upper Meadow Creek fishery.
- Increased local employment opportunities.
- Local purchase of goods and services.
- Tax proceeds to Valley County and the State of Idaho.
- Improvements in Yellow Pine's water system.
- Reduction of the balance of payments deficit for the United States, and aid in the country's efforts to attain mineral self-sufficiency.

Management constraints and guidelines and mitigation measures were designed to: provide a framework for avoiding or minimizing adverse environmental effects during the construction, operation and reclamation phases of the project; and to conform to all applicable laws relating to Forest Service activities. Special attention was directed toward: the stabilization and reclamation of the existing tailing pile in order to reduce existing water quality and air quality problems; geotechnical and reclamation guidelines for controlling drainage and reducing erosion, sedimentation potential from the mine areas, waste dumps and roads; proper handling and disposal of toxic chemicals; reducing visual impacts of the project; and minimizing effects on local public services and utilities (i.e., schools, roads, water system). Emphasis of these programs focused on temporary and long-term sedimentation and erosion control techniques at the mine sites, roads and tailing area; and the long term reclamation and revegetation programs at the mine sites, waste dumps, tailing area, and areas affected by road construction activities.

Monitoring programs were designed to measure the effects of project implementation and provide adequate background data in order to develop adequate environmental safeguards. These programs involve surface

water flow measurements, water quality monitoring, fish and aquatic habitat surveys, and public attitudinal surveys.

ALTERNATIVES CONSIDERED

Alternative 1 - Project Proposed by CSM in the "Notice of Intent to Operate: Operating Plan for the Stibnite Project, Canadian Superior Mining (U.S.) Ltd. Alternative"

This option involves mining the West End and Garnet Creek mines over a 10-year period. Mine waste dumps would be located in West End Canyon and adjacent to the Garnet Creek mine. Approximately 2500-3000 tons would be mined each day (150 day operation season). The mine areas would be served by double land haul (60 ft. wide) road systems. The operation would process 400,000 tons of ore annually at the leach plant located at Adkin's Flat, and employ approximately 60 personnel. The majority of the mine work force would be housed at a mobile home subdivision to be located at the Midnight Creek site. Processed ore would be disposed of at the existing tailing pile. This would involve draining of the Meadow Creek pond, and rerouting of Meadow Creek around the tailing pile.

Alternative 2 -No Action Alternative

The No Action Alternative would involve denial of the proposed Stibnite Mining Project by the Forest Service. The Forest Service would not approve CSM's Operating Plan for the Stibnite project. It is recognized that this decision is in direct conflict of the Mining Law of 1872 and 36 CFR 252 which gives the company the right to pursue a reasonable mining operation; and also provides the Forest Service the authority to require or impose reasonable environmental controls and conditions on an operating plan. The No Action Alternative would mean that CSM could not mine either the West End or Garnet Creek deposits. These deposits contain an estimated 3,076,000 tons and 252,000 tons respectively, of gold ore reserves. Predevelopment costs for exploration, metallurgical testing, engineering, environmental studies, and legal agreements and administration which total approximately $2.3 million would not be recovered by the company. An estimated annual payroll of $1.03 million and related purchases and services would not be realized by the local community. The No Action Alternative provides a baseline against which the impacts of the proposed project and the selected alternative can be measured.

Alternative 3 - Meadow Creek Landing Field Processing Facilities Location Alternative

This alternative would involve the same level of mining as described for Alternative 1. The alternative would not include a Garnet Creek mine waste dump. Instead, mine waste from Garnet Creek would be utilized to construct a retaining berm at the face of the existing tailing pile. Single lane (30-ft. wide) one way haul roads would provide access to the mine areas. The leach plant would be located at the Meadow Creek Landing Field. Under this option, the tailing pile would

be stabilized and used for processed ore disposal. Meadow Creek pond would be drained, and the creek channel would be rerouted around the pile. The crushing plant and support facilities would be located at Adkin's Flat.

Alternative 4 - Existing Tailing Pile Processing Facilities Location Alternative

This option also involves a full scale mining and processing operation. However, only a West End Canyon mine waste dump, and single lane haul roads would be constructed. The major difference is that the leach plant would be constructed on the existing tailing pile. This would require early stabilization of the tailing pile, draining of the pond, and rerouting of Meadow Creek around the pile. The housing site would be located at Adkin's Flat. Crushing facilities and the ore stockpile would be located at the landing field. Processed and neutralized ore would be contoured into available valley bottoms and hillsides, and utilized for road surfacing.

Alternative 5 - All Mine and Process Waste Disposal at the Existing Tailing Pile Alternative

This option would involve mining the full scale 2500-3000 tons per day. No mine waste disposal dumps would be located at the mine sites. The mine areas would be served by single lane haul roads. Approximately 400,000 tons of ore would be processed each year under the proposal. All mine and process waste material would be hauled to the existing tailing pile for disposal. The leach plant would be located at the Meadow Creek Landing Field. The housing complex would be constructed at the old sawmill site. A crushing and stockpiling area would be located at Adkin's Flat.

Alternative 6 - Reduced West End Canyon Waste Dump, Limited Valley Fill Option Alternative

Alternative 6 involves a full scale mining and processing operation, and a reduced West End Canyon waste dump and single lane haul roads. A portion of the mine waste from West End Canyon would be disposed of utilizing available valley fill and sidehill disposal sites in the project area or hauled to the existing tailing pile. The leach plant would be constructed at the Meadow Creek landing Field. Crushing and stockpiling would be at Adkin's Flat. The existing tailing pile would be utilized for processed ore waste disposal.

SUMMARY OF ENVIRONMENTAL EFFECTS

Alternative 2 - No Action Alternative

The No Action Alternative would not allow CSM to develop the proposed mining operation at Stibnite. This would mean that CSM would not mine either the West End or Garnet Creek deposits. No changes from existing

environmental conditions would be expected to occur. The existing tailing pile, which has been identified as a major source of sedimentation and wind-blown dust, would not be reclaimed. Potential for mass failure associated with seismic activity would continue to exist. Predevelopment costs for exploration, pilot testing, metallurgical testing, engineering and environmental studies, and legal agreements and administration would not be recovered by the company. Approximately $1.03 million in annual payroll, and local income from trade and services would not be realized. State and county tax revenues associated with the operation also would not be available.

Alternative 1

This alternative would have a higher potential for adverse effects on Garnet Creek water quality associated with the construction of the waste dump adjacent to the mine site. Maximum land disturbance would take place, and increased sedimentation associated with the size of cuts and surface exposure for double lane haul roads would also occur. However, an overall net reduction in sediment production in the drainage would occur as a result of stabilization and reclamation of the tailing pile. Effects on air quality would involve increases in total suspended particulate concentrations of approximately 64 tons annually. The majority of this projected increase is from vehicular emission associated with ore and waste rock hauling. Surface water would be diverted eight to ten times each operating season to saturate and wash the ore pile. Water requirements are the same for all of the major action alternatives. This alternative would have moderate negative effects on fish and wildlife habitat related to these short-term water withdrawals and to mining-related land disturbance. These effects could be largely mitigated by management constraints described in Chapter 4. The proposal would not affect any threatened or endangered wildlife or plant species. Visual quality impacts would be the greatest for this alternative due to total area disturbed and wider road widths (approximately 60-ft.). Major socio-economic effects include new jobs, increased population, and additional tax revenue.

Alternative 3

This alternative would involve less total areal disturbance and result in a lower potential for erosion and wildlife habitat loss than Alternative 1, because no Garnet Creek waste dump would be constructed above the mine site. As in Alternative 1 the project would result in a net reduction in sediment production in the drainage because the existing tailing area would be stabilized and reclaimed. Visual impacts would be less than for Alternative 1 due to the reduced road widths. Effects on personal income, the local tax base, and services and utilities would be the same as for Alternative 1. No major reclamation/stabiliza-tion problems are expected to be encountered with the proposed West End waste dump, based on the results of a detailed geotechnical evaluation.

Alternative 4

This alternative would be expected to create major problems associated with stabilizing the existing tailing area in order to construct a leach plant on the pile. The pile currently has erosion and liquefaction problems, and could be subject to mass failure under any significant seismic activity. While it would be technically feasible to stabilize the pile prior to construction of the leach plant, the procedures involved would be costly. Reclamation of the pile would also be more difficult for this option. By locating the processing facility on the pile, reclamation of the area could not take place until all the ore reserves are leached. Alternative 4 would be the most costly to construct, with estimated capital costs of approximately $14.3 million. This compares to an estimated $3.9 million cost for the other action alternatives.

Alternative 5

Alternative 5 involves hauling all the West End mine waste to the existing tailing area. This alternative is the most energy intensive, requiring approximately 250 percent more hauling than the other action alternatives. Total suspended particulate concentrations for these alternatives would also be the greatest of the five major action alternatives, due to increased hauling and associated dust generation. However, the option would involve the least areal disturbance and disruption of wildlife habitat. Annual operation and maintenance costs are slightly higher due to increased hauling requirements. Reclamation requirements would be reduced since no new waste dumps would be constructed at either the Garnet Creek or West End mine sites. Anticipated socio-economic effects are generally the same as those which were discussed for Alternative 1, and involve new jobs, increased tax revenues, and an increase in the local annual payroll.

Alternative 6

Alternative 6 would involve a reduced West End Canyon waste dump, and would also utilize limited valley fill for disposal of the remaining waste material. This would require additional land area disturbance and problems associated with waste dump construction and reclamation of valley fill areas. The leach plant would also be located at the Meadow Creek landing field. Under the alternative, the existing tailing pile would be stabilized and reclaimed. The pile currently contributes an estimated 500 tons of sediment annually to the East Fork of the South Fork Salmon River drainage. Additional area would be required for valley fill disposal, with resultant short-term losses in wildlife habitat.

IDENTIFICATION OF FOREST SERVICE SELECTED ALTERNATIVE

Based on the results of the information presented in the "Effects of Implementation" and "Evaluation of Alternatives" chapters, and a sub-

sequent re-evaluation of the preferred alternative presented in the DEIS by the Forest Service resource interdisciplinary team special team, the Forest Supervisor selected a slight variation of Alternative 5. This alternative involves:

- Mine areas - Garnet Creek and West End.
- Mine method - Surface mining.
- Mine waste disposal - construct a reduced waste dump in West End canyon to dispose of a limited volume of internal waste (approximately 1.2 million cubic yards) from the mining operation. The remaining waste material would be hauled to the tailing pile for disposal.
- Hauling and material transportation - materials transported by truck; hauling on a single lane (30-foot wide loop) road system to the West End Mine and single lane, 30-foot wide road serving the Garnet Creek Mine.
- Processing facilities location - leach plant at the Meadow Creek airfield; ancillary facilities at Adkin's Flat.
- Processing methods and materials - cyanide heap leach process; pads constructed of synthetic reinforced protective lining covered with drain rock and sub-base rock, capped by compacted asphalt which will be coated with a special impervious sealant.
- Stockpile location - Adkin's Flat.
- Processed ore disposal - existing tailing area, use in road resurfacing to the extent feasible.
- Housing complex location - split between Stibnite (sawmill site location) and Yellow Pine.
- Power source options - onsite diesel and/or propane generators.
- Access corridor - Landmark/Johnson Creek route.

DATE OF TRANSMISSION TO ENVIRONMENTAL PROTECTION AGENCY AND THE PUBLIC:

- Draft Environmental Impact Statement - January 28, 1981
- Final Environmental Impact Statement - MAY 5 1981

STIBNITE MINING PROJECT
GOLD MINE AND MILL
FINAL ENVIRONMENTAL
IMPACT STATEMENT

CHAPTER 1

CHAPTER 1

INTRODUCTION

PROPOSED FEDERAL ACTION

This Final Environmental Impact Statement (FEIS) was prepared for the U.S. Department of Agriculture, Forest Service, in response to an application by Canadian Superior Mining (U.S.) Ltd. (CSM) to mine and process gold ore at their Stibnite mine properties in Valley County, Idaho. The proposed mining and processing operation would involve approximately 100-140 acres of land including two separate mine sites and waste dumps, a cyanide leaching plant and ancillary facilities, and a processed ore waste disposal area. An estimated 35-45 acres of existing road improvements and new roads will also be required. These project components would be connected by access corridors. Figure 1 (following page 10) shows the general location of the project. The federal action considered in this document is the approval by the Forest Supervisor, Payette National Forest, of the Operating Plan for the Stibnite Mining Project (a conceptual version of the Operating Plan is presented in Appendix B as the Proposed Action) and imposition of reasonable environmental constraints. The Supervisor's decision may be to approve the Operating Plan as proposed, or to require modification of the Plan, or to defer the decision based on proper grounds.

In most environmental impact statements, the No Action Alternative involves maintenance of the status quo. On the Payette National Forest, current mining activities are primarily limited to a number of small operations including Canadian Superior's pilot plant leaching facility at Stibnite. However, after considerable study and debate, the Forest Service elected to define the No Action Alternative for this proposal as denial of the Stibnite Mining Project proposed by CSM. This decision was made primarily to provide a baseline against which other reasonable alternatives could be weighed. The decision was made, realizing that the General Mining Law of 1872 governs the prospecting, locating and claiming of most valuable metallic and related nonmetallic minerals on national forest lands. The Forest Service is responsible for managing surface resources of the National Forest System under the 1897 Organic Act, Multiple Use Mining Act of 1955, and the Multiple Use Sustained Yield Act of 1960, and has promulgated regulations (36 CFR, Part 252, 9/1/74) which require mining operations to file a "Notice of Intent to Operate" with the local national forest office, and that the operation be conducted in an environmentally sound manner.

A joint agreement was made among representatives of the Forest Service and CSM that the Forest Service would supervise the preparation of this EIS, and conduct the environmental review required by the National Environmental Policy Act of 1969 (NEPA) relative to federal actions. Initially, a Draft EIS was issued, followed by a specified time period for public review and comment.

This Final EIS is issued by the Forest Service in compliance with NEPA. Current NEPA regulations specifically include the following requirements:

- The EIS should be analytic and concise.
- Impacts should be presented in proportion to their significance.
- The EIS should include a full range of "reasonable" alternatives.
- The EIS should document the extent to which each alternative will comply with NEPA.

BACKGROUND OF PROJECT

Canadian Superior Mining (U.S.) Ltd. has been actively exploring the Stibnite area since 1974. The company has spent over $2.3 million on geologic mapping, sampling, diamond drilling, rotary drilling, metallurgical testing, and pilot plant construction and operation.

During the 1978 and 1979 seasons, CSM also constructed and operated a pilot level mining operation and cyanide heap leaching plant. The pilot operation consisted of mining three 500-ton lots of ore. The ore was processed at the leaching facility located north of the existing tailing pile in an area known as Adkin's Flat shown later in Figure 2 (following page 10). The operation involved a specially designed impervious asphalt pad, and a total containment non-discharge leaching process utilizing a dilute sodium cyanide solution to dissolve gold and silver from the ore pile. The gold and silver-laden solution was then passed through activated carbon columns which adsorbed the precious metals. The columns were taken to a commercial laboratory for final processing. At the end of each operating season, the piles were washed and neutralized, and the remaining solution treated to convert the sodium cyanide to nitrogen and various salts.

Prior to pilot plant startup an environmental assessment was prepared for the pilot plant operation by the Forest Service to comply with applicable provisions of NEPA. Baseline environmental conditions were monitored during operation to detect any potential contaminants. The overall project was designed to determine the feasibility of processing low grade gold ores which characterize the two main areas being considered for mining by CSM. A second major objective was to analyze the potential environmental impacts associated with such an operation.

In June, 1979, a "Notice of Intent to Operate: Operating Plan for the Stibnite Project" was filed by CSM with the Forest Service, Payette and Boise National Forests. The project, as proposed, involves 571 unpatented and 29 patented claims. Under the proposal, two open pit (surface) mines would be developed. These mines (West End and Garnet Creek) would be located in the N½ of Section 2 T18N, R9E and SE¼ of Section 11 T18N, R9E, Valley County, Idaho. West End Mine would encompass approximately 44 acres, and Garnet Creek Mine would contain approximately two acres. Two mine waste dumps involving approximately 25 and six acres, respectively, would also be established. A processing facility involving appproximately 20 acres would also be constructed to treat the ores. A process waste disposal site involving an existing tailing pile which covers an area of approximately 55 acres in

Section 15 T18N, R9E would also be developed under the proposal. The process waste disposal site would occupy approximately 35 acres. Haul roads (an estimated 35-45 acres) built to Forest Service specifications would connect the mine areas, processing facility, and waste disposal areas.

The operation would utilize conventional surface mining techniques, mining an estimated 2500 to 3000 tons of ore per day. The amount of waste material to be removed, which was originally estimated at approximately 9,000 tons per day, was later revised to approximately 4,000 tons daily. Gold would be extracted from the ore using a pilot operation-tested cyanide leaching process. The project would mine and process ore approximately 150 days each year during the late spring, summer and early fall. The operation would employ an estimated 50-60 workers.

In August, 1979, the Payette National Forest and Canadian Superior Mining entered into a Memorandum of Understanding (MOU) specifying the responsibilities for preparation of this EIS. The Forest Service subsequently approved the selection of an independent consulting firm, James M. Montgomery, Consulting Engineers, Inc., (JMM) to complete the necessary environmental studies and prepare the EIS. Under the agreement, the Forest Service retained the ultimate responsibility to supervise the consultant and any subcontractors to assure that the requirements of NEPA were met. CSM assumed the financial responsibility for preparation of the EIS.

JMM has completed a one-year environmental study on the project area (supplemented by two years of baseline studies), and has worked closely with the Forest Service resource specialists to prepare this document. The names and qualifications of Forest Service and JMM technical staff and subcontractors who developed the information are listed in Appendix A of this document.

GENERAL DESCRIPTION OF THE PROJECT AREA

The Stibnite Mining District is located in north-central Valley County, approximately 75 miles northeast of Cascade, Idaho. The project location is shown in Figure 1 (following page 10).

Mineral claims are located within a claim block of approximately 15 square miles which straddles the boundary of the Payette and Boise National Forests. The overall project would involve 571 unpatented and 29 patented claims.

A narrow flat-bottomed valley surrounded by steep mountains characterizes the study area. Elevations range between 6,300 feet above sea level at the valley floor to 7,500 feet at the proposed West End mine site. Mean annual precipitation for the Stibnite area is 31.22 inches. Climatic conditions are characterized by long winters with extremely cold temperatures and heavy snowfall, and relatively short, mild summers.

The upstream end of the Stibnite area displays remnants of early mining activities. Approximately 30 percent of the total tungsten and 90 percent of the antimony for the nation's wartime needs were mined from Stibnite during the period 1941-1952.

The Stibnite area is included in Big Game Management Unit 25 of the Idaho Department of Fish and Game. The region has relatively diverse wildlife and fishery resources. Big game in this unit include mule deer, elk, black bear, cougar and mountain sheep. The fishery in the area includes chinook salmon, cutthroat trout, rainbow, Dolly Varden, mountain whitefish and sculpin.

MAJOR ISSUES, CONCERNS AND OPPRORTUNITIES

A number of major issues, concerns and management opportunities have been raised by the public, involved agencies, organizations, the Forest Service and CSM during the course of the study. These include potential adverse effects and positive opportunities which could arise as a result of the project. The major significant issues and concerns and management opportunities are summarized below:

Public Issues

- To what extent are streams in the study area receiving pollutants from past mining activities?
- What effects will the project have on local water quality, particularly as related to potential increases in sediment production associated with mining activities, and the possibility of cyanide spills and contamination?
- What methods will be used to treat any water that will be released into streams following use in the operation?
- What provisions will be made to direct water away from the leaching pads, pit areas, waste and overburden disposal areas?
- Will disturbed areas be reclaimed and revegetated?
- What will the impacts of this project be on the resident and anadromous fisheries?
- Will the economic benefits of the project (new jobs, purchasing, tax revenues, etc.) offset potential effects on local public services and utilities (primarily Yellow Pine School and the town's water system)?
- What will the long-term effects of the project be on the local community lifestyle?

- How much growth (population and economic) can we expect?

- Management agencies should also consider the positive aspects of the project, particularly those related to job opportunities, in evaluating the various alternatives.

Management Agency Concerns

- Will potential Prevention of Significant Deterioration (PSD) air quality requirements be met?

- How will instream water needs for fish be met during diversion periods required to saturate the ore piles?

- What amount of sediment will be generated by construction of the haul roads and the mining operation?

- Can the existing tailing pile, which has been shown to be a major source of sedimentation, be stabilized and reclaimed?

- What geotechnical considerations should be included in the placement and design of waste dumps, and the design of a retaining berm which will be constructed across the face of the tailing pile?

- Can toxic substances in fish flesh be maintained at or below those shown to be present from the baseline analyses?

- Will the project result in increased erosion and sedimentation, with resulting negative effects on salmon spawning and rearing areas?

- Are these risks from the project of catastrophic proportions which could result from toxic chemical spills?

- Can surface and groundwater be protected from toxic chemicals?

- Can wildlife habitat disruption be effectively minimized?

- Is energy consumption an important element in the evaluation and selection of alternatives?

- Will project design and construction include adequate provisions for reducing visual impacts?

- Similarly, will the selected alternative protect the most area identified as having cultural significance?

- Major consideration should be given to the socio-economic aspects of the project. These include potential effects on

the local tax base, existing public services and utilities, and economic benefits to the community.

- Will the project have adverse effects on the community of Yellow Pine's lifestyle?

Opportunities Resulting from the Project

- Improve fish habitat in upper Meadow Creek by stabilizing and reclaiming the existing tailing area and draining the Meadow Creek pond.

- Reduce cummulative heavy metal concentrations in fish flesh over the long-term through stabilizing and reclaiming the tailing pile and rerouting Meadow Creek.

- Broaden the economic base of Valley County and the Town of Yellow Pine.

- Increase tax revenues to Valley County and the State of Idaho.

- Make a number of needed improvements to the existing utilities in the Yellow Pine area possibly including a 10,000 gallon storage facility and distribution system improvements, an improved communication system at Yellow Pine, and additional recreational facilities to be used by the entire community.

- Assist the balance of payments deficit in the United States by helping to reduce the country's overall reliance on imported gold and silver.

Applicable Licenses, Controls and Constraints

There are a number of federal, state and local regulatory permits, controls and constraints which apply to the proposed Stibnite Mining Project. The following list describes the primary permits and approvals necessary for the proposed Stibnite Mining Project by major categories. Additional permits may also be necessary during the life of the project.

Air

- Clean Air Act Amendments of 1977 (P.L. 95-95); Prevention of Significant Deterioration applicability determination from the U.S. Environmental Protection Agency (EPA); and State of Idaho New or Modified Source Permit. Based upon the results of an air quality analysis prepared for the Stibnite project, EPA has determined that the operation will not be subject to Prevention of Significant Deterioration requirements. To

date, the state has not adopted Preventive Significant Deterioration requirements for constructing or operating major new facilities. However, a New or Modified Source Permit may be required by the Idaho Department of Health and Welfare for crushers, power generating facilities, etc. The project is also subject to federal and state primary and secondary ambient air quality standards.

Water

- Clean Water Act of 1977 (P.L. 95-217); State of Idaho Water Quality Standards and Wastewater Treatment Requirements. Specific water quality requirements for the project relate to the application of approved best management practices for controlling nonpoint water pollution sources (the East Fork of the South Fork Salmon River and its major tributaries are designated as Special Resource Waters). An applicability determination by EPA for a National Pollutant Discharge Elimination System permit for the project was officially requested. EPA has determined that the permit will not be required, provided a "plan of operation" demonstrating that there will be no discharge is submitted and approved. Any wastewater treatment systems serving individual residences would be subject to Central Health District requirements. Permits from the Department of Army, Corps of Engineers are also required for structures and work in or affecting navigable waters, and for the discharge of dredged or fill materials into navigable waters (Section 404).

- Safe Drinking Water Act (P.L. 93-523). This act applies to standards for public drinking water supplies. Approval of drinking water supplies by the Idaho Department of Health and Welfare - Division of Environment is required.

- Stream Channel Alternation Permit from the Idaho Department of Water Resources for any modification, alteration or relocation of any stream channel within or below the mean high water mark (i.e., relocation of Meadow Creek).

- Approval from the Idaho Department of Water Resources of plans, specifications and drawings for any impoundment facilities or dams (tailing, water), as required by the State of Idaho Safety of Dams Rules and Regulations. The Safety of Mine Tailings Impoundment Structures Rules and Regulations, 1980 also apply.

- A water rights application should be filed for any surface water withdrawal with the Idaho Department of Water Resources. Applications should also be made for groundwater withdrawals (wells). CSM has secured permits for withdrawals from Meadow Creek, Sugar Creek, and the East Fork of the South Fork Salmon River.

- Spill Prevention and Control Countermeasure Plan which is required by the Clean Water Act. The plan addresses the need to develop a program for controlling spills of petroleum products stored at the site (applicable to any operation storing 660 gallons (in a single container) above ground, or 42,000 gallons or less below ground). The plan should also include contingency provisions for coping with any emergency spill situation involving toxic substances (i.e., cyanide, chlorine), and be displayed at the site in case of a spill episode.

- The State of Idaho Technical Guide for Control of Water Pollution from Mining and Milling Operations (July, 1979) should be applied as appropriate.

Land Use and Reclamation

- Approval of the EIS by the Supervisor of the Payette National Forest.

- Approval of Operations Plan, Corridor Plan, and Reclamation Plan by the Forest Service Supervisor, Payette National Forest.

- Approval of the Reclamation Plan by the Idaho Department of Lands which sets forth the action which the operator intends to take to comply with the provisions of the State of Idaho Surface Mining Act.

- Guidelines developed by the Forest Service presented in the Engineering Guide: Stability of Non-Water Impounding Mine Waste Embankments (March, 1980) should be utilized in designing mine waste dumps and disposal areas.

- Compliance of the mining operation and related facilities with the Valley County Comprehensive Plan.

- Building permit to construct support facilities (housing, storage building, etc.) at the site. Applicable requirements included in the Valley County Mobile Home Park and Travel Trailer Courts and Parks Ordinance would also have to be met.

- Acceptance by CSM of the Forest Service's selected alternative and recommended management constraints and mitigation. These management considerations will be negotiated prior to approval of the Operations Plan.

Others

- Consultation with the U.S. Fish and Wildlife Service and the Idaho Department of Fish and Game concerning threatened, endangered or sensitive species, as required by the Endangered Species Act of 1973 (P.L. 93-205).

- Resource Conservation and Recovery Act. Compliance with recently adopted Hazardous Waste Consolidated Permit Regulations. EPA is currently promulgating standards for management of hazardous waste use and recovery operations. These regulations are scheduled to be completed sometime during 1981.

- Compliance with the Idaho Solid Waste Management Regulations and Standards. This will involve securing a Conditional Use Permit for construction of any necessary solid waste disposal facilities at the mine site.

- Approval of the cultural resources assessment by the Forest Service and the Idaho State Historic Preservation Officer (includes opportunity for the Advisory Council on Historic Preservation to comment).

- Transportation safety requirements enforced by the Idaho Public Utilities Commission concerning the transport of hazardous materials.

- Permit for transporting, storing, and using explosives from the U.S. Department of Treasury, and the U.S. Department of Labor under the Federal Mine Safety and Health Act, as amended in 1977.

- Compliance with other applicable regulations and standards relating to the Federal Mine Safety and Health Act of 1977 (Regulations and Standards Applicable to Metal and Nonmetal Mining and Milling Operations, January 1, 1980).

STIBNITE MINING PROJECT

GOLD MINE AND MILL

FINAL ENVIRONMENTAL

IMPACT STATEMENT

CHAPTER 2

CHAPTER 2

AFFECTED ENVIRONMENT

A. PHYSICAL ENVIRONMENT

1. Location, Topography and Geology

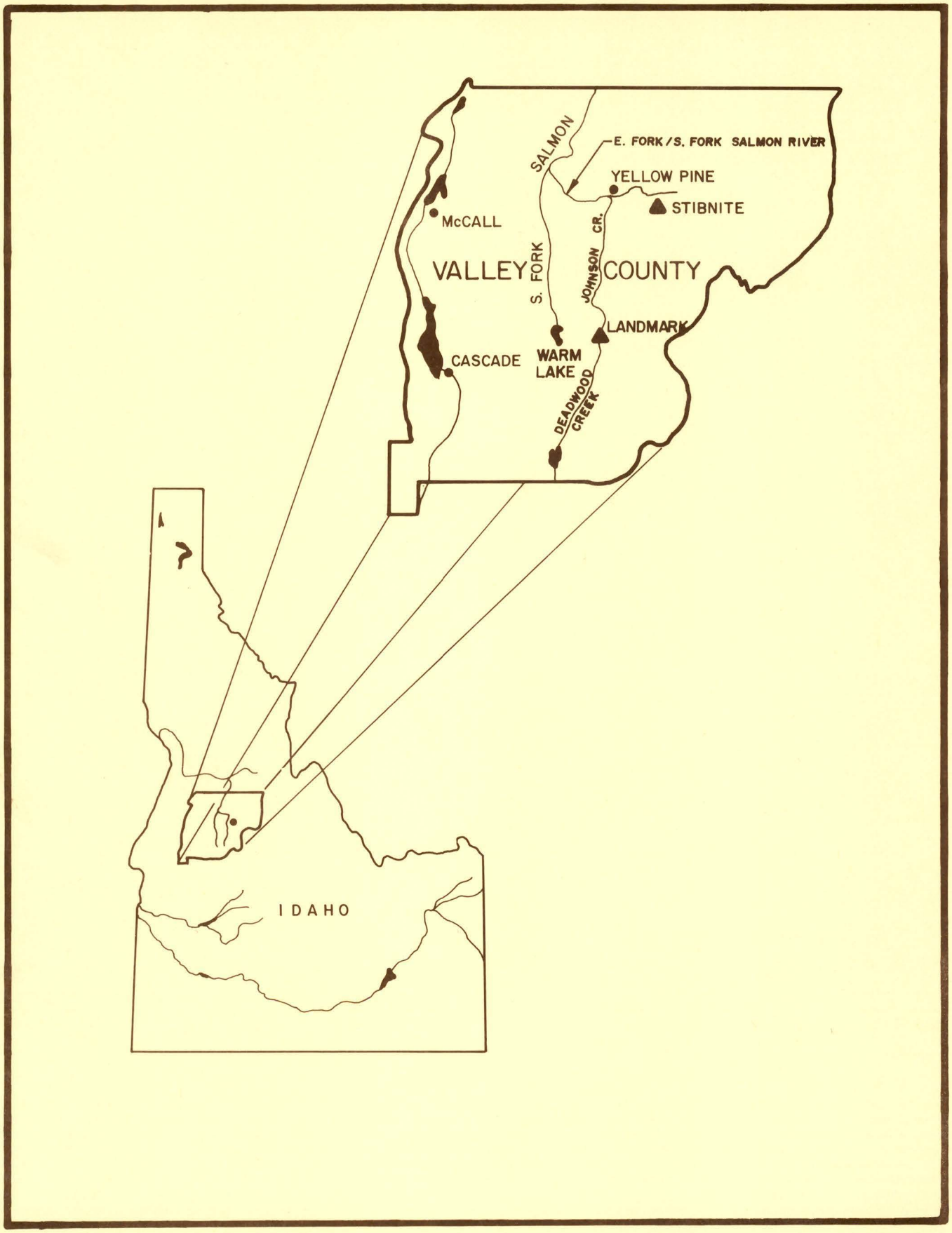
The Stibnite Mining Project study area is located in north-central Valley County, approximately 75 miles northeast of Cascade, Idaho (Figure 1). Gold discoveries in the area date back to the Thunder Mountain gold rush of 1902. However, most historians agree that a portion of the area was prospected as early as 1891. The area was the scene of extensive mining for antimony and tungsten during World War II.

The boundary between the Payette and Boise National Forests follows the East Fork of the South Fork (EFSF) Salmon River through the center of the mining area. However, for administrative convenience, the entire Stibnite mining area is included within the Big Creek Ranger District, Payette National Forest.

The study area is located in Meadow Creek Valley, a narrow flat-bottomed valley surrounded by steep mountains. Elevations range between 6,300 feet above sea level at the valley floor to 7,500 feet at the proposed West End mine site (Figure 2). The upstream end of the Valley displays remnants of early mining activities and a large outwash feature created by a dam failure in the drainage south of Stibnite.

Much of the Salmon River Drainage is characterized by granitic rock of the Idaho Batholith. The Idaho Batholith is a 16,000-square-mile expanse in central Idaho (Figure 3). Soils developed from the Batholith typically have little cohesion because of their low silt and clay contents. Generally quartz monzonite, an igneous-intrusive rock, underlies the Stibnite area (NTL, 1979). A roof pendant of metasedimentary rocks extends from Monumental Summit to Sugar Creek, overlying the intrusive quartz monzonite of the east side of the Stibnite Valley (Figure 4). These Precambrian rocks consist primarily of dolomite, limestone, mica schist, and quartzite.

A series of ring faults related to the Thunder Mountain Caldera cuts through the granitic rocks and Precambrian metasedimentary rock of the area. Generally, these faults have displaced both the intrusive and metasedimentary rocks. During the Pleistocene Epoch, glaciers occupied high valleys, including the present day Meadow Creek Valley and the adjoining valley of the EFSF Salmon River. As a result, the valleys were filled with glacial-fluvial-colluvial deposits consisting of silts, sands and gravels. The mountainsides are covered with a very thin layer of granular soil and occasional talus deposits. Boulders up to 20 feet in diameter are scattered near the valley edges.



STIBNITE MINING PROJECT LOCATION MAP

FIGURE 1

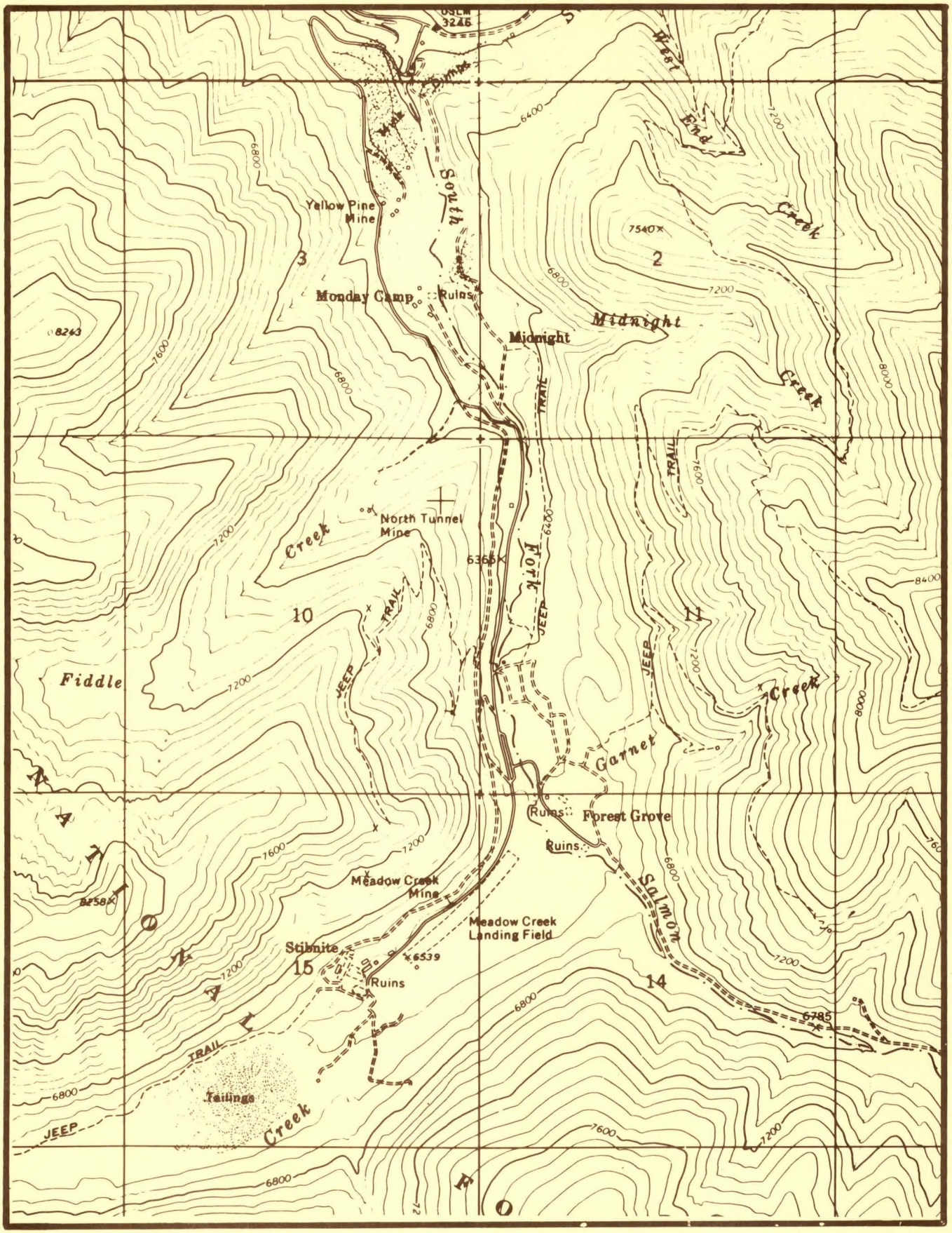
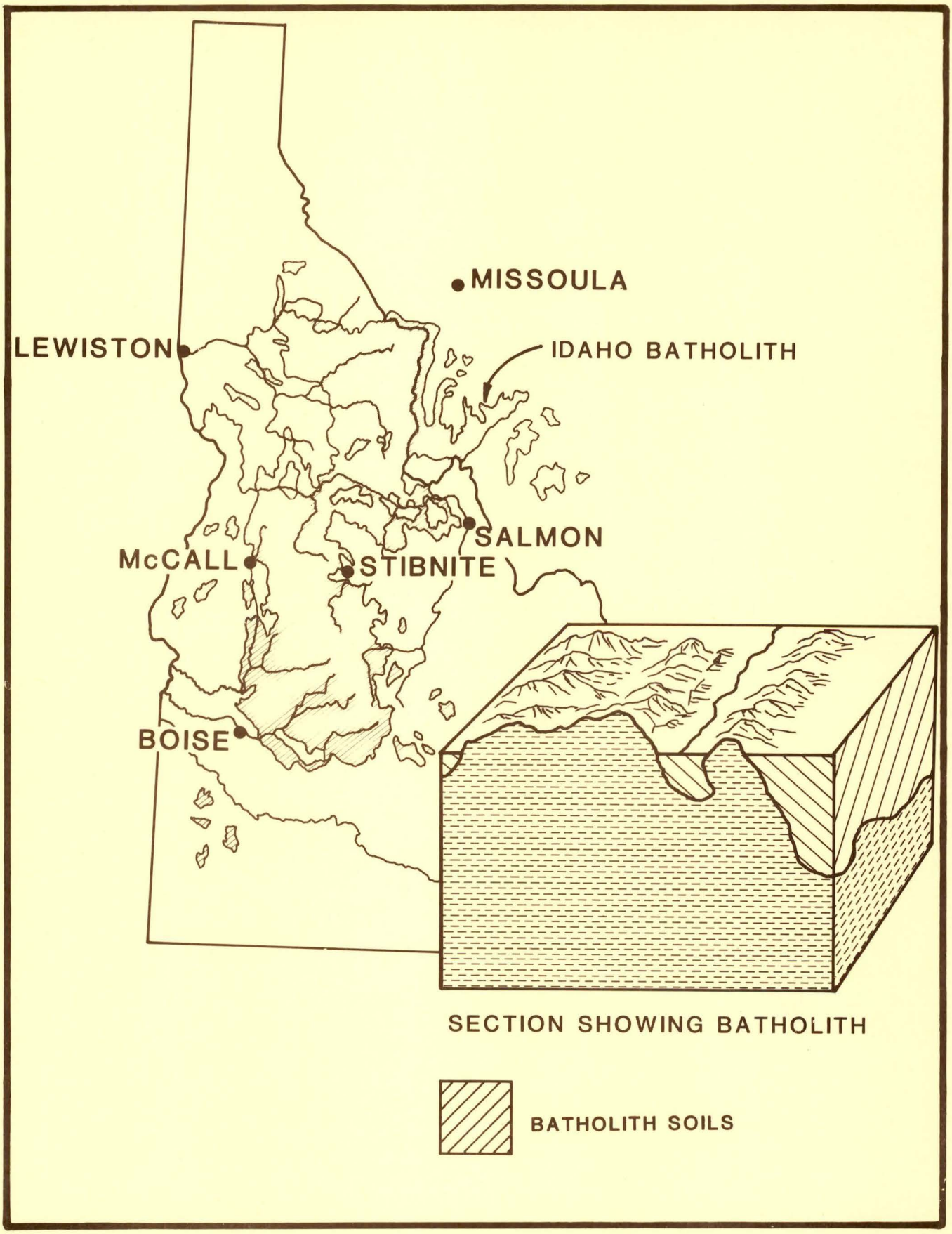


FIGURE 2

STIBNITE MINING PROJECT EXISTING FEATURES MAP



IDAHO BATHOLITH
FIGURE 3

The area is located in a Zone 2 seismic region (NOAA, 1973). Zone 2 indicates areas with an expected moderate damage level associated with seismic activity. Earthquakes of a magnitude of 6 have been recorded in the vicinity.

Mineral deposits in the Stibnite area are localized in the fault and fracture zones which characterize the local geology . The chemical and physical character of these deposits indicates formation during the development of the Thunder Mountain Caldera. The large ring-fault system contains gold, silver, mercury, antimony, and tungsten deposits.

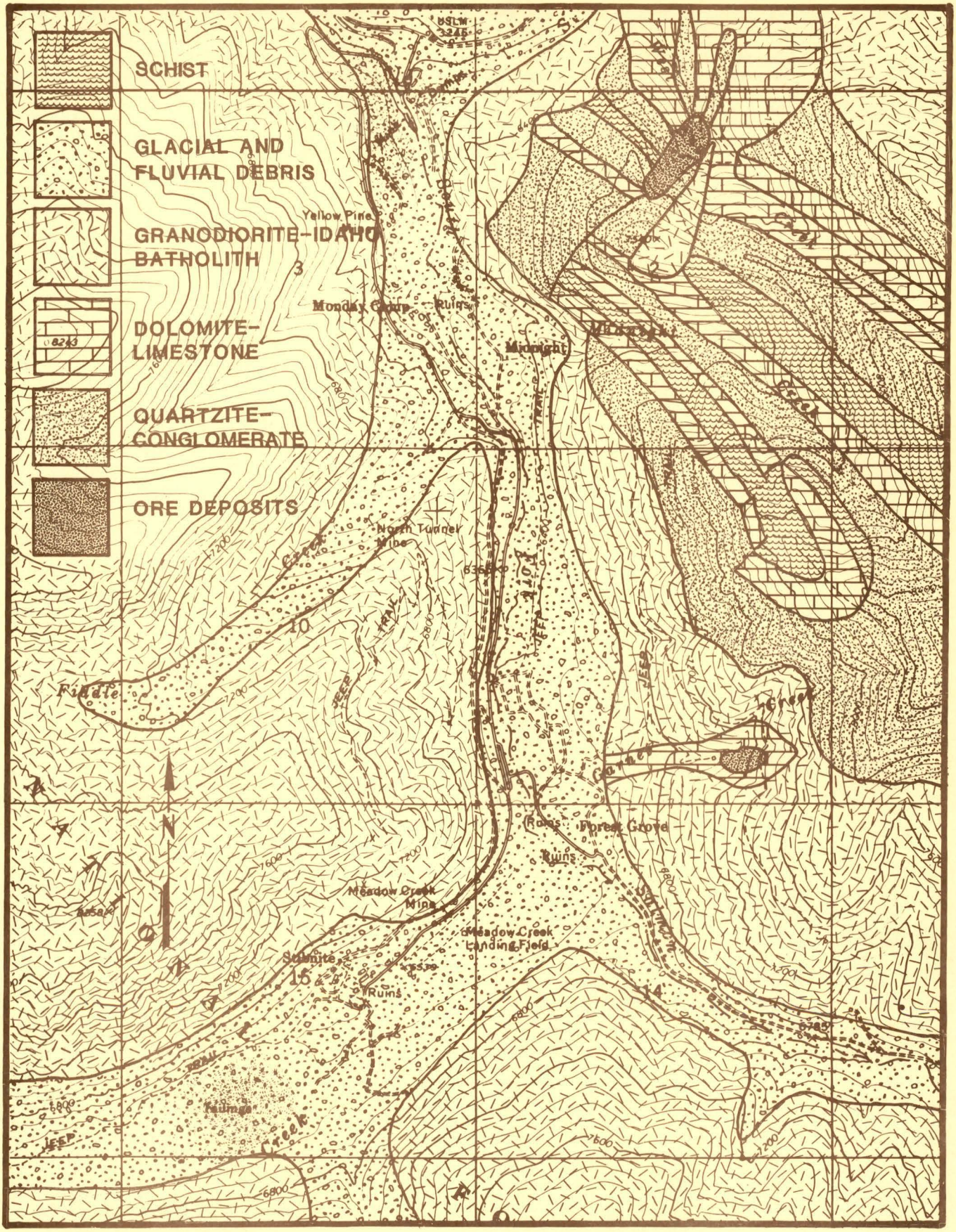
Two mineralized areas in the Stibnite District are included in the CSM proposal. They are the West End and Garnet Creek deposits (Figure 4). These deposits have significant tonnages of oxidized gold ore overlying sulfide mineralization. Iron, antimony, mercury and arsenic sulfides constitute the sulfide mineralization. However, mercury and antimony are essentially nonexistent in the oxide zone. CSM proposes to mine only the oxidized ore.

2. Soils/Geotechnical Conditions

The study team conducted a soils survey of the area during the summer of 1978. A complete discussion of field and laboratory test results is included in the Geotechnical Evaluations Canadian Superior Mining, Ltd. Project on the Payette National Forest, (NTL, 1979) supplemental report which is on file at the Forest Service Big Creek Ranger District office at McCall, Idaho.

Soils which characterize the proposed mine areas and haul roads are not classified as true decomposed-granitic Idaho Batholith types which comprise much of the South Fork Salmon River Drainage. Land types in the proposed West End and Garnet Creek mine areas contain sandy and loamy skeletal soils. These soils are coarse-grained and shallow and are generally of a more competent nature than true Batholithic soils which have little cohesion and erode easily (NTL, 1979). Soil cover at both the areas is thin or non-existent on the sides of the canyons, but thicker near the mouths of the tributary drainages. Both of the mine areas were determined to be quite stable. Erosion potential is considered low when compared to other areas in the South Fork Salmon River drainage.

Soils at the general area initially proposed for the leach plant site (located on the flat valley floor west of the Garnet Creek Mine) are characterized by a combination of glacial, fluvial and colluvial deposits. Backhoe test pits have exposed very coarse-textured soils consisting of granular sands and gravels. A decision was subsequently made to consider locating the leach plant at the Meadow Creek landing field. Backhoe tests at this location also showed soils consisting of coarse gravel and sand. No groundwater was observed in the boring holes. Both of these sites are generally considered stable against both mass soil movements and erosion.



STIBNITE AREA GEOLOGY

FIGURE 4

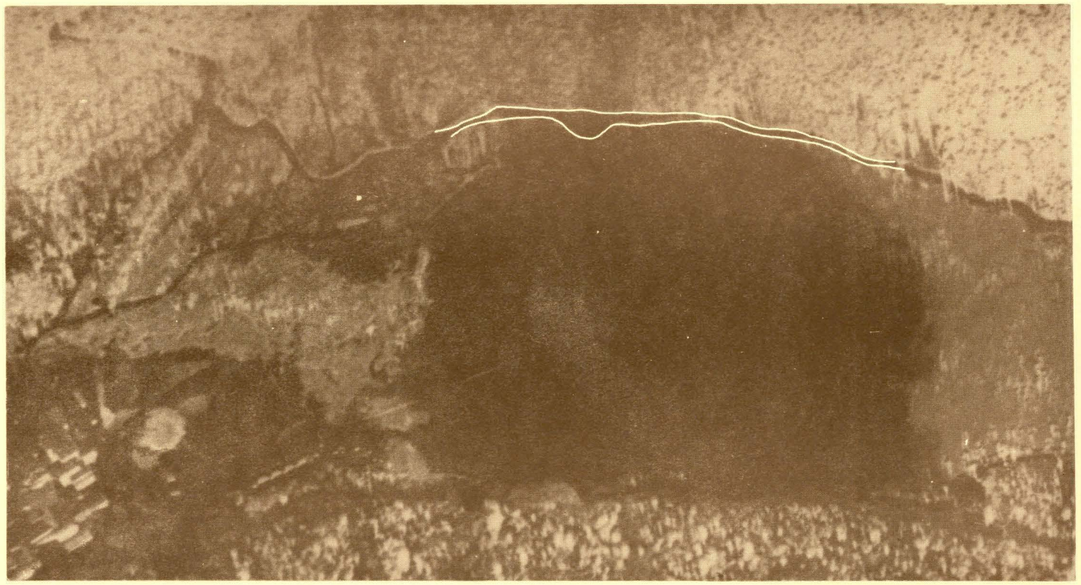
The proposed leach waste dump area, which is the large tailing pile located approximately ¼ mile southwest of old Stibnite ruins, occupies the entire width of the upper valley (approximately 1,200 to 1,500 feet wide). Thickness of the pile ranges from 25.0 to 46.5 feet. The tailing material which comprises the pile is generally quite fine grained, and consist of ore that was pulverized for processing in earlier mining operations. This tailing deposit was hydraulically placed upstream by a slurry pipeline method.

The situation is complicated by an upstream lake (Meadow Creek) which has formed behind the tailing pile, and the associated liquefaction potential (the potential for the loose soil to act like a liquid) of the pile. Extensive movement of sediments from this source has already occurred, as evidenced by large erosion gullies in the pile and deposits on the banks of Meadow Creek downstream from the pile. Information on past mining production indicates that during the period 1932 to 1951, over 4.7 million tons of ore were milled at Stibnite from the Meadow Creek and Yellow Pine Mines. An estimated 4.2 million tons of mill waste are presently impounded behind the tailing pile. Calculations for total erosion loss from the pile using a series of historic aerial photographs (Figure 5) and available records on mining production and processing indicate that over 10,000 tons of fine silt-to-sand-sized particles have been washed from the pile into the EFSF Salmon River since 1958 (see additional discussion under Surface Water Resources later in this section).

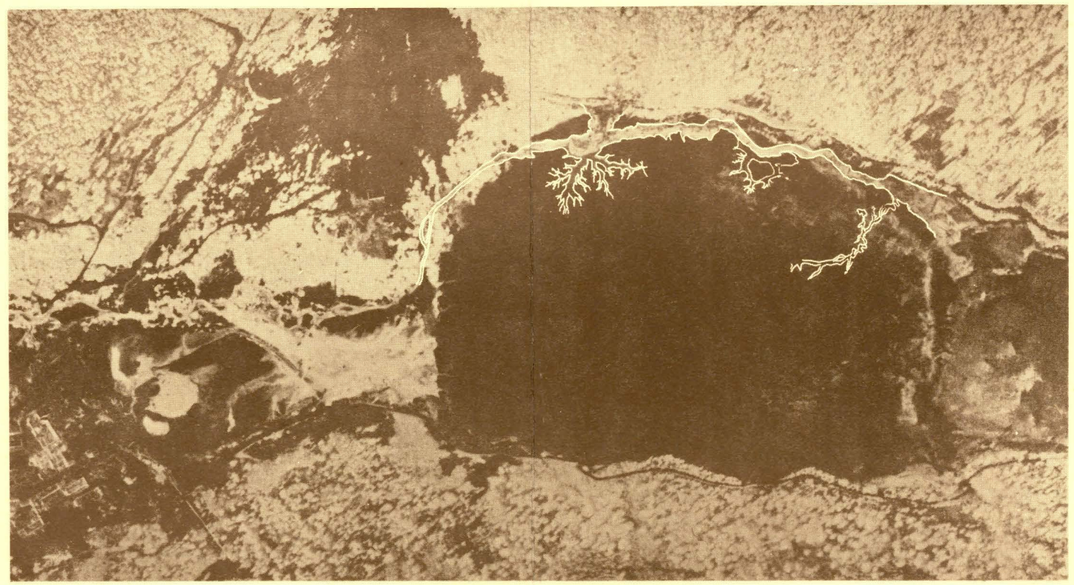
The tailing pile is also susceptible to wind erosion. However, no estimates of material lost by wind erosion are available. This condition is discussed in the Meteorology/Air Quality section of this chapter.

The proposed haul roads, which include upper and lower routes connecting the West End Mine to the processing site, and a route running southward from the Garnet Creek Mine to the existing road paralleling the EFSF Salmon River above its confluence with Meadow Creek, cross a number of small drainages in the study area. The hillsides in these areas are steep, and similar in composition to those in the mine and waste dump areas. Based on the results of the geotechnical study, stability is generally good. However, road construction on steep hillsides will require deep cuts, resulting in large amounts of waste material. This excavated material must be disposed of in a safe, suitable manner.

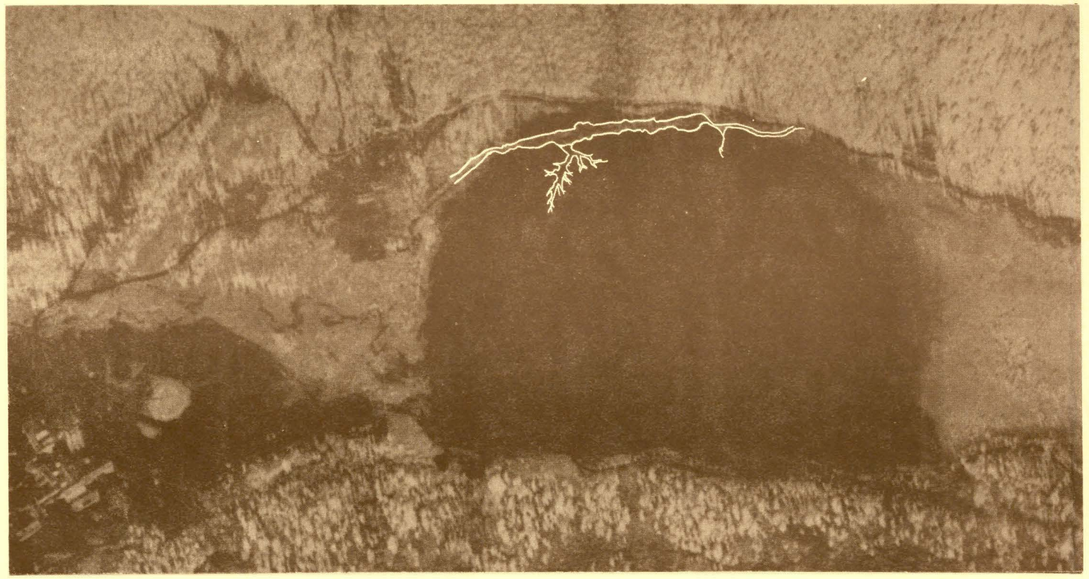
A number of sites were studied as potential locations for housing. These sites are all located in relatively flat areas. The two areas considered by CSM were located immediately east of the landing field near the old recreation hall and in Adkin's Flat. These areas are characterized by gravel (sandy; medium-dense soils). The third site falls on a flat bench near the mouth of Midnight Creek. A fourth site located near the remains of the old sawmill was also studied. Soils in these areas are composed of a combination of undifferentiated meta-



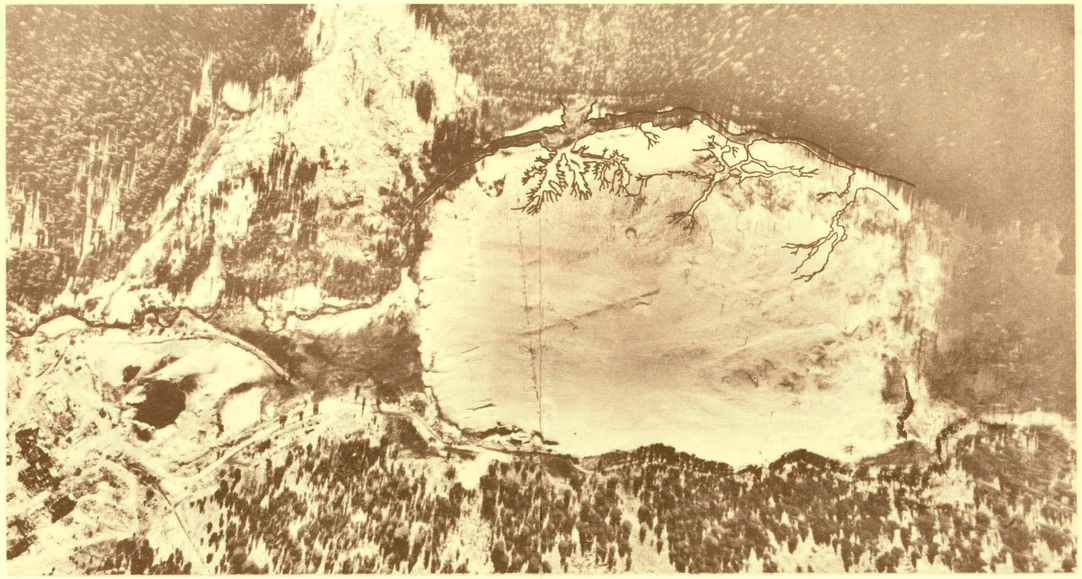
1952



1976



1964



1979

FIGURE 5
EXISTING TAILING PILE
MATERIAL LOSS SEQUENCE

morphosed rock (primarily topsoil covering gravel). Overall stability of both these areas is considered good.

3. Climatology

The Stibnite area is characterized by harsh, long winters and cool, dry summers. These conditions are caused by low pressure moisture-laden maritime air masses which move over the area from autumn to spring, bringing heavy winter snows and spring and fall rains. The majority of storms which produce significant amounts of precipitation in the study area are long duration storms which occur in the winter and spring. However, short-term, high-intensity summer storms also occasionally occur in the area. During the summer months the climate is influenced by a high pressure system which brings relatively dry weather to the area.

Mean annual precipitation for the Stibnite area is 31.22 inches. About 70 percent occurs during the non-operational period (November - April) of the proposed mining project. This compares to 21.29 inches at Cascade. January is usually the wettest month of the year (4.89 inches); while July is consistently the driest (0.65 inches). The mean annual temperature for the Stibnite-Yellow Pine study area is 39.5°F. July is the warmest month, with an average temperature of 58.7°F for the 30-year period of record. January is the coldest month with a mean temperature of 19.3°F.

Cold temperatures limit the proposed mining facilities' operational period, due to freezing of the cyanide application and washwater systems. Winter temperatures and access problems restrict the operating season to approximately 150-180 days annually.

Average monthly evaporation rates for the Stibnite study area extrapolated from monthly and seasonal totals are presented in Table 1. This information was used in design calculations for the existing pilot plant facilities which were operated during the 1978 and 1979 seasons. Precipitation duration/intensity data for the 100- and 50-year, and maximum 10-day expected storm events were also considered in the design criteria.

TABLE 1
AVERAGE MONTHLY RAINFALL, EVAPORATION RATES
FOR OPERATIONAL MONTHS, STIBNITE STUDY AREA[1]

MONTH	PRECIP./INCHES	EVAP./INCHES	NET/INCHES
May	2.67	3.64	loss 0.97
June	2.36	4.48	loss 2.48
July	0.65	6.72	loss 6.07
Aug.	1.07	5.60	loss 4.53
Sept.	1.17	3.64	loss 2.47
Oct.	2.36	1.68	gain 0.68

[1]Source: Climat. Handbook, Col. Basin States Precip., Vol. 2, 1969 PNRBC.

4. Meteorology/Air Quality

The proposed mining areas are located in a canyon. In order to characterize local wind speed, wind direction and temperature conditions, a mechanical weather station was installed at the pilot plant. Continuous meteorological data was recorded during the period August through October, 1979.

The meteorological data collected during this period demonstrated definite diurnal patterns controlled by topography. The patterns were dominated by a strong high pressure system resulting in warm clear days with light to moderate winds, and cool nights. Maximum daily temperatures in the mid-sixties to seventies occurred in the early afternoon; minimum temperatures in the low thirties occurred at night.

Data indicated predominant wind flow from the southeast and south-southeast (down valley) at low speeds during the nighttime. Daytime patterns showed increases in wind speed to moderate levels, and a shift in wind direction to the northwest indicating up-valley flow.

Due to the relatively small size of the proposed project, total suspended particulates (TSP) was the only air quality parameter determined to be of concern for this project by the Idaho Department of Health and Welfare-Division of Environment, Air Quality Bureau. A high volume sampler was installed near the site of the leaching/processing facilities to measure ambient total suspended particulate concentrations.

The IDHW and the U.S. Environmental Protection Agency (EPA) have established air quality standards for particulate matter. These standards are summarized in Table 2. The primary ambient standards were established to protect public health, while the secondary standards provide protection for plants, animals, materials, etc., in cases where the primary standard does not provide full protection against damage. These ambient standards and Prevention of Significant Deterioration (PSD) increments for Class I and Class II areas are also presented in Table 2.

TABLE 2

STATE OF IDAHO AND U.S. ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY STANDARDS FOR TOTAL SUSPENDED PARTICULATES (TSP)(ug/m^3)[1]

	PSD Increment		National and Idaho AAQS[2]	
Average Time	Class I	Class II	Primary	Secondary
24-Hour Concen.	10	37	260	150
Annual Geometric Mean	5	19	75	60

[1]Source: Rules and Regulations for the Control of Air Pollution In Idaho, Idaho Dept. of Health and Welfare-Division of Environment, 1979.

[2]Ambient Air Quality Standards (Data Presented as Micrograms per Cubic Meter).

The results of TSP monitoring conducted during the two-month period is summarized in Table 3. Samples were collected according to approved EPA methods for determining suspended particulates in the atmosphere.

TABLE 3
TOTAL SUSPENDED PARTICULATES (TSP) CONCENTRATIONS,
STIBNITE AREA MONITORING PROGRAM, 1979

Date	TSP ($\mu g/m^3$)	24-Hour National and Idaho AAQS	
		Primary	Secondary
9/12/79	31	260	150
9/14/79	87	260	150
9/16/79	26	260	150
9/18/79	58	260	150
9/20/79	38	260	150
9/22/79	59	260	150
9/24/79	47	260	150
9/26/79	9	260	150
9/28/79	31	260	150
9/30/79	21	260	150
10/5/79	61	260	150
10/7/79	42	260	150

The results of the short-term air quality monitoring program for the Stibnite mining area show no violations for the 24-hour standards of 260 and 150 $\mu g/m^3$. The highest concentration, 87 $\mu g/m^3$, observed on September 14, 1979 is well within the primary and secondary standards for total suspended particulate. Major sources of existing levels include local vehicular traffic and wind-blown dust. During wind storms, the existing tailing pile is also a significant source of particulates.

The area included in the Stibnite mining proposal is classified as a "clean air region," and has been designated as a Class II attainment area. In clean air regions, pollution is regulated in terms of how much additional pollution is permitted. In Class II areas, significant new pollution may be allowed, depending on ambient air quality conditions. However, it should be noted that the Stibnite area lies across the drainage from Class I lands (River of No Return Wilderness Area). In Class I areas, only very little or no additional pollution is allowed.

Initially, the EPA notified the Forest Service that the Stibnite mining proposal may be subject to federal new source Prevention of Significant Deterioration regulations. These regulations require that the preconstruction permit, which the owner or operator of a new or modified stationary pollution source must obtain, be subject to a review that includes an ambient air quality analysis. The State of Idaho has proposed, but not adopted, similar regulations. Under these regulations major emitting facilities for 28 source categories which emit

or have a potential to emit 100 tons per year or more of any pollutant regulated under the Clean Air Act, or 250 tons per year or more of any regulated pollutant for other source categories such as mining, are subject to Prevention of Significant Deterioration (PSD) requirements.

The results of the Stibnite Project Air Quality Analysis for Prevention of Significant Deterioration Determination, (DRI, 1980) which included an emissions analysis for the proposed project, were submitted to the EPA for an applicability determination in February, 1980. On the basis of this analysis and related information supplied by the consultant, and a review based on recently revised Ambient Monitoring Guidelines for the Prevention of Significant Deterioration, (EPA, 1979), EPA has determined that the proposed Stibnite Mining Project will not be subject to these requirements. The emissions analysis is discussed in more detail in Chapter 5 of this report.

Another particulate-related air quality consideration involves the potential detrimental impact of increased suspended particulate matter on local visibility. Visibility degradation is caused by airborne particles absorbing and scattering light particles which range between 0.1 μm to 1.0 μm in diameter. Current research has shown that mining does not produce significant amounts of particles of this size. The particles in this size range are generally secondary aerosols such as sulfates and nitrates, and constitute a small portion of the mass of total suspended particulates (EPA, 1978). The potential effects of the project alternatives on local visibility and measures for minimizing visibility degradation are also described later in Chapters 4 and 5 of this document.

5. Surface Water Resources

The importance of protecting Idaho's water resources cannot be overstated. The need to protect, maintain and enhance the water quality of the State is not only the concern of the citizens of Idaho but also part of the national water quality strategy defined by Public Law 92-500 (Clean Water Act) and its amendments.

Little background information on water quality conditions of many of the stream segments in the State exists. Historically, only limited water quality data has been collected on the segment of the EFSF Salmon River or its upper tributaries originating within the study area. Some unpublished information collected in 1970 by a University of Idaho graduate student during July, August and September, showed that pH was highest in the EFSF Salmon River above its confluence with Meadow Creek (pH 7.2). pH values for Meadow Creek were lower, ranging from 6.6-7.1. The pH of a water body is the hydrogen ion activity of that water in moles per liter. A pH of 7 is considered neutral; below 7 acid; and above 7 alkaline. Two other parameters measured during the study were temperature and conductance. These parameters both remained relatively constant at the five sites investigated.

A review of the state's STORET Retrieval system shows that one water quality sampling station was maintained from 1970 to 1974 in the EFSF Salmon River in the general vicinity of the proposed project. This site was located below the town of Yellow Pine, and was sampled during late summer. The data reveal no unusual water quality conditions. The parameters measured generally indicate high water quality, with little variation over the four-year period.

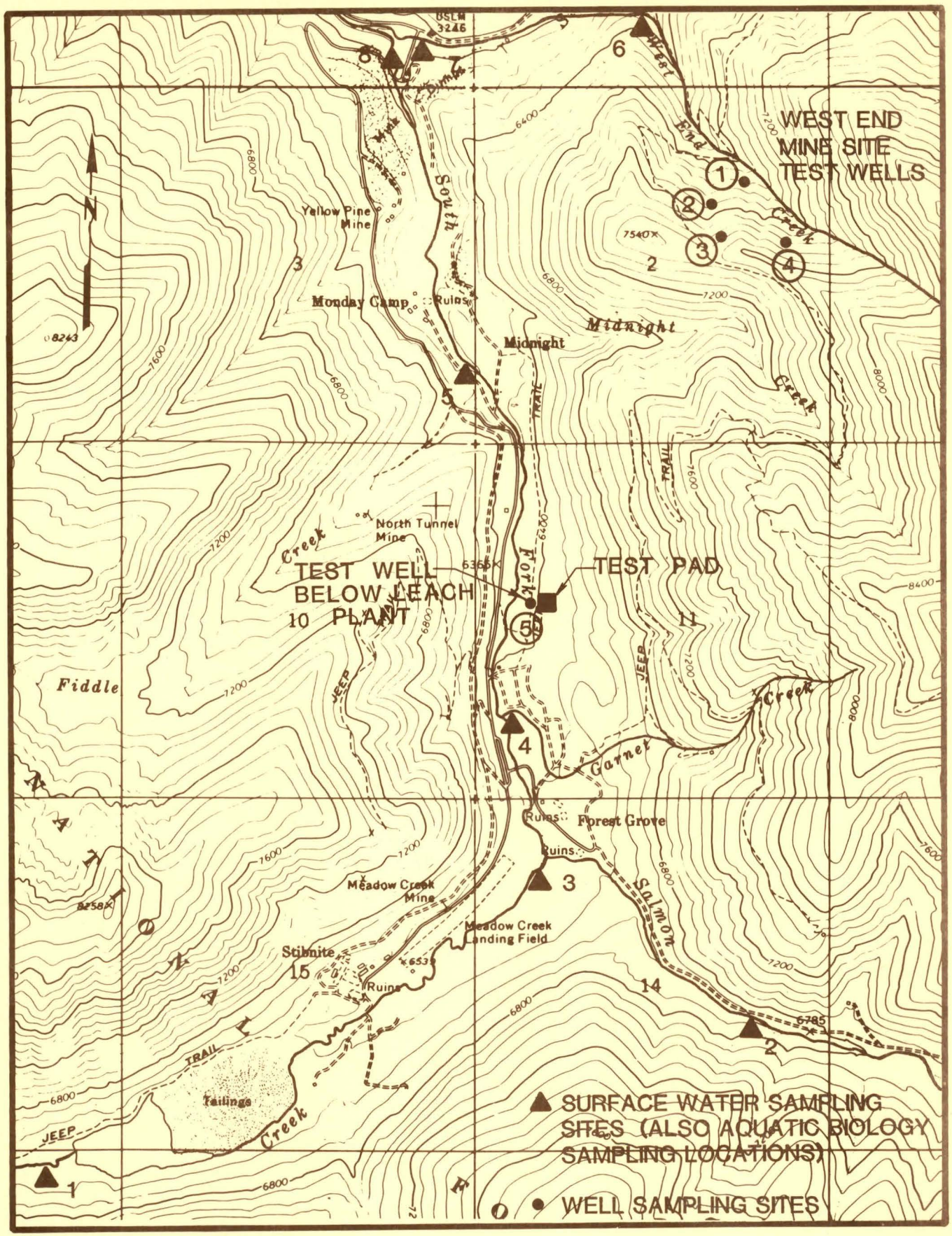
Hydrologic data for the study area is more complete. The 19.5 square miles draining into the EFSF Salmon River at Stibnite have an average water yield of approximately 16 inches. The U.S. Geological Survey operated two gauging stations near Stibnite from 1928 to 1943. Records for one station (located 30 feet downstream of Meadow Creek), indicate a monthly discharge ranging from 2 cubic feet per second (cfs) to 369 cfs over the 13-year period. Records from a second station located 200 yards downstream from Sugar Creek show a minimum monthly discharge of 10 cfs, a maximum monthly discharge of 483 cfs, and an average monthly discharge of 50.4 cfs. These records indicate that low flows usually occur during the months of January and February, and that peak flows take place during May and June.

The lack of baseline water quality information prompted CSM to conduct a detailed water quality study in 1978 and 1979. During the early spring to the late fall (April-November) in 1978, water quality data were collected on a monthly basis at eight sites in the study area (Figure 6). In 1979, bimonthly samples were collected at the stations. Bi-monthly samples were also collected during the 1980 field season. The results of the monitoring is summarized in Table 4. A copy of the full report Environmental Background Report, Stibnite Mining Project (JMM, 1979) is available at the Big Creek Ranger Station District office at McCall, Idaho.

TABLE 4
SUMMARY OF SURFACE WATER QUALITY MONITORING PROGRAM FOR PROPOSED STIBNITE MINING PROJECT 1978, 1979, 1980 KEY PARAMETERS*
(16 OF 33 PARAMETERS)

PARAMETER (UNIT)	SITE 1	SITE 2	SITE 3	SITE 4	SITE 5	SITE 6	SITE 7	SITE 8
Conductance (µmho/km)**	105/46	88/55	120/62	109/50	106/60	209/91	129/85	134/72
C.O.D. (mg/l)	12.4/5	14.0/3.2	13.8/5.7	20.4/4.7	14.4/4.7	6.3/1.3	13.4/2.1	9.8/3.5
Nitrate - N (mg/l)	0.01/0.01	0.01/0.01	0.33/0.25	0.38/0.25	0.25/0.25	0.25/0.25	0.31/0.25	0.25/0.25
Total P (mg/l)	0.05/0.025	0.05/0.025	0.11/0.05	0.065/0.05	0.07/0.05	0.05/0.025	0.08/0.025	0.06/0.05
Tot. susp. solids (mg/l)	4.8/0.2	13.7/0.1	75.2/0.2	25/0.4	47.6/0.8	26.5/0.1	84/0.4	2/0.6
Dissolved Oxygen (mg/l)	11.7/8.2	12.2/9.8	12/8.3	10.6/8.6	11.8/8.2	12.1/9.6	10.8/8.2	11.8/8.5
Temperature °C	11/3.5	10/2	14/1	10/5	13/4.7	7/4	11/5.5	12/6.5
Turbidity (NTU)	4.2/1.2	4.9/0.2	14/1.6	7.8/0.35	13/0.61	11.7/0.22	32/0.47	12/0.55
Field pH	8.4/7.2	8.0/7.3	8.1/5.3	8.1/6.0	8.4/6.4	7.9/7.2	7.8/7.1	7.7/7.1
Hardness ($CaCO_3$) (mg/l)	33/14	34/16	49/18	49/22	45/18	108/28	61/31	42/17
As (mg/l)	0.01/0.004	0.02/0.008	0.24/0.03	0.23/0.09	0.14/0.05	0.072/0.004	0.48/0.02	0.26/0.08
Ca (mg/l)	10/7.8	9.5/8.0	14/12	14/11	13/10	27/10	19/16	16/11
Fe (mg/l)	0.12/0.04	0.46/0.02	2.2/0.26	0.33/0.02	1.0/0.12	0.05/0.02	1.6/0.03	0.6/0.15
Mg (mg/l)	1.8/0.7	2.5/1.2	3.5/1.4	3.5/1.5	4.8/1.6	10/4	4.8/1.8	3.7/0.82
Sb (mg/l)	0.01/0.005	0.005/0.004	0.39/0.04	0.25/0.06	0.28/0.04	0.013/0.003	0.07/0.008	0.21/0.08
Tot. Coli/(lbs./100 ml)	230/5	62/1	180/4	110/1	36/2	14/1	47/3	58/1

High/Low - Range of Analysis
*Complete water quality records are on file with the Big Creek Ranger District, Payette National Forest
**Specific electrical conductance (µmho/cm)



WATER QUALITY SAMPLING SITES, FIGURE 6

Generally, the baseline water quality monitoring program indicated that the surface waters within the drainage of the EFSF Salmon River are of excellent quality. The analysis indicates that dissolved oxygen levels are consistently high (8.2 to 12.1) at all of the stations. pH values range from 5.3 to 8.4. Total hardness (as $CaCO_3$) ranges from 14 mg/l to 108 mg/l over the eight stations. Arsenic concentrations at sites 3 and 8 were 0.24 and 0.26 mg/l, respectively, which is expected in view of the geologic conditions which characterize the area and the magnitude of post-mining activities. Generally, most other chemical parameters increase in a downstream direction from Site 1 above Meadow Creek to Site 8, below the abandoned pit in the EFSF Salmon River. The only significant change in water quality observed during the study occurred in response to peak spring runoff (May and June). This was most evident in the suspended solids and turbidity measurements at the sampling stations below the existing tailing pond (Stations 3-5-7-8). This increase in the spring sediment loading has been observed over the years by Forest Service personnel. A primary contributor appears to be the gradual erosion and instream transport of the fine materials that make up the existing tailing pile.

Surface water throughout the study area is extremely soft (low calcium and magnesium hardness), low in nutrients and associated ions (i.e., iron, manganese, etc.), high in dissolved oxygen, and fairly low in phytoplankton productivity, thus providing a relatively sterile environmental system. Physical alterations of the stream bed and channel, the poor condition of the existing tailing pond, and the general disturbance of land bordering the streams have caused the greatest amount of water quality degradation in the drainage.

As previously discussed, high level aerial photographs taken during the period 1952-1979 were evaluated to determine the possible impacts of erosion from the old existing tailing pile on instream water quality and the general condition of the aquatic habitat. The tailing pile is made up of very fine silt-to-sand-sized materials (0.05 to 6.4 mm in diameter), which were deposited as a slurry during approximately seven years of mining and processing. Figure 5 (presented earlier in this section) has been highlighted to portray the amount of erosion and resultant discharge of suspended sediment and fine particles which have been deposited into the system during the period. In 1952, little or no material had been lost from the main tailing pile into Meadow Creek. By 1964, significant sloughing had occurred, as evidenced by the photographs. The 1979 photograph shows major areas where sediment has been carried and/or washed into Meadow Creek. Preliminary calculations using recent photogrammetric topographic maps indicate that in excess of 10,000 tons (160,000 cf) of material have been deposited into the stream from the main wash alone. Suspended solids and turbidity data collected over the last two years indicate that the majority of this material is being generated during spring runoff.

A detailed evaluation of the heavy metals in the drainages surrounding the project area was also conducted as part of the baseline water quality evaluation. Due to the existing mineralogy (rich in mercury, arsenic, iron, etc.) of the Stibnite area, and the increasing public concern over the effects of such elements as lead and mercury, it was decided to continue the analyses over the entire sampling period. The toxic effects of heavy metals such as arsenic, lead and mercury from natural and man-caused sources are of increasing concern to numerous researchers and regulatory agencies. Contamination by toxic metals affects the entire biota. However, most attention has focused on the potential public health hazards to man and toxicity to fish.

Results of heavy metal analyses for water samples collected during the two-year Stibnite monitoring program are discussed in detail in the Environmental Background Report, Stibnite Mining Project (JMM, 1979). From this information, it can be seen that heavy metal concentrations in the water samples (with the exception of arsenic) are below maximum acceptable drinking water levels. Levels increase immediately downstream from previous mining-impacted areas (Sites 3,4, and 8). Arsenic concentrations show high level increases at Sites 3 and 8 (Figure 6). Concentrations five times the maximum allowable drinking water standard were observed at these monitoring stations (particularly during periods of high runoff). This condition is expected, given the heavy flushing action of surface waters, and the high grade arsenic-bearing mineralization (i.e. arsenopyrites) which characterizes the area.

The ability of fish to concentrate heavy metals above the levels found in their environment is well documented (USGS, 1970; Kamps et al, 1972). The results of an analyses of fish sampled in conjunction with the water quality monitoring program are presented later in this section.

6. Groundwater Systems

The groundwater systems in the Stibnite study area involve deposits of fluvial sand and gravel including glacial outwash (50-300 feet). Expected well yields in the area range from one to 20 gallons per minute (IDWRB, 1968).

In order to develop a baseline of existing groundwater quality, five wells were drilled in 1978 as an element of the monitoring program developed for the Stibnite pilot plant operation. Four wells were drilled at strategic locations below the mine area (Figure 6). A well was also drilled downgradient from the leach plant. The locations were designed to establish background levels for 16 chemical parameters, and to determine any potential leakage of cyanide from the test leach pad.

Information from the four sampling stations at the proposed West End Mine site indicate that groundwater at the site is generally moderately hard (Table 5). Hardness values (as $CaCO_3$) generally range from 101 to 219 milligrams per liter (mg/l).

TABLE 5

GROUNDWATER MONITORING DATA FOR WEST END MINE SITE, 1978

GROUNDWATER SAMPLING STATIONS 10-16-78 STATION				
Parameter (Unit)	1	2	3	4
Hardness* (mg/l)	219	179	154	101
Aluminum (mg/l)	19	4.4	< 0.2	< 0.1
Arsenic (mg/l)	0.4	1	0.08	0.01
Calcium (mg/l)	58	42	40	25
Cadmium (mg/l)	0.0008	0.0014	0.00072	0.0002
Copper (mg/l)	0.13	0.013	0.0008	< 0.001
Iron (mg/l)	55	9.7	< 0.02	< 0.02
Mercury (mg/l)	0.0002	0.0002	< 0.0002	0.0004
Magnesium (mg/l)	18	18	13	9.5
Manganese (mg/l)	6.5	1.3	0.02	< 0.01
Sodium (mg/l)	18	1.2	1.2	0.5
Nickel (mg/l)	0.1	0.02	<0.02	< 0.01
Lead (mg/l)	0.008	0.005	0.001	< 0.001
Antimony (mg/l)	0.017	0.01	0.01	< 0.005
Zinc (mg/l)	1.3	0.47	0.05	< 0.01

* Hardness calculated from calcium and magnesium.

Arsenic levels in three of the four wells sampled were higher than what would normally be expected for groundwater supplies. A maximum concentration of 1.0 mg/l arsenic was measured at Well 2. This compares to the EPA recommended criteria of 0.05 mg/l arsenic for drinking water supplies. Iron levels in two of the samples (55 mg/l at Well 1, and 9.7 mg/l at Well 2) also exceeded the recommended criteria of 0.3 mg/l for iron in drinking water supplies. Mercury levels were lower than expected given the known mercury deposits which occur in the Stibnite area. Other general parameters measured were within recommended criteria established by EPA.

Overall, the groundwater quality of the four wells was fairly good. Generally, calcium and magnesium hardness was two to three times higher than the surface resource, as might be expected. Ionic constituents (i.e., sodium, calcium, etc.) were also higher than levels observed for the surface water samples.

Water quality data for the well located below the leaching pad is presented in Table 6. The well was installed in 1978 to monitor po-

tential leakage of cyanide at the facility. Initial water quality data shown in Table 6 indicates localized degradation in the system resulting from construction activities and the introduction of the packing materials (bentonite clay and others) at the time the observation well was drilled. Once these materials settled out of the system (no test pumping was conducted), the overall groundwater quality improved appreciably as shown in the results of the September sampling. The analysis did not indicate the presence of cyanide in the aquifer above the minimum level of detection for the test procedure utilized.

TABLE 6
GROUNDWATER MONITORING RESULTS FOR TEST WELL BELOW LEACHING PAD, 1978

TEST WELL BELOW LEACHING PAD					
	8-15-78		9-4-78		10-16-78
PARAMETER (UNITS)	FILTERED	DIGESTED	FILTERED	DIGESTED	FILTERED
Hardness ($CaCO_3$) (mg/l)	830	1000	249	228	174
Aluminum (mg/l)	150	375	38	60	5.4
Arsenic (mg/l)	1	2	1	2	2
Calcium (mg/l)	120	120	42	42	40
Cadmium (mg/l)	-	0.012	-	0.0012	0.0012
Copper (mg/l)	0.46	0.84	0.087	0.12	0.022
Iron (mg/l)	204	620	82	148	28
Mercury (mg/l)	-	0.0060	-	0.0014	0.0004
Magnesium (mg/l)	130	190	35	30	18
Manganese (mg/l)	15	18	3.6	3.7	1.8
Nickel (mg/l)	0.26	0.58	0.06	0.14	0.15
Lead (mg/l)	0.054	0.076	0.035	0.060	0.008
Antimony (mg/l)	0.02	34	0.094	8.2	0.01
Zinc (mg/l)	3.9	4.7	3.3	3.3	0.66
Cyanide (mg/l)	< 0.005	-	< 0.005	-	< 0.005
	non-digested, non-filtered		non-digested, non-filtered		
Sodium	19		19		1.4

The test pad well was resampled during the 1979 operating season. The results of the analyses are presented in Table 7. Groundwater quality was similar to that observed for the 1978 analyses. Data showed hard water, with hardness (as $CaCO_3$) ranging from 329-500 mg/l. Arsenic and iron concentrations were elevated. Mercury levels remained low (less than 0.003 mg/l). The analyses did not show any cyanide present in the samples (less than 0.001 mg/l).

TABLE 7
GROUNDWATER MONITORING DATA FOR TEST WELL BELOW LEACHING PAD,
CANADIAN SUPERIOR MINING (U.S.) LTD. PROJECT AT STIBNITE, IDAHO, 1979

PARAMETER	7/27/79 FILTERED	9/10/79 FILTERED
Hardness ($CaCO_3$)(mg/l)	329	500
Aluminum (mg/l)	65	25
Antimony (mg/l)	0.022	0.020
Arsenic (mg/l)	1.29	0.38
Calcium (mg/l)	46	54
Iron (mg/l)	160	104
Magnesium (mg/l)	52	89
Manganese (mg/l)	6.6	4.0
Mercury (mg/l)*	0.003	0.0005
Cyanide (mg/l)	0.001	0.001

*Mercury digested as received.

7. Physical Hazards

Physical hazards in the Stibnite area are limited to four general types which involve: 1) erosion potential; 2) flooding; 3) fault zones and seismic risk (including potential associated mass failure); and 4) excessive slopes. Erosion potential and seismic risk were discussed previously in this section. A more detailed discussion of these considerations and slope factors related to the proposed mine and waste dump areas, haul road routing and leach plant location is also presented in the Geotechnical Evaluations Canadian Superior Mining, Ltd. Project on the Payette National Forest (NTL, 1979), which was prepared as a support document to this report.

Slope problems relate primarily to the construction of roads and the potential for mass failure of road surfaces and fill material. Generally, the steeper the side slope the greater the potential for mass failure. Slopes in the area proposed for the two mine sites and access roads range from 23° to 28°.

Information on flood hazards and historical flooding for the study area is limited. A 1974 Flood Report for the Payette National Forest describes severe flooding which occurred following record high spring runoff (Kulesza and Skabelund, 1974). Streams affected in the Stibnite area included the EFSF Salmon River, Sugar Creek, and Tamarack Creek. No official flood hazard surveys or other information have been prepared for these streams.

According to the flood report, damage throughout the Payette National Forest involved industrial facilities, a major fish loss of over five million steelhead fry at the Rapid River Salmon Hatchery, agricultural losses, flooding of numerous residences, and heavy damage to transportation facilities throughout the study area. Above Yellow Pine, the road between Yellow Pine and Stibnite was severely washed out at 23 different sites. The bridge at Tamarack Creek was destroyed and required replacement. Damage in the locality was estimated at $145,000. Climatic events preceeding the flood included above-average amounts of winter precipitation (7.02 inches above the normal), below-normal spring temperatures, and a sudden warming period in June.

Few measurements of the amount of sediment and debris transport or deposition were made in the major drainages during this high flow period. However, visual observation showed that flows in the EFSF Salmon River were particularly high, and a large amount of logs and other debris was transported through the channel systems. Suspended sediment levels were also described as high.

The report also noted that flood damage and erosion throughout the forest was dependent to a large degree on types of soils, plant cover, and bedrock characteristics. Where stream banks were armor-plated with large rock, or stabilized with heavy bush and grasses, erosion was substantially reduced. These types of considerations will be discussed later in this report as they relate to recommended mitigation for mine and waste dump areas, roadcuts, etc.

While streamflows for the EFSF Salmon River, Sugar Creek and Tamarack Creek were not discussed in the report, it was noted that recorded peak flows exceeded past records. An indication of the increased magnitude of streamflows is provided by a comparison of water year average discharges near Krassel Ranger Station on the South Fork of the Salmon River. During the period 1966-1973, the mean water year streamflow for the drainage was 637 cfs. This compares to a water year average of 1,126 cfs which occurred in 1974. No estimates of peak streamflow discharge are available for the EFSF Salmon River (just downstream from the confluence with Sugar Creek) for the flood episode. However, an estimated 6,500 cubic yards of sediment entered Sugar Creek in the lower two miles of the stream.

Executive Order 11990, "Protection of Wetlands" (May 24, 1977) and Executive Order 11988, "Floodplain Management" (May 24, 1977), advocate the retaining prime wetlands and acting to reduce the risk of flood loss and minimize impacts of floods on human safety and welfare. Planning and management constraints which address these concerns as related to the proposed action and alternatives are discussed later in Chapter 4 of this report. More specific flood hazard concerns related to design and construction of the leach plant, bridges, culverts, etc. will be presented in the final Operating Plan.

BIOLOGICAL ENVIRONMENT

1. Plant Communities

Most sites disturbed by surface mining activities require some type of revegetation. Soils and planting surfaces exposed by road construction, mining excavation, and other related activities may change to the extent that few plants can re-establish and persist on them. More significantly, stabilization and revegetation of bared surfaces is important in the rehabilitation of disturbed areas because they reduce the potential for sediment production from runoff.

Vegetation for erosion and sediment control purposes should be an integral part of the planning and design phases for any proposed mining activities. It is therefore important that existing plant communities and species types are inventoried prior to any mining activity. The objectives of such an inventory are: 1) evaluate native species for reclamation application; and 2) determine the presence of potential threatened or endangered species so that adequate measures can be taken to protect these plants from disturbance and/or encroachment.

The forest communities in the Stibnite mining area consist of four main series which are identified by the primary tree species which occupy the site (pers. comm., Noblitt, 1980). These series are subalpine fir, lodgepole pine, Douglas fir, and ponderosa pine.

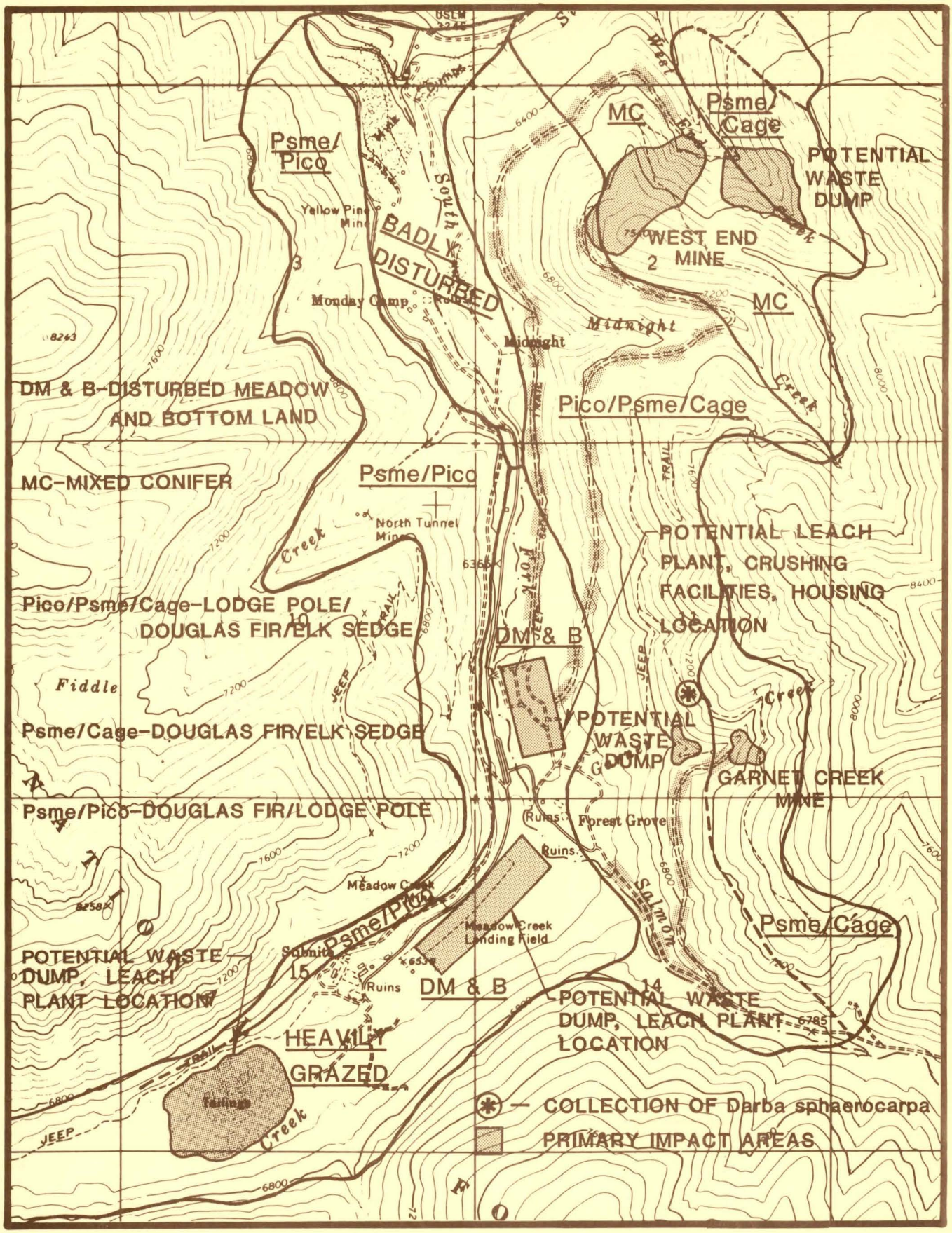
A seasonal vegetation analysis was performed by the study team during the fall season, 1979. Three primary sites, including the West End Mine site, Garnet Creek site, and the proposed leaching facilities site, were surveyed, and extensive plant collecting was conducted. No established plant species were observed at the existing tailing pile.

A summary of site conditions and major vegetation types is presented in the section that follows. A complete checklist of plants collected at the study area is on file at the Big Creek Ranger District office at McCall, Idaho. A general distribution map for the major species is also included as Figure 7.

Site 1 (West End Mine/Waste Dump Area) - The West End Mine site consists of a steep (up to 45 percent) forested hillside (elev. 6,500 to 7,500 feet) north-facing slope. Mixed coniferous forest occupies the majority of the site. Primary species are lodgepole pine, white fir, Douglas fir, and Engelmann spruce. Understory species include grouse whortleberry, big whortleberry and elk sedge.

Site 2 (Garnet Creek Mine) - The Garnet Creek Mine site is located near mid-slope, and is characterized by a dense, mixed coniferous forest. Douglas fir is the dominant species. The site is steep and faces northwest. The area is somewhat moister than the West End location. Understory species are similar to Site 1, but also include mountain maple, shiny spiraea and snowbrush.

Site 3 (Leaching/Processing Facilities Areas) - The potential processing facilities sites are located on Meadow Creek landing field, at



VEGETATION TYPES MAP

FIGURE 7

Adkin's Flat, and at the existing tailing pile (Figure 2). The airstrip was heavily used during previous tungsten and antimony mining operations at Stibnite, and is essentially void of any vegetation as a result of periodic maintenance, grading, and resurfacing. The second site considered for the leaching facilities is located in a flat valley meadow area known as Adkin's Flat. The area was previously used as a townsite, and vegetation is limited to native sedges and sparse lodgepole pine. The third site, the existing tailing pile, does not support major vegetation types due primarily to soil conditions and the abrasive action of the fine grained material during wind storms.

Within the general area of Stibnite in Valley County there are five plant species which are classified as candidate species for the Threatened and Endangered Species List, according to the U.S. Fish and Wildlife Service. These species will probably be reclassified as "sensitive" for the Forest Service. These species are listed in Table 8. In considering endangered, threatened, and sensitive flora of the Payette National Forest, Noblitt (1979) lists 23 sensitive species which occur on or adjacent to the Forest. He also lists two species common elsewhere, but rare in Idaho. Of these 23 species, the following were judged potential inhabitants of the study area: Mirabilis macfarlanei - (habitat for this species is unlikely in Stibnite area); Allotropa virgata; Chaenactis evermanii - (found in areas similar to Stibnite in the Payette National Forest); Draba sphaerocarpa - (found in areas similar to Stibnite in the Boise National Forest).

TABLE 8
CANDIDATE PLANT SPECIES FOR THE THREATENED AND ENDANGERED SPECIES LIST KNOWN TO OCCUR IN THE AREA OF VALLEY COUNTY, IDAHO[1]

SPECIES	STATUS
Draba argyraea Rydb. Recommended for removal from the threatened list by Henderson et al. (1977).	Threatened
Draba shpaerocarpa Macbr. & Pays. Recommended for removal from the threatened list by Henderson et al. (1977)	Threatened
Allium madidum Wats. Has been found in NW Valley Co.	Threatened
Tofieldia glutinosa (Michx.) Pers. var. absona (Hitch.) Davis Although found near McCall in NW Valley Co. it is not to be expected on the mining site since its habitat is Sphagnum bogs and this habitat is absent from the Stibnite area.	Endangered
Castilleja oresbia Greene. Has been found in central western Valley Co. and occurs on exposed, sometimes eroded slopes.	Threatened

1 Source: Henderson et al., 1977; Pers. Comm., U.S. Fish and Wildlife Service, 1980.

On the basis of a fall and spring vegetation survey of the study area, none of the plant species listed as candidates for the Threatened and Endangered Species List (Sensitive Flora Checklist) were observed at the inventoried sites. While Draba sphaerocarpa was found on the hillside above the Garnet Creek mine site, the species has been withdrawn from the list of candidate threatened species. The Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Coordinating Committee has also recommended that this species be removed from consideration for threatened status.

2. Aquatic Biology

The abundance and diversity of aquatic plants and vertebrates and invertebrates serve as general indicators of the condition of a particular river or stream. The measurement of changes in biological species composition, diversity and numbers can indicate subtle changes in habitat conditions resulting from development activities such as mining and logging.

Aquatic biology investigations for the Stibnite mining project area were conducted by the study team during August, 1978 and September, 1979. The studies were designed to provide baseline information for future monitoring programs.

Eight aquatic biology stations were sampled in August, 1978. Biological samples were collected at seven of these pre-established stations (Figure 6). No samples were collected at Station 6 because flow at the lower West End Creek site is essentially seepage emanating from a series of small springs. Station 10, which is located approximately seven miles downstream from Site 8 on the EFSF Salmon River, was also added.

Benthic (bottom-dwelling) macroinvertebrates sampled at the eight stations are summarized in Table 9. Predominant organisms were of four major orders: Trichoptera (caddisflies), Ephemeroptera (mayflies), Diptera (true flies), and Plecoptera (stoneflies). Species composition at the sites indicated generally good water quality conditions.

The periphyton (attached algae) community was sparsely distributed at Sites 1, 3, 4 and 7, and was primarily composed of blue-green algae attached to the undersides of rocks. Presence of the species (Nostoc sp.) indicates clean, well-oxygenated water. Downstream of Site 8 (EFSF Salmon River station), periphyton was extremely dense and composed primarily of chlorophyta with long streamers extending two to three meters in length. This increased density was attributed to the channel openness and apparent leaching of nutrients from exposed soils.

TABLE 9
SUMMARY OF AQUATIC BIOLOGY SAMPLING,
PROPOSED STIBNITE MINING PROJECT STUDY AREA, AUGUST, 1978

Station	Macroinvertebrates Sampled (Order)	Dominant Periphyton Present
Site 1 (one mile upstream from Stibnite Mill ruins on Meadow Creek)	Trichoptera, Coleoptera, Ephemeroptera	Blue-green algae
Site 2 (EFSF Salmon River, one mile upstream of confluence with Meadow Creek)	Trichoptera, Ephemeroptera	Not identified
Site 3 (Meadow Creek, immediately above confluence EFSF Salmon River)	Diptera	Blue-green algae
Site 4 (Garnet Creek above EFSF Salmon River)	Diptera, Trichoptera, Ephemeroptera	Blue-green algae
Site 5 (EFSF Salmon River above Glory Hole)	Ephemeroptera	Not identified
Site 7 (Sugar Creek near bridge, above EFSF Salmon River)	Ephemeroptera	Blue-green algae
Site 8 (EFSF Salmon River, near confluence Sugar Creek)	Trichoptera, Ephemeroptera	Chlorophyta (with long streamers)
Site 10 (EFSF Salmon River, 7 miles downstream from Stibnite)	Not sampled in 1978	Not sampled in 1978

A more intensive biological survey of the eight water quality monitoring stations was conducted by the study team in September, 1979. Periphyton sampling showed similar results to the 1978 sampling, with low periphytic growth at all of the sites sampled except Station 8. The large quantity of periphyton at this site appeared to provide a good forage base for macroinvertebrates.

A more detailed discussion of periphyton occurrence is presented in Biological and Prehistoric Cultural Resources Evaluation of the Proposed Canadian Superior, Ltd. Mining Project at Stibnite, Idaho (DRI, 1980) supplemental report on file at the Forest Service Big Creek Ranger District office at McCall, Idaho. The report also discusses mean diversity indices (a measure of induced stress on the structure of the biological community) for the study area.

A summary of the relative abundance of the benthic macroinvertebrates for the eight sampling stations is presented in Table 10. Mayflies and dipterans were the dominant groups found comprising 37 percent and 36 percent, respectively. The eight stations were also evaluated in terms of benthic communities and those stations altered by previous mining activities (Sites 3, 4, 5 and 8) versus those which have not been altered (Sites 1, 2, 7, and 10). At the unaltered sites, mayflies were dominant, comprising nearly 46 percent of the total population. Most

mayflies are considered indicators of good water quality. True flies (25.5 percent), stoneflies (16.4 percent) and caddisflies (12 percent) were also present. True flies were the dominant group at the altered sites, comprising 39 percent. Of these, the Chirmonomidae family (non-biting midges), comprised 92 percent. Chirmonomidae are an important food source for several fish species including adult trout and are tolerant of a wide range of water quality conditions. Mayflies (35 percent) and caddisflies (24.3 percent) were also prominent at these sites.

TABLE 10
SUMMARY OF RELATIVE ABUNDANCE OF MACROINVERTEBRATES,
PROPOSED STIBNITE MINING PROJECT STUDY AREA, SEPTEMBER, 1979

	Station (numbers/m^2)							
Order	1	2	3	4	5	7	8	10
Trichoptera (Caddisflies)	33	120	445	885	1597	725	3305	1930
Ephemeroptera (Mayflies)	54	601	1411	1421	1952	2746	4788	1991
Coleoptera	--	--	43	11	--	11	--	11
Hirudinea	--	11	11	--	--	--	--	--
Hydracarina	--	--	--	--	11	--	--	--
Plecoptera (Stoneflies)	216	65	22	--	22	970	110	271
Diptera (True flies)	119	1046	822	584	5006	724	5321	1144

3. Fish

Ebel et al. (1979), Ortman (1979), and a number of other researchers have described the current crisis of salmon and steelhead populations in the Snake River System associated with dams (annual summer chinook runs over Bonneville Dam have declined from 200,000 in the mid-1950's to less than 50,000 for the years 1973-1977). This section provides a summary of the existing fish resources in the Stibnite study area. The discussion will also highlight the effects of past logging activities and road construction on local fish populations as a gauge of the effects these activities can have when sound planning and engineering considerations and reclamation measures are not applied.

The South Fork Salmon River Drainage, which includes the EFSF Salmon River, Meadow Creek, and Sugar Creek in the proposed Stibnite mining project study area, has historically contained one of Idaho's largest salmon runs. Prior to 1973, about 20 percent of the total salmon redds counted in Idaho were found in the South Fork Salmon River (Platts, 1979). On the basis of redd counts, the South Fork is considered one of the single most important summer chinook spawning streams in Idaho (IDF&G, 1974).

Since the early 1960's the South Fork of the Salmon River has been studied extensively because of major declines in summer chinook populations. Salmon redds in the mainstem South Fork decreased from over 2000 in 1960 to approximately 100 in 1979 (pers. comm., Reid, 1980). Erosion produced by severe winter storms in 1964 and 1965, and fires, logging activity and construction of access roads were determined to be primary causes of large scale sediment buildup which occurred in the South Fork of the Salmon River upstream from its confluence with the EFSF Salmon River (Corley, 1976). The South Fork of the Salmon River was incapable of discharging bedload sediment as fast as it accumulated. In 1967, for example, an additional 70,250 cubic yards of sediment was produced by those activities. In comparison, natural erosion in the South Fork was estimated to be 21,750 cubic yards. Main access roads and logging roads accounted for approximately 85 percent of the accelerated sediment levels. As a result of these findings, logging was suspended in 1965, and a rehabilitation program was initiated in an effort to stabilize roads and disturbed slopes in the drainage system (USFS, 1973).

Accelerated production of fine sediments has been cited as one of the significant causes of aquatic habitat degradation and the decline in summer chinook populations. Accumulated fines in spawning areas lower the material's permeability to water and thus reduce oxygen transport and removal of nitrogenous waste from egg pockets. Fines also entrap salmon embryos in the gravel, preventing them from emerging as fry (Bjornn, 1973; McCuddin, 1977). Other major contributing factors for the reduction in the anadromous fishery include: 1) passage problems for smolts and adults at dams on the Columbia and Snake Rivers; and 2) overharvest of salmon by marine and lower Columbia commercial and recreational fishermen. Studies of the trends in wild salmon populations are being conducted by the U.S. Fish and Wildlife Service and National Marine Fisheries Service as an evaluation of the species status under the Endangered Species Act.

Extensive mining has not occurred in the study area since 1952. However, studies in other areas of the state (i.e., Panther Creek, South Fork Coeur d'Alene, Indian Creek) have documented damage to the aquatic habitat and fishery resources resulting from mining activities. The remaining portion of this discussion is intended to establish a baseline to be used in monitoring the potential effects of the proposed Stibnite Mining Operation on fish populations in the study area, and to help analyze the effectiveness of planned pollution abatement systems.

This discussion is based primarily on the results of two intensive stream surveys which were conducted in August, 1978 and September, 1979 by the JMM study team. The surveys were performed because previous studies concentrated on the South Fork of the Salmon River, above the confluence with the EFSF Salmon River and Secesh River. Other related information and studies were also used, as applicable, to define existing fish habitat conditions in the study area.

According to the Idaho Department of Fish and Game (IDF&G) the primary fish species present in the Stibnite study area include chinook salmon (Oncorhynchus tshawytscha), cutthroat trout (Salmo clarki), rainbow trout (Salmo gairdneri), and Dolly Varden (Salvelinus malma). Other species occurring in the study area are shorthead sculpin (Cottus confusus) and mountain whitefish (Prospuim williansomi). Some cutthroat trout are of the westslope strain, based on the results of a 1979 study by the University of Idaho Department of Biological Sciences (Wallace, 1980).

While the IDF&G has been doing extensive work in many parts of the Salmon River drainage directed at re-establishing the anadromous fish populations, no effort has been made in the Stibnite area due to existing environmental conditions (pers. comm., Reid, 1978). The IDF&G does, however, plant the area with rainbow, juvenile steelhead, and cutthroat. In 1978, 3,500 catchable rainbow and 200,000 juvenile steelhead were planted in the EFSF Salmon River including the Stibnite area (IDF&G, 1979). The department also conducts an extensive Chinook planting program in the South Fork of the Salmon River.

In August, 1978, fish species were collected at the eight water quality monitoring stations. Fish species present were cutthroat trout and Dolly Varden. These species were found at seven of the eight sampling stations. Site 6, which is located in the lower portion of West End Creek, was not sampled because stream flows and habitat conditions appeared to preclude any fish inhabiting the stream. Fish condition for the samples collected was generally good to excellent.

In September, 1979, a second survey was conducted by the study team. The results of the survey are presented in Table 11.

TABLE 11

FISH SPECIES COMPOSITION AND RELATIVE ABUNDANCE, STIBNITE, IDAHO,1979
(Total Number/1000 Meters Sampled), and Frequency of Occurrence

Fish Species		Relative Abundance		
Common Name	Scientific Name	Percent	Number	Occurrence
Shorthead Sculpin	Cottus confusus	8.8	14	1
Chinook Salmon	Oncorhynchus tshawytscha	1.3	2	1
Dolly Varden	Salvelinus malma	16.3	26	3
Rainbow Trout	Salmo gairdneri	5.6	9	5
Cutthroat Trout	Salmo clarki	68.1	109	9
TOTAL		100	160	--

Cutthroat was the predominant species sampled, comprising 68 percent of the total catch. This species was captured at all sites. Dolly Varden was second in relative abundance. Sculpin, chinook salmon, and rainbow trout comprised the remaining species.

Distribution patterns of fish within the study area were apparent. Dolly Varden were found in the upstream areas unaffected by historical activities (Stations 1, 2 and 7). These streams are characterized by low stream flows, dense riparian vegetation, and clean rock and gravel substrates. Cutthroat were present throughout the study area, indicating a wide range of habitat adaptability for both altered and unaltered stream areas. Rainbow trout were also widely distributed throughout the study area, but were predominant in the disturbed sites. Most of the rainbow trout captured had eroded dorsal fins which are characteristic of hatchery-reared fish. The rainbow trout captured were probably residuals from the IDF&G planting program. Station 10 (located in the EFSF Salmon River 6.7 miles downstream from the confluence with Sugar Creek) was added to the monitoring program. Cutthroat, chinook salmon, and shorthead sculpin were captured at this site.

Presently summer chinook salmon are found only in very limited numbers the South Fork of the Salmon River (Simpson and Wallace, 1978). No recent observations of chinook salmon spawning in the vicinity of Stibnite have been recorded. The presence of one juvenile chinook at Station 10 may indicate spawning occurred in the area, or that adults spawned elsewhere and juveniles subsequently moved into the area (Platts, pers. comm., 1979).

The 14 sculpin captured at Station 10 were sent to Dr. Richard Wallace of the Department of Biological Science, University of Idaho, Moscow, for taxonomic verification. All species were verified as sculpins (Cottus confusus). Sculpins are benthic predators, and have been used as indicators of high water quality. Their absence in the vicinity of Stibnite and presence downstream could be related to the degree of habitat disturbance which has occurred in the study area, or to temperature extremes and winter icing conditions experienced at the higher elevations in the drainage.

Fish diet was also analyzed during the 1979 survey. Terrestrial organisms comprised 43 percent of the total diet for all fish. Fish collected at the upstream stations where riparian vegetation was most dense showed a greater proportion of terrestrial organisms in their diets. This is probably due to increased numbers of insects dropping from bushes overhanging the streams.

Fish condition factor was computed for the major species collected at eight stations. Due to the fact that species abundance varied by station, direct comparison of condition factors was not possible. Condition factors would normally be expected to vary by species, age of fish, etc. A more complete discussion of fish condition factors is

presented in Biological and Prehistoric Cultural Resources, Evaluation of the Proposed Canadian Superior (U.S.) Ltd., Mining Project at Stibnite, Idaho, (DRI, 1980) support document which is on file at the Forest Service Big Creek Ranger District office at McCall, Idaho.

Instream Flow Considerations

The quantity of water flowing in a segment of a stream channel can have major effects on water quality characteristics of the stream, and associated aquatic habitat conditions. Water withdrawals become an important consideration when conditions alter the channel or reduce flows below the levels necessary for maintaining aquatic organisms to the extent that the complex interactions which occur within a stream environment are affected.

Predicting the effects on water quality resulting from reductions in instream flow in terms of temperature, oxygen saturation and chemical composition can be accomplished fairly simply. However, predicting effects on the aquatic habitat, fish and other aquatic life is more difficult. A methodology developed by the Fish and Wildlife Service for studying instream flows involves the weighted usable area or index of all habitat available within the limits of the defined use, and the required streamflow for a given species of fish at the various life stages. The comparison, or resulting habitat index, is specific for a particular reach of a stream. The index is defined by the depth, velocity and substrate at a specific stream discharge. By analyzing a stream and determining the weighted usable area for a particular species, the "best" streamflows for various desired management objectives can be determined.

The Forest Service contracted with the Idaho Cooperative Fishery Research Unit of the Fish and Wildlife Service to calculate weighted usable areas for salmon, trout, and whitefish for a number of stream sections in the Stibnite area. This information has been combined with historic streamflow data and proposed operational surface water withdrawals, for use as a tool to predict the potential environmental impacts of water-related development actitivies on fish.

Figure 8 presents an example of the information generated using this approach (U.S. Department of the Interior - Fish and Wildlife Service Instream Flow Group Increment Methodology). The graphs plot the weighted usable habitat area for various life stages of several species of fish at flows expected in the EFSF Salmon River below its confluence with Sugar Creek. This section of stream area was determined to be critical by Forest Service personnel in terms of low flow/aquatic habitat considerations. The data will be utilized to predict the changes in usable area which would occur as a result of project-related diversions or withdrawals, given a known base flow. While this process is not designed to generate "minimum flow" recommendations, it does provide useful information for quantifying and predicting impacts

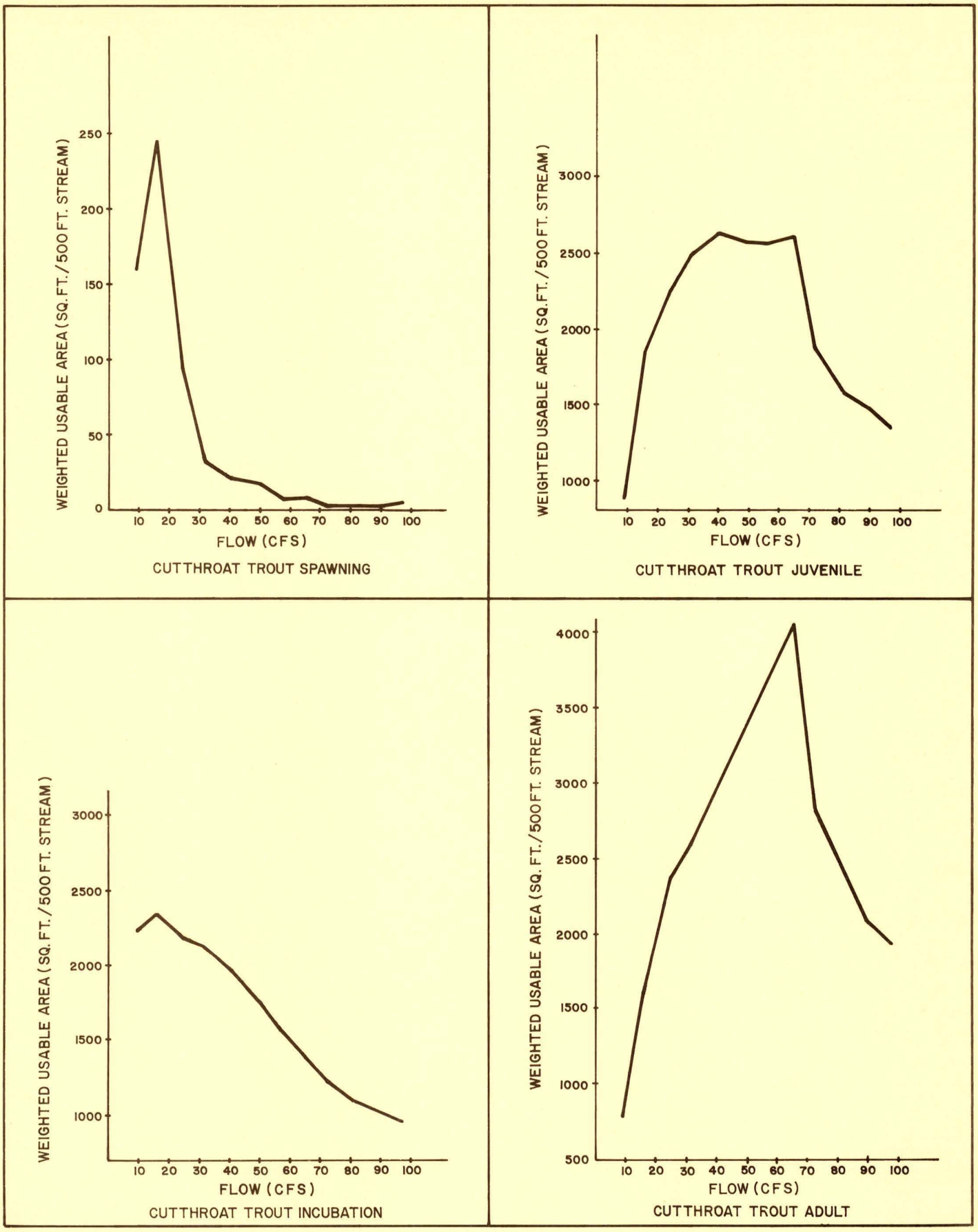


FIGURE 8

SELECTED WEIGHTED USABLE HABITAT AREAS DERIVED FROM THE USDI-FWS INSTREAM FLOW GROUP INCREMENTAL METHODOLOGY

associated with various flows which are described later in Chapter 5 of this report.

Fine Sediment

A great amount of research has been conducted on sediment production and the impacts of sedimentation on aquatic habitat and fish resources in Central Idaho. This interest stems largely from problems that have occurred within the drainage as a result of natural events, as well as earlier development activities (road building, logging, etc.). While sediment production is a natural dynamic process that occurs even in undisturbed areas, accelerated levels of sediment production can have a detrimental impact on aquatic life in streams.

The majority of the studies on sediment production and transport in Idaho were conducted in areas of the Idaho Batholith. The Batholith soils are characterized by granitic formations that readily decompose into coarse sands. These materials are easily eroded, and in steeper areas can wash into streams. However, even some Batholithic soil has been shown to be relatively stable.

Road construction, removal of surface vegetation, and disruption of unstable soil surfaces have been identified as the major types of human-related disturbances which can produce increased deposits of fine sediment in stream channels in the Batholith. Because of the interest placed on bedload sediment yields and effects on fish in central Idaho, one of the most serious areas of concern regarding the proposed Stibnite mining project will be its potential for accelerating bedload sediment production and the effect upon downstream fishery resources.

It is difficult to relate most of the research conducted earlier on the South Fork of the Salmon River to the Stibnite area. Stibnite does not have either the same Batholith-type soils or geologic formations which are characteristic of the study areas cited in the available literature. Soils in the area have been classified as relatively stable by both the Forest Service and a private geotechnical consultant retained to prepare an evaluation for the proposed Stibnite mining project. The geotechnical evaluation generally concluded that while local topography is steep, the areas proposed for mining are stable due to the competent nature of the bedrock. The soil cover in the impact areas is also extremely thin. These factors indicate that these areas have a low potential for generating large amounts of sediment (NTL, 1979).

As discussed earlier, the major source of sediment production in the Stibnite area appears to be the existing tailing area. This material is extremely fine, with a very high erosion potential. Other potential sediment sources include the Yellow Pine Mine Pit (Glory Hole) and waste areas, and existing roads and mine exploration sites in the area. The 1964 dam failure above the abandoned mill site is also considered a major continuing source.

In order to measure existing bedload sediment levels, core samples were taken by the study team at several sites in the main EFSF Salmon River

below Stibnite. The sites sampled were selected by Forest Service personnel (the Payette National Forest Fisheries Biologist), and were determined to represent potential salmon spawning in the study area.

Fine sediments, characterized by particle sizes of less than 6.35 mm, have been shown to have the greatest detrimental effects on insect populations and fish embryo development and fry emergence (Bjornn et al., 1977; McCuddin, 1977). Two sites were established near Salt Creek and Tamarack Creek in the study area, and three samples were collected in transects across the stream at each site in November of 1979. Composite results of these samples demonstrated that at Site 1 (Salt Creek), 28 percent of the core sample material was less than 6.35 mm. At Site 2 (Tamarack Creek), 22 percent was less than 6.35 mm.

Bjornn et al., (1977) in his study of survival emergence of salmon and trout fry in gravel-sand mixtures found that emergence of fry was severely reduced as the amount of fines in the gravel-sand mixtures of spawning areas approached 40 percent. From previous studies, he concluded that riffles with less than 20 percent fine sediment generally provided good spawning habitat and supported excellent salmon fry emergence (approximately 90 percent), while in riffles with over 40 percent fines, emergence decreased appreciably (less than 50 percent emergence). McCuddin (1977) reported that egg emergence in spawning gravels with approximately 20 percent fine sediment produced egg to emergent survival of approximately 70 percent, while gravel with approximately 40 percent fine sediment produced only about 20 percent survival. During the 1979 Stibnite sampling, the substrate appeared free of excessive silt buildup. However, no embedded depth measurements were made.

Special Conditions

The ability of fish to concentrate heavy metals above levels found in their environment is well documented (USGS, 1970; Kamps et al., 1972). Toxicity concentrations for various fish species are also well documented (EPA, 1978; CWRCB, 1973). Due to the increased potential for heavy metal bio-accumulation associated with previous and proposed mining activities at Stibnite, fish tissues and organs from samples collected by the study team during the 1978 and 1979 surveys were analyzed for heavy metal concentrations.

The analysis was intended to provide an accurate determination of baseline concentrations of heavy metals present in fish in the study area. The determination was considered essential due to the level of previous mining activities which had occurred the study area, and the need to establish levels of existing natural or man-caused heavy metal contamination occurring in the study area prior to initiating any new mining operations.

Mercury, arsenic and lead concentrations were selected for the analysis. Mercury (cinnabar) was mined on Sugar Creek and Cinnabar Creek

prior to and during the period 1921 to 1966 by Fern Quicksilver Mining Company, United Mercury Mines, and Bonanza Mines, Inc. The Fern operation (Bonanza Mine) was, in fact, the largest single producer of mercury (1.2 million pounds) in the U.S. during World War II (Lasmanis, 1978). Arsenic was also selected for analysis due to the nature of arsenopyrite mineralization in the area, and the cumulative nature of the metal. Lead concentrations were also measured. Approximately 7,200 pounds of lead were recovered from the Yellow Pine Mine mill and smelter operation at Stibnite.

Fish flesh (muscle), gills and liver were analyzed by approved EPA methodology. The results of the two heavy metal surveys are presented in Table 12. Data shows high background arsenic levels for both sets of fish sampled. This is particularly the case for species collected at Station 8 in the EFSF Salmon River near the confluence with Sugar Creek, where concentrations as high as 22.0 micrograms/gram (µg/g) (parts per million) were recorded. No significant differences in arsenic concentrations were exhibited between fish species sampled.

The California State Water Resources Board has recommended a beneficial use level for arsenic of 1.0 µg/g for water supporting fish and aquatic life. This limit is based on related studies which indicate that freshwater benthic organisms are adversely affected by concentrations as low as 1.3 µg/g. Elevated arsenic levels in fish samples examined are attributed to high background levels in the surface water samples, as discussed earlier in this section. It should be noted that arsenic toxicity to aquatic organisms is highly dependent on the elemental form in which it occurs (CSWRB, 1973).

Mercury concentrations in fish samples were not as high as expected, given the high levels present in water samples and the history of mercury mining in the area. Levels ranged from less than 0.2 µg/g at the upstream sites during the 1978 sampling, to 0.56 µg/g at Site 2 (EFSF Salmon River) for the 1979 survey. The level of mercury which is generally accepted as naturally occurring background levels for most fish is 0.2 µg/g (D'Itri, 1972). The U.S. Food and Drug Administration has also established a 1.0 µg/g mercury concentration as the maximum allowable level for fish flesh. The California State Water Resources Board recommends a beneficial use limit for mercury in water supporting fish and other aquatic life of 0.005 µg/g.

A number of studies have shown a direct relationship between the level of mercury present in a fish species, and feeding habitats and location of species in the food chain (piscivorous species tend to demonstrate higher heavy metal concentrations). Studies have also shown a direct relationship between fish weight and total mercury content (EPA, 1978; Scott and Armstrong, 1972). Fish species and total number of fish collected and analyzed for the Stibnite monitoring program were not adequate to statistically determine these types of relationships. How-

TABLE 12
HEAVY METAL LEVELS FOR FISH FLESH AND TISSUE ANALYSES
PROPOSED CANADIAN SUPERIOR, LTD. MINING PROJECT AT STIBNITE, IDAHO,1978 AND 1979

Station	Sample Type	Species[4]	Parameters[1] Arsenic (µg/g)[2]	Mercury (µg/g)	Lead (µg/g)
1(1978)	Flesh	C	<2[3]	< 0.2	0.3
1	Liver and Kidney	C	< 2	< 0.2	0.1
4	Flesh	C	< 2	< 0.2	0.3
4	Liver	C	< 3	< 0.2	---
4	Flesh and Skin	C	< 2	< 0.4	0.2
4	Liver	C	< 3	< 0.2	---
4	Flesh	C	< 2	< 0.3	0.1
4	Liver	C	< 4	< 0.3	0.2
5	Flesh	C	< 2	< 0.3	---
5	Liver and Gills	C	< 8	< 0.2	---
5	Flesh and Skin	C	< 2	< 0.2	---
5	Liver and Gills	C	< 3	< 0.4	---
7	Flesh and Skin	C	3	< 0.2	0.2
7	Gills	C	< 2	< 0.2	0.2
7	Flesh	C	< 2		0.1
7	Liver	C	<10	---	---
8	Flesh and Skin	C	< 2	< 0.2	0.2
8	Liver	C	16	< 0.3	---
8	Flesh	C	4.7	< 0.2	0.2
8	Liver	C	9.9	< 0.2	< 0.3
1(1979)	Muscle	D.V.,C	< 0.7	0.13	< 0.3
1	Liver and Gills	D.V.,C	< 1	0.16	< 0.4
2	Muscle	C.,D.V.	< 0.6	0.39	< 0.3
2	Liver and Gills	C.,D.V.	< 0.7	0.56	0.3
3	Muscle	C.,R.	< 0.6	0.14	< 0.2
3	Liver and Gills	C.,R.	2.5	0.19	< 0.2
4	Muscle	R.	0.8	0.37	< 0.3
4	Liver and Gills	R.	13	0.12	< 0.2
5	Muscle	C.	5.7	0.08	< 0.3
5	Liver and Gills	C.	6.9	0.08	< 0.3
7	Muscle	D.V.,R.	1	0.10	0.3
7	Liver and Gills	D.V.,R	1.7	0.20	0.3
8	Muscle	C.,R.	0.8	0.12	< 0.2
8	Liver and Gills	C.,R.	22	0.26	0.2
U. Tail. Pd.	Muscle	C.	< 0.6	0.34	< 0.2
U. Tail. Pd.	Liver and Gills	C.	< 0.7	0.07	0.54

[1]Samples were analyzed using cold vapor and graphite furnace atomic adsorption spectrophotometer methods.
[2]µg/g = micrograms/gram or parts per million
[3]<= less than, analysis limited by sample size
[4]D.V. = Dolly Varden, C = Cutthrout, R = Rainbow

ever, data do not show any apparent difference in mercury levels between species. The data do demonstrate that mercury concentrations in fish samples (and water) are higher than what would be expected as naturally occurring background levels, indicating that some mercury uptake in the aquatic food chain is occurring. The information also provides a solid baseline for measuring potential increases in mercury levels in fish associated with any future mining activities in the drainage.

Lead concentrations in fish samples ranged from 0.09 µg/g at Station 1 to 0.54 µg/g at the Upper Tailing Pond Station for the two surveys. No apparent trends were observed at the monitoring stations, as would be expected from the surface water data. Lead toxicity in the aquatic environment is dependent on a number of variables including hardness and dissolved oxygen content. The California State Water Resources Board has recommended a beneficial use level of 0.1 µg/g for water supporting fish and wildlife.

The results of the Stibnite analyses have been submitted to both the Idaho Departments of Health and Welfare and Fish and Game for evaluation. Study findings compare favorably with heavy metal analyses performed by the State Health Laboratory on fish collected in the Stibnite drainage by the Forest Service and IDF&G in 1978. This survey showed arsenic levels in composite fish samples as high as 3.5 µg/g.

Opportunities for reducing heavy metal uptake by aquatic organisms in the Stibnite area associated with the various project alternatives are discussed later in Chapter 5 of this report.

4. Wildlife

The terrestrial wildlife communities inhabiting the Stibnite area are a result of local vegetative patterns and other habitat features including elevation, climate and human activities. The area is characterized by a moderate degree of habitat diversity. A coniferous forest of lodgepole pine, white bark pine, white fir and Douglas fir predominates. Understory consists of grouse whortleberry, globe huckleberry, and elk sedge. Much of the area is steep-sloped, and the climate is charterized by pleasant mild summers and severe winters with cold temperatures and heavy snowfall.

Terrestrial wildlife investigations conducted for the proposed Stibnite Mining Project characterized existing mammal, bird, reptile and amphibian populations through an evaluation of existing information and literature sources, and site-specific field studies (including transect trapping). The study also identified unique wildlife habitat features. Habitat preferences and use patterns were identified for key species.

The Stibnite study area is included in Big Game Management Unit 25, of the IDF&G. According to IDF&G personnel, big game animals which potentially occur in Management Unit 25 are mule deer, elk, black bear,

cougar and mountain goat. Infrequent sightings of moose, bighorn sheep and whitetail deer have also been reported in the Unit. These species generally utilize the region for summer range between seasonal snow cover, and winter on the South Fork of the Salmon River and the EFSF Salmon River below Stibnite, as well as portions of Monumental Creek drainage and the Middle Fork of the Salmon River.

Elk migration routes and winter range areas near Stibnite are shown in Figure 9. The largest elk population in the unit uses the lower portions of Monumental Creek in the Big Creek drainage as a winter range area. This herd migrates to the north of Stibnite in the spring when snow cover leaves the higher elevations. Elk are adversely affected by roads, due to increased noise, vehicular traffic and hunter access. The potential effects of increased human activities, roads, etc., associated with the proposed mining project on elk populations and migration routes are discussed later in Chapter 5 of this report.

Estimated 1979 pre-hunting season populations for the four major big game species in Management Unit 25 are shown in Table 13. As an indication of hunter usage, over 6,000 hunter days for elk are spent annually in the Unit, ranking ninth in the state. Over 2,500 hunter days for deer and 1,300 hunter days for black bear are recorded annually. However, hunter harvest is light, due to extremely rough terrain, lack of access, and heavy vegetation. The IDF&G has established a statewide goal to rebuild elk numbers and allowable harvest to a level equal to that achieved in 1965. The 1965 statewide elk population was estimated at 81,000; while the 1965 harvest was approximately 14,000 (IDF&G, 1978).

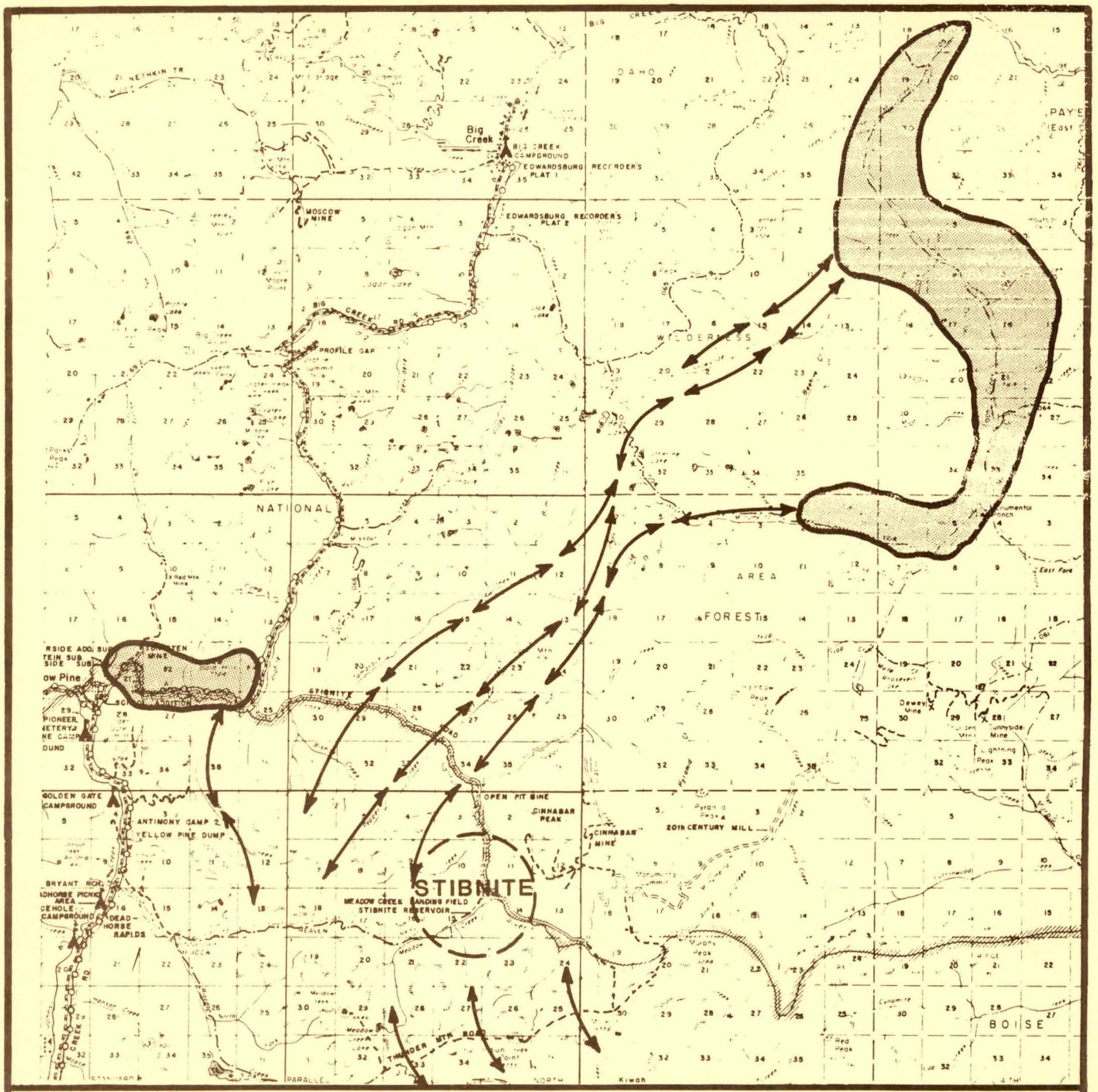
TABLE 13

ESTIMATED PRE-HUNTING SEASON 1979 BIG GAME[1] POPULATIONS IN MANAGEMENT UNIT 25[1]

Species	Estimated Population
Mule Deer	2500
Elk	1100
Black Bear	65
Mountain Lion	45

[1]Source: M. Dunbar, IDF&G, pers. comm., 1979

Mule deer in central Idaho are primarily dependent on bitterbrush and Scouler willow for winter forage. Winter range in Unit 25 is presently converting from a seral succession stage to a climax stage which does not favor these high quality forage species. A mule deer population trend route was established for Unit 25 in 1978. Over 830 animals were counted during the flight. No deer were counted upstream from Deadman Creek on the EFSF Salmon River, which probably indicates that deer



LEGEND

ELK WINTER RANGE

ELK MIGRATION ROUTES

FIGURE 9
ELK MIGRATION ROUTES

wintering in Unit 25 utilize regions lower in elevation than the Stibnite area.

The IDF&G management goals for the state's mule deer population involve rebuilding mule deer numbers to the approximate 1970 level (approximately 300,000 animals), and increasing allowable harvest above the current level (33,000).

Black bear, cougar and mountain goat populations are difficult to assess in Unit 25. The local bear population is thought to be relatively stable, while the status of the mountain goat population is difficult to estimate due to the inaccessibility of their habitat. Cougar populations have been increasing in the unit due to their reclassification as game animals and subsequent protection from predator control programs (IDF&G, pers. comm., 1979).

Small carnivores and furbearing mammals which potentially inhabit the Stibnite area include weasel, badger, river otter, mink, skunk, bobcat, coyote and red fox. Rodents likely to be found in the region are beaver, marmot, squirrel, chipmunk, gopher, vole, woodrat, muskrat, mice and rats. Results of overnight transect trapping at the two proposed mining areas showed deer mice, meadow voles and chipmunks as comprising the majority of the small mammal population at these sites. A complete list of the species which have the potential of occurring in the area is included in full report Biological and Prehistoric Cultural Resources Evaluation of the Proposed Canadian Superior, Ltd. Mining Project at Stibnite, Idaho (DRI, 1979), which is on file at the Big Creek Ranger District office at McCall, Idaho.

Over 200 bird species are either residents or seasonal visitors of the study area. Blue grouse and ruffed grouse are the most important gamebird species. Spruce grouse and mourning dove are found at lower elevations. Waterfowl which inhabit the area include several species of ducks and shorebirds.

Species of Special Concern

The Northern Rocky Mountain wolf (Canis lupus irremotus), a species presently listed as endangered, has been sighted in both the Payette and Boise National Forests. These sightings occurred east of Little Payette Lake (33 miles west of Stibnite) and at Big Creek Summit (approximately 34 miles southwest of the study area). Based on an evaluation of wolf sighting data, existing prey base, and the level of past and present human activity in the Stibnite area, it is not likely that the species is present in the Stibnite area.

The full report of a "Biological Data and Evaluation, Grey Wolf Biological Assessment," conducted for the Northern Rocky Mountain Wolf, as required by Section 7 of the Endangered Species Act of 1973, is available at the Big Creek Ranger District office at McCall, Idaho. The assessment was reviewed by both the IDF&G and the Fish and Wildlife

Service. The Forest Service determined that the Stibnite Mining Project would have "no effect" on the Northern Rocky Mountain Wolf.

Other protected species which could potentially occur in and around the Stibnite area include the peregrine falcon (status endangered), the bald eagle (status endangered), and the grizzly bear (status threatened). Neither the peregrine falcon nor bald eagle are known to nest in the area, although both may fly through as occasional migrants. There have been no reports of grizzly bear in the area.

C. Mineral Resource Values

1. Values of Stibnite Mineral Resources at Utilization

Late in 1978, largely in response to the issuance of the "Rare II, Draft Environmental Impact Statement, Roadless Area Review and Evaluation" report by the U.S. Department of Agriculture, Canadian Superior Mining (U.S.) Ltd. prepared an analysis of historic production statistics and mineral reserves for the entire Stibnite-Yellow Pine Mining District (Lasmanis, 1978). Based on past production records and an update of the 1978 metal prices, the actual net production value and current estimated value of the Meadow Creek Mine (1932-1938) were estimated as follows:

EST. 1932-1938 PRODUCTION		
Gold	- 48,046 oz.	Ore was shipped to
Silver	- 173,176 oz.	Salt Lake City,Utah
Antimony	- 7,003,852 lbs.	as a concentrate
Est. Value of Total net production (1938)		$1,878,000

Similar total net production for the Yellow Pine Mine, which was in production from 1938 - 1952, is estimated at approximately $53 million (Oberbillig, pers. comm., 1950). This figure is based on the following production:

Gold	- 256,442 oz.	Antimony	- 68,516,787 lbs.
Silver	- 1,497,223 oz.	Tungsten	- 865,495 S.T.U.

In 1951, the U.S. Department of Interior Geological Survey estimated that the Yellow Pine Pit and Meadow Creek Mine contained an additional 12 million tons of ore reserves (Cooper, 1951). Subsequent check drilling by private companies during recent years confirmed the following potential reserves:

Antimony Ore Reserves	Gold Ore Reserves
3,477,000 tons	8,236,000 tons

Recent exploration by CSM and El Paso Natural Gas Company has resulted in the discovery of additional ore. These reserves, not previously identified are estimated at:

New Antimony Ore Reserves	New Gold Ore Reserves
4,763,000 tons - Scout Ridge	252,000 tons - Garnet Creek
	1,140,000 tons - Homestake
	3,016,000 tons - West End

The Stibnite area contains approximately 8,240,000 tons of antimony ore and an estimated 12,644,000 tons of gold ore. These deposits amount to an in-place value of over $170 million for known antimony reserves, and a current in-place value of approximately $206 million for known gold deposits.

It should be emphasized that the CSM proposal only involves the West End and Garnet Creek deposits. It should also be noted that these reserve estimates do not take into account actual recoverable reserves, land ownership, and a number of other factors which will ultimately determine the final level of mining which occurs in the total area in the future. These figures also do not consider form of ore, mining and mineral economics, etc. The possibility of recovering by-product tungsten also is not included in these calculations.

The United States is not presently self-sufficient in gold, silver, antimony and tungsten. Based on figures taken from U.S. Bureau of Mines Mineral Commodity Summaries, net reliance on foreign imports as a percent of consumption is as follows (U.S. Bureau of Mines, 1978):

Metal	Net Import Reliance as Percent Of Apparent Consumption
Gold	60%
Silver	42%
Antimony	52%
Tungsten	38%

The national significance of these minerals was demonstrated by past Strategic Minerals Projects and National Security Resources Board programs which were initiated by the federal government at Stibnite during World War II and the Korean War. Approximately 30 percent of the total tungsten and 90 percent of the antimony for the nation's wartime needs were mined from Stibnite during the period 1941 to 1952 (Lasmanis, 1978).

2. Availability

In former operations at Stibnite, the final products were shipped to smelters outside the area mostly in the form of sulfide concentrates. Smelters in the United States can no longer accept such concentrates for conventional treatment due to existing environmental standards and regulations. The sulfides at the Garnet Creek and West End Mine sites have been partially removed from the mineralized zones through natural oxidation processes. The oxidized gold ores have been successfully treated by CSM at the pilot plant operation utilizing heap leaching methods developed by the U.S. Bureau of Mines (Heinen et al, 1977).

The method is also being used successfully at the Windfall, Round Mountain, and Cortez Mines in Nevada, and the Pegasus Explorations, Ltd. operation at Landusky, Montana.

D. SOCIO-ECONOMIC (HUMAN) ENVIRONMENT

1. Existing Land Use and Ownership

Valley County includes some 2,377,900 acres of land. Approximately 87 percent is under federal control. An estimated 250,000 acres of land are privately owned.

Agriculture and timberlands comprise the majority of land use in the county. Over 103,000 acres are involved in agricultural use. Approximately 114,835 acres are classified as timberland. Urban subdivisions and recreational sites account for an estaimted 17,000 acres.

Mineral lands constitute approximately 4,500 acres of private land in the county. Most of these are located in the eastern portion of the county near Stibnite, and south in the Bear Valley area.

Land use in the Stibnite area is dominated by previous mining activities. The Town of Stibnite housed a population of more than 1,000 people during World War II. Remnants of past mining including ruins of the mill, bunkhouses, the existing tailing pile and the Yellow Pine Mine pit "Glory Hole", still remain.

Existing land use in the Stibnite mining project area involves 29 patented and 571 unpatented claims and millsites in the project area under lease to CSM (Figure 10). Actual mining and processing facilities will utilize only about 130 acres (excluding roads). Approximately 67 acres of this area are presently forested (primarily the proposed mine areas and waste dump sites). Disturbance in these areas to date has been limited to construction of exploration roads.

The site proposed as the processed waste disposal area would involve some 55 acres, and is located on top of the World War II mining operation's tailing pile. Mr. Derrold Slavin and partners, all of Carmen, Idaho, located a 103-acre placer claim(s) on the tailing pile in 1977. To date, the partnership has not taken any steps to obtain an Operating Plan from the Forest Service. While Mr. Slavin has indicated that the potential exists to recover certain valuable minerals from the existing tailing pile, the technical feasibility of economically extracting the minerals from the tailing pile (if shown to exist) has not been established.

Processing facilities would require an additional 20 acres of land. The areas proposed for construction of the leach ponds involve a portion of the Meadow Creek Landing Airfield, Adkin's Flat and the existing tailing pile. The field is not Federal Aviation Agency dedicated, and its use as a landing strip is limited.

2. Land Management and Resource Planning

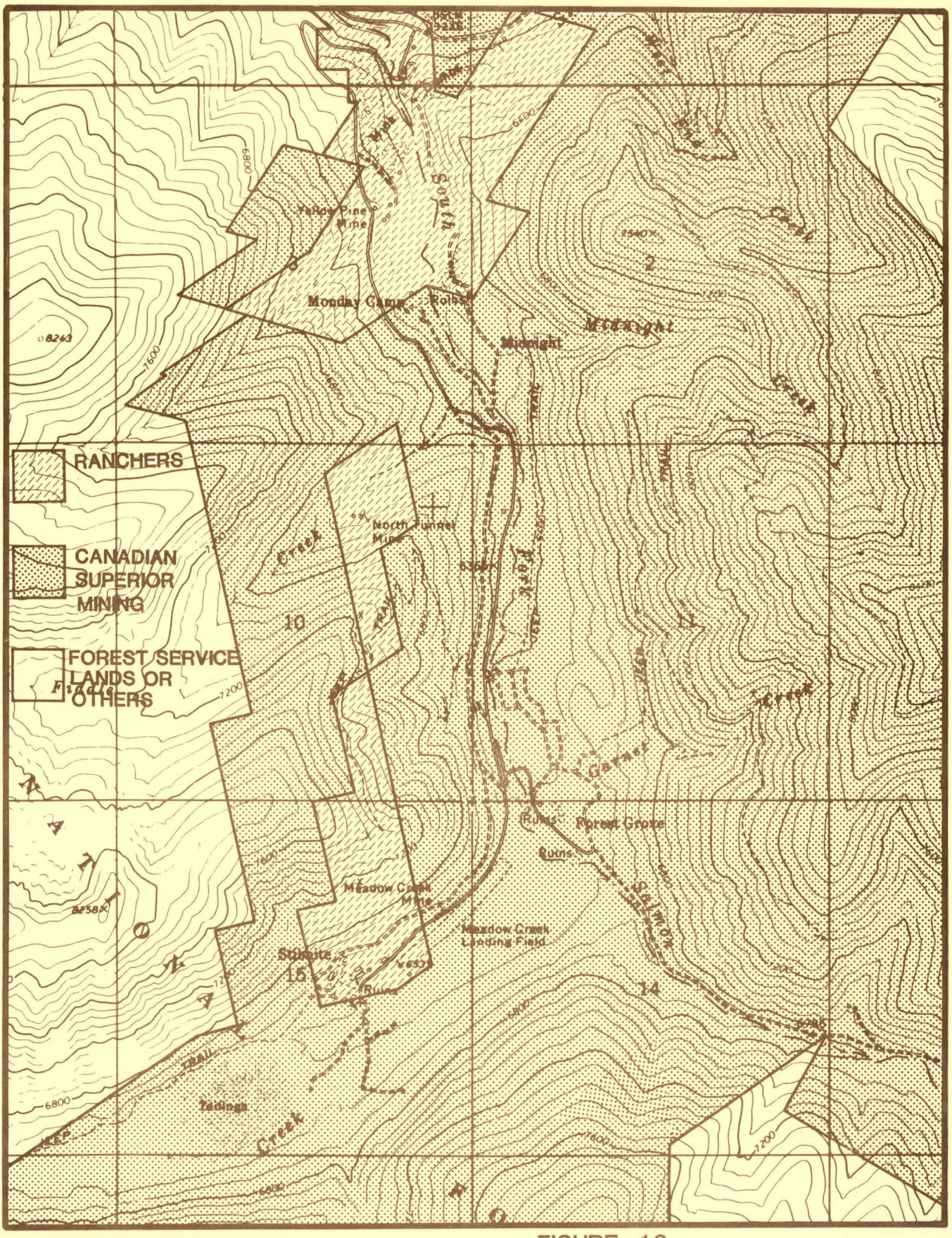


FIGURE 10
STIBNITE AREA CLAIM LOCATION MAP

NATIONAL FOREST SYSTEM LAND AND RESOURCE MANAGEMENT PLANNING

Regulations for implementing the National Forest Management Act of 1976, prescribe guidelines for resource management practices, harvest levels, and procedures under the principles of multiple use and sustained yield on National Forest System lands. The present direction of this effort focuses on development of an awareness of other related planning efforts. Under the Management Act, the Chief of the Forest Service is required to develop an "umbrella plan" and assessment which includes an analysis of the present and anticipated forest-wide allocation of resources. Until the Forest Plan for a specific forest is developed and approved by the Regional Forester, land may continue to be managed under existing land and resource plans (CFR, Vol. 44, No. 181).

The current National Forest management directive for the Stibnite area is contained in the Big Creek Ranger District Multiple Use Management Plan which was originally approved in 1974. The portion of the plan which addresses the project area emphasizes "...the historic significance of the area..." The plan also includes a management policy to "...guide mining activity as much as possible to prevent stream sedimentation and damage to soil, watershed, and recreation values..." in the Big Creek District.

Specific Forest Service concerns and management efforts included in the Stibnite Mining Project EIS involve treatment of the existing tailing pile as a source of sediment and heavy metals. These concerns are shown throughout this document, specifically on pages ii, 5, 6, 12, 18, 33, 63, 74, 81-83, 96, 97, 105, 117, 118, 119, 123-133, 140-155, and the Conceptual Reclamation Plan (Appendix E). By draining, stabilizing and reclaiming the tailing pile (the CSM proposal would involve use of the tailing area for waste rock and processed ore disposal), the Forest Service would be exercising its jurisdiction over surface activities in keeping with existing approved land management plans. Such a course of action would also be in keeping with the intent of the U.S. Congress and the State of Idaho in protecting fisheries and other values in the Salmon River system, as expressed in the recent Central Idaho Wilderness Act, and Rules and Regulations Governing Dredge and Placer Mining in Idaho.

Other Forest Service planning programs which have influenced the development of the Stibnite Mining Project EIS include the South Fork Salmon River, Warren, and Landmark Land Management Plans and Environmental Statements. These plans were developed in compliance with the Forest and Range Land Renewable Resource Planning Act of 1974, and Section 102(2)(c) of NEPA to present broad-based strategies for managing and developing National Forest System lands and resources within the respective units. While the plans have not been implemented due to pending legal and administrative considerations, much of the data base and the major management concerns and issues related to the plans (particularly as related to minimizing impacts on fish and water qual-

ity, and wilderness values) were considered in the preparation of the Stibnite DEIS. These included:

1. Many of the issues and concerns generated by the public and other agencies during the planning process for the land management projects have direct application to the Stibnite proposal.

2. Public interest is strong concerning development activities within the Salmon River Drainage, as evidenced by the appeals and pending litigation on the land management plans. This interest has had a major influence on scoping the level of effort directed to the various issues and concerns identified for the Stibnite project, particularly in terms of NEPA requirements, sediment production and impacts on fish, monitoring, and overall land management and environmental protection. The interest also resulted in a decision to prepare a full environmental impact statement for the proposed Stibnite Mining Project, rather than a less detailed environmental assessment.

3. The procedure used to analyze the potential effects of implementation of the land management plans served as a "prototype" for developing an improved impact analysis and evaluation format for assessing the effects of alternatives for the Stibnite Mining Project. Many of the procedures used in the Stibnite analysis were developed as a direct result of these planning-associated research efforts; particularly those related to the South Fork Salmon River Planning Unit Land Management Plan and Environmental Statement.

4. Much of the data collected during the course of developing the land management plans was used as a baseline from which additional project-specific information needs were identified. The data base was expanded through intensive field surveys and reconnaissance, and supplemental literature reviews and consultation with management agencies.

5. An improved monitoring program was developed for the proposed Stibnite project, based on the need to be able to detect subtle changes in baseline environmental conditions, particularly as related to water quality and the existing fishery resource. The need for this type of a program was clearly pointed out in the respective land management plans, and the associated appeals and litigation.

LOCAL LAND USE PLANNING PROGRAMS

The Valley County Comprehensive Plan, which was adopted in 1977, provides local land use policy directives which affect the proposed Stibnite Mining Project. The plan includes goals and objectives designed

to guide growth and development in the unincorporated areas of the county. The old townsite of Stibnite is identified in the plan as a special site, "...to be protected and preserved as historically significant...". While the plan does not include specific policies to guide mining development in the county, it does discuss mineral lands which constitute approximately 4,500 acres of private land in the eastern part of the county.

Valley County also requires building permits, and enforces "Subdivision Regulations" and "Minimum Standards and Criteria for Mobile Home Subdivisions and Parks, Travel Trailer Courts and Parks."

3. Population

Historic Trends

Before 1870, Idaho's population was primarily made up of itinerants, trappers, miners and traders. Discoveries of gold and other precious metals in the early 1900's spurred the first large-scale migrations into Idaho. Early population growth in Valley County was also heavily influenced by mineral resources development. This growth began with the Long Valley and Round Valley gold rushes of the 1860's. During the 1870's, packers and miners moved into the area near what was later to become the town of Cascade. Later in the 1890's, homesteading made its mark, and by about 1895 an estimated 750 people lived in northern Valley County.

Although gold was discovered at Thunder Mountain in 1893, growth did not begin until 1902 when W. H. Dewey began mining on a large scale. By 1908, as many as 3,000 miners had located near the town of Roosevelt northeast of Stibnite. The overall population growth in the county was spurred with the coming of the railroad in 1914, thereby making commercial logging profitable. Logging, farming, ranching and tourism later became the economic mainstays of Valley County.

Population growth at Stibnite began about 1919 with the organization of the Meadow Creek Silver Mines Company. By 1929, Monday Camp was established and ore was produced from three independent mining operations in the area. A landing strip and hydroelectric power plant were built soon afterward. By 1930, the population at Stibnite was estimated to be about 200 people. The major growth at Stibnite occurred in the late 1930's and early 1940's, during the wartime rush to increase antimony and tungsten production. By 1942 an estimated 2,000 people were located at Stibnite. The average population during the war years was about 1000, but with the collapse of the antimony market in 1952 the plants were dismantled and active mining ceased (Bailey, 1978).

Future Growth

Growth in Idaho is expected to exceed the national rate during the next 20 years, with the statewide population increasing from the current

890,000 estimated population, to a forecasted 1.37 million persons by the year 2000 (IDWR, 1978). Similarly, the Valley County population is also expected to increase. Valley County forecasts prepared by the Idaho Department of Water Resources are summarized below.

Valley County Population Forecasts Summary

1970	1975	1980	1985	1990	1995	2000
3600	3780	4420	4860	5460	5960	6490

The population of Yellow Pine and the immediate vicinity varies seasonally ranging from 30 to 40 people during the winter months, up to about 80 people in the summer. No permanent population resides at Stibnite. During the summer of 1978, approximately 45 additional people employed by Canadian Superior Mining (geologists, pilot plant operators, other personnel) resided in the Yellow Pine/Stibnite study area.

4. Economic Base

Employment

Traditionally, the economy of Valley County has been dependent on three major sectors: government; the wood products industry (lumbering); and agriculture. While mining was the county's leading industry for a short period in the early 1950's, the industry largely collapsed in 1955.

Current employment figures for Valley County by major industry are shown in Table 14 which follows.

TABLE 14
VALLEY COUNTY EMPLOYMENT BY MAJOR INDUSTRY, 1975[1]

Major Industry	Standard Industrial Code	Employment	Percent Distribution
Agriculture	A	124	6.291
Mining	B	2	0.101
Construction	C	60	3.044
Wood Products	24	187	9.488
Other Manufacturing	D39	18	0.913
Subtotal		205	10.401
Trans., Comm, & Util.	E	128	6.494
Whsle. and Retail Trade	F&G	410	20.802
Finance, Ins., Real Est.	H	98	4.972
Services and Misc.	J&K	324	16.438
State and Local Govt.	J	367	18.620
Federal Govt.	JJ	253	12.836
Subtotal		620	31.456
TOTAL		1971	100.000

[1]Source: Idaho Department of Water Resources, 1978.

As shown by this information, government employed nearly 32 percent of the total work force in 1975. According to the Idaho Department of Employment, the Forest Service was the single largest employer, employing over 250 persons during the summer months and approximately 70 in the winter. This accounted for nearly 13 percent of the total Valley County employment.

Wholesale and retail trade followed government, accounting for the second highest portion of employment (20.8 percent); with wood products and manufacturing producing about 10.4 percent of the local jobs. Construction employment was down significantly from 1970. However, this trend has recently reversed itself. More discussion on second home (recreation) development is presented later in this section.

The mining employment sector accounted for only 0.10 percent of the County's employment. This facet of the local economy is expected to increase appreciably during the next decade.

An important trend in the economy of Valley County is the shift from a major reliance on wood products to increased emphasis on developing the tourism industry. Tourism, recreation and second home development also stimulate the services sector of the employment base in the county. In 1969, for example, some 325 persons in Valley County were employed in lumbering and other manufacturing. By 1975, this figure had fallen to 205. The situation was further aggravated with the closure of the Boise Cascade McCall Mill in 1977. During a similar period (1967-1976), taxable sales attributable to recreation and tourism increased from approximately $1.7 million to $3.4 million (Valley County Planning and Zoning Commission, 1977).

Valley County is considered a "distressed county" by the State Department of Employment. The monthly unemployment rate during 1978 ranged from a low of 9.6 percent in September, to 12.8 percent in January, and averaged 11.5 percent. These figures were substantially higher than the unemployment rate for the state, which ranged between 3.7 percent and 6.5 percent, and averaged 4.9 percent for the same period.

Economic forecasts for Valley County prepared by the Idaho Department of Water Resources indicate that the major employment categories are not expected to show any major changes through the year 2000. Finance, insurance and real estate should continue to gain, while the government category is projected to decline slightly. The wood products and manufacturing categories are expected to remain relatively stable. Mining, which accounted for less than one percent of the Valley County's total employment, is also not expected to show any significant

gains, according to state projections. These projections were prepared prior to the development of a recent mining project at Thunder Mountain, and the proposal by CSM to develop the Stibnite project.

National Forest Reserve Funds are a major portion of the Valley County Road and Bridge and School District Funds, and are particularly important to the local revenue base. Twenty-five percent of all monies received during any fiscal year from each National Forest is paid to the county in which the forest is situated for the benefit of roads and public schools. Over $995,000 in county revenues were generated from this source in 1979 (Valley County Auditor, 1979). This represented approximately 34 percent of the county's 1979 operating budget which totaled approximately $2.9 million.

The average per capita income for Valley County was $6,642 in 1978. Similar information for Ada County shows a 1978 estimated per capita income of $8,268, which represents the highest income in the Ida-Ore Regional Economic Development District (IORDA, 1980). By comparison, Owyhee County shows the lowest per capita income in the district ($3,652).

5. Housing, Services and Utilities

Housing

The most recent comprehensive housing assessment for Valley County was prepared in 1970, in conjunction with the U.S. Census. The assessment showed 2,431 housing units in the county. An estimated 1,523 units were year-round houses, and 908 were seasonal, demonstrating the importance of recreational development in the county.

Housing in Yellow Pine is limited and is largely made up of houses built during the 1920's and 1930's. There are an estimated 50 housing units in Yellow Pine. The current vacancy rate is low, with the supply of potentially available undeveloped land limited.

Existing hotel and motel facilities in Yellow Pine can also accomodate an additional estimated 25-30 persons. These facilities include Park's Yellow Pine Motel, Van's Yellow Pine Lodge, and the Alpine Village. In addition, hookups for 10-12 trailer units are available at Yellow Pine. Sufficient land area for several new trailer parks is also located in the vicinity of Yellow Pine.

Two larger communities located in the general vicinity of the proposed project are Cascade and McCall. Due to the distance of these communities from the immediate project area, it was not considered feasible that any portion of the Stibnite project work force would be housed at these locations.

Water and Wastewater Facilities

The Yellow Pine water system serves approximately 50 hookups, and an estimated 100 people. The estimated capacity of the existing system is 120 people. However, approximately 40-50 percent of the users do not reside in Yellow Pine at any given time. Several residences also have individual wells. The water supply source is a spring and creek located southwest of town. The supply is not provided any type of treatment. Central District Health Department presently monitors the system. Some limited bacteria problems have been observed during late summer in the past. The system does not include storage facilities. Most of the distribution system has been in operation for approximately 20 years, and is in fair condition. According to Water Board officials, the system is in need of a 10,000 gallon holding tank. Water service presently costs local residents $60 annually. Several residences and establishments are also served by private wells. Most of the distribution system has been in operation for approximately 20 years, and is in fair condition.

Wastewater treatment is provided by individual waste treatment systems (primarily septic tanks). According to Health District officials, most of these systems are providing adequate treatment. Both of the hotel/motels in the town of Yellow Pine are served by community septic tank/drainfield systems. Alpine Village, which is located just east of town, is served two 1,000-gallon septic tank systems and a cesspool/leach field.

No existing water or wastewater facilities are available at Stibnite. Current Valley County and Central District Health development and sanitary regulations address minimum lot sizes and water and wastewater system requirements, including a sanitary restriction on all new plats.

Schools

The project area lies within the jurisdiction of McCall-Donnelly School District #421. The area is served by the Yellow Pine School, which is located in Yellow Pine. Prior to construction of the existing one-room schoolhouse in 1936, various facilities ranging from a tent to a log cabin were utilized. The school serves grades K-8. High school level education is provided by correspondence classes which are supervised by the local teacher, or through boarding programs at McCall and Cascade.

During the 1979-80 school year, one teacher taught a minimum of seven and a maximum of nine students. Fluctuating enrollment causes a major problem for the district, as the policy of the district requires that a facility must have a minimum of eight students by the 10th of August in order to operate the Yellow Pine Elementary School the ensuing school year. This problem is exemplified by the fact that during the period 1961-1980 the facility was closed for six years due to lack of sufficient enrollment.

According to district officials, the annual operational costs for the school fluctuate considerably, based on the experience and education of the teacher that is hired. The per-student costs also fluctuate considerably, but per-student costs at the Yellow Pine Elementary School are greater than student costs in the McCall-Donnelly Elementary School in McCall. The approximate number of students that could be handled with existing facilities is 30 students. A teacher's aide would probably be required with 30 students.

The McCall-Donnelly School District is currently faced with the possibility of major budget cuts due to reduction in the amount of Forest Fund Receipts to Valley County (receipts from the Payette, Boise and Salmon National Forests). In the past, approximately 20-25 percent of the district's budget has been Forest Fund Receipts. The total district revenues for the 1979-1980 school year are estimated at $1,535,169. This compares to $1,489,565 actually received during the 1978-1979 school year (budgeted $1,536,179). National Forest Reserve Funds for the 1978-1979 school year budget were $364,282, for the 1979-1980 school year budget were $305,049, and for the 1980-1981 school year budget were $203,953. Forest funds for the 1981-1982 school year are predicted to be still lower than the previous year.

The major concerns related to the Stibnite Mining Project expressed by the McCall-Donnelly School District are:

1. The number of additional students that the Stibnite Mining Operation will create for the Yellow Pine Elementary School.

2. Since the mining operation is scheduled to occur from late May to the middle of October, will the students enrolled initially in August be attending the entire school year, or will the student impact be just during the months of September, part of October and part of May?

3. Will additional facilities be needed, and how is the McCall-Donnelly School District to pay for those additional facilities, especially if they are needed immediately?

These concerns are addressed later in Chapter 5 of this report.

Police and Fire Protection

Valley County is served by the Valley County Sheriff's Department, which is located in Cascade. In 1978-79, the total county expediture for the Sheriff's Department was approximately $156,000. Local law enforcement is provided by a sheriff's deputy operating out of Yellow Pine. The total salary and operating cost to maintain the existing level of law enforcement protection is estimated at $20,000. The Payette National Forest reimburses the Valley County Sheriff's Department for a portion of the costs during the period May 15 through November 5. From November through April, the deputy is paid for maintenance and snow removal by the Valley County Road Department.

Valley County has three city fire departments and two rural fire districts. Fire protection at Yellow Pine, which is not incorporated, is provided by the Yellow Pine Quick Response Unit. Local residents are trained to operate fire fighting equipment which includes a 500 gallon pumper truck. The areas outside Yellow Pine are provided fire protection service by Forest Service fire protection crews.

Solid Waste

Valley County operates two solid waste landfill facilities. The Yellow Pine operation has been designated for use as a "modified" landfill. The facility is operated jointly by the County and the Forest Service. The operation involves once-a-week coverage of solid waste materials, and is open to receive waste on Friday and Saturday only. No solid waste facilities are available at Stibnite. Stibnite has been designated as a potentially dangerous abandoned chemical disposal site by the U.S. Environmental Protection Agency.

Power

Electric power in Valley County is provided by Idaho Power Company, with rates established by the Idaho Public Utilities Commission. Yellow Pine is served by a transmission line from Cascade.

Stibnite does not presently receive a power supply. During the early mining activities power was supplied by diesel generators and three small hydroelectric plants. In 1944, Idaho Power completed a 100-mile transmission line to Stibnite. Service was discontinued about 1955, with closure of the operation. Approximately 14 miles of line was removed with the closure. A diesel generator provided electricity to the gold and silver leaching plant operated by CSM during the 1978 and 1979 summer seasons.

Communications

The urban areas of Valley County are served by the Continental Telephone Company of the West. This service does not include Yellow Pine or Stibnite, which are totally dependent on radio communication.

6. Transportation

State Highway 55 is the main north/south transportation route through Valley County. The route is heavily used, with average daily traffic counts having increased by over 52 percent since 1969.

Three main transportation routes serve the community of Yellow Pine (Figure 11). These include Lick Creek Road (McCall to Yellow Pine); the Warm Lake Road/Johnson Creek route (Cascade to Yellow Pine via Landmark); and the South Fork Road which follows the South Fork of the Salmon River to Krassel, then east along the EFSF Salmon River to Yellow Pine. All of these routes are seasonal roads closed during the

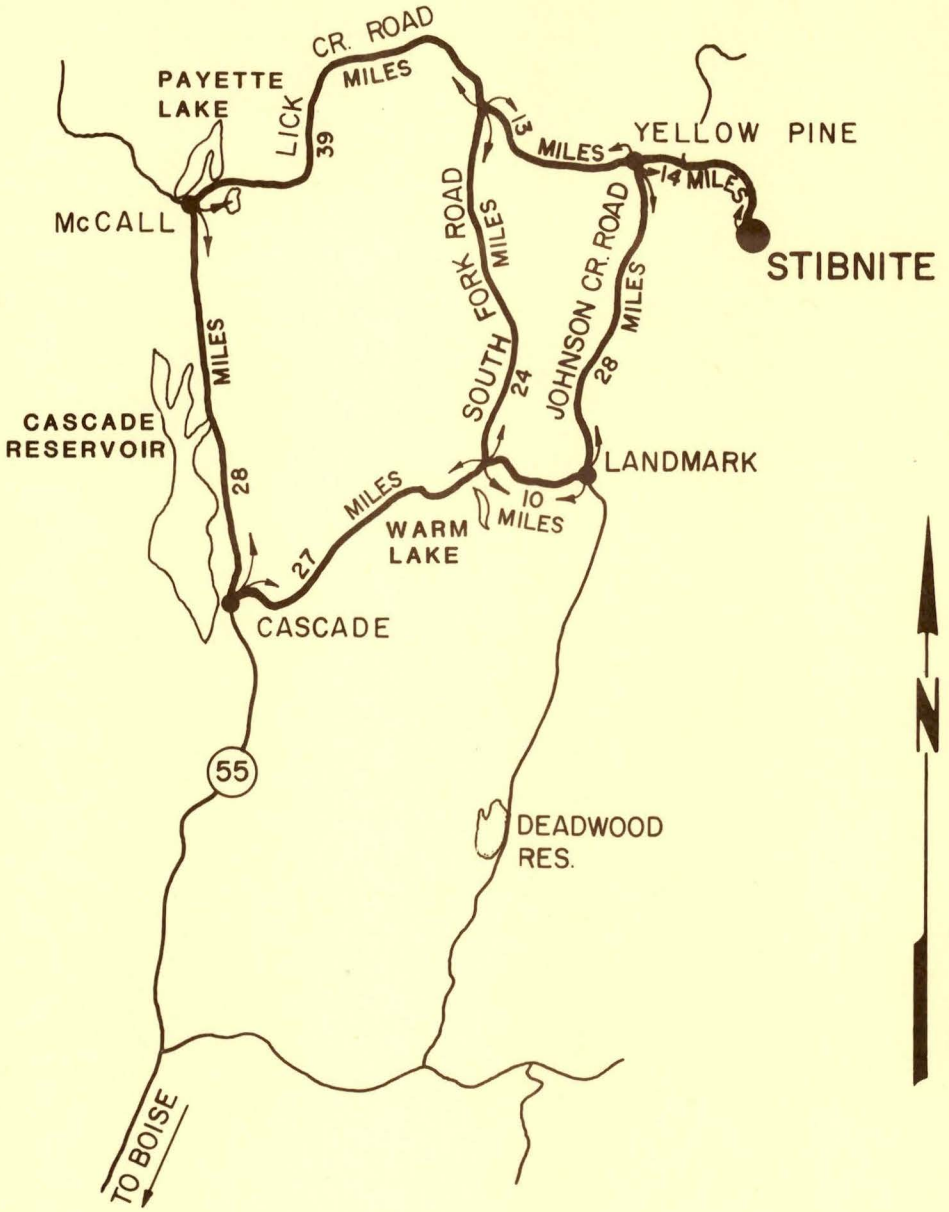


FIGURE 11 MAJOR ACCESS ROUTES

winter by snow, and require extensive grading and maintenance in the summer. Both the South Fork and Warm Lake Roads have recently undergone major improvement programs. These programs involved various levels of widening, paving and stabilization (i.e., reculverting, grading, drainage, revegetation). The roads are suitable for light volume commercial use.

A 14-mile section of road runs generally northwest along the EFSF Salmon River connecting Yellow Pine and Stibnite. The unpaved road surface has been washed out in several areas in the past during peak spring runoff and flood episodes. The existing road is in fair condition, and requires annual grading and maintenance work.

Limited back country air service is available to the project area. Mail service is also provided by airplane.

7. Health and Medical Care/Safety

Cascade County is served by two hospital facilities: McCall Memorial Hospital and Valley County Hospital (at Cascade). The McCall Hospital has a 20-bed capacity, four doctors, 14 registered nurses, 24-hour ambulance and emergency service, and a total of 50 employees. The Valley County Hospital is a 10-bed facility, with a staff of two doctors, a nurse practitioner and eight registered nurses.

The Community of Yellow Pine participates in the County's Emergency Medical Training program. A registered nurse also resides in Yellow Pine. However, the community primarily relies on Arnold's Flying Service (Cascade) to provide emergency medical transportation to hospital facilities at Cascade, McCall and Boise. The Yellow Pine Quick Response Unit has applied for federal funds to purchase a four-wheel drive vehicle which would be utilized as an ambulance.

8. Governmental Organization

Valley County is the largest governing body in the general project area. The County administers and collects taxes for a number of entities including the McCall-Donnelly School District 421 and the Southern Idaho Timber Protection Association. Services provided involve administration, schools, police and fire protection, recreation and transportation.

Yellow Pine is unincorporated. Yellow Pine uses a town council form of government. The council is comprised of five elected members. Meetings are conducted three times during the winter, and once a month in the summer. Decisions concerning the community's water system are made by a five-member elected board.

9. Visual Resources and Aesthetic Values

A visual resource analysis of the Stibnite area was performed as part of the environmental impact statement process. The visual quality of the area was assessed with the Forest Service Visual Management System, which considers the visual landscape as a basic resource, like water, air, and soils. The full results of the study are available in the report Visual Analysis, Stibnite Mining Project (RCA, 1979), which is on file at the Forest Service Big Creek Ranger District office at McCall, Idaho.

The Visual quality objectives portion of the system uses landscape diversity to determine variety classes and public concern for scenic quality in an area to determine sensitivity levels. This information is combined with seen area distance zones (landscapes and distances seen from travel routes and/or use areas) to determine existing visual quality objectives zones. Visual quality objectives describe the different degrees of acceptable landscape alteration based upon the importance of aesthetics.

Visual quality objectives were established for the Stibnite project area utilizing basic information developed by the Forest Service. Once the visual quality objectives for an area were identified, the degree of acceptable alteration to the landscape was determined. This information was then used to define the area's visual absorption capability.

Visual absorption capability refers to the landscape's ability to support management activities such as mining, and maintain its visual integrity. Visual absorption capabilities of high, intermediate and low are determined from evaluating the scope, vegetative screening and regeneration potential, soil color contrast, and the viewer's position relative to the viewed landscape.

The Visual quality objectives map is shown in Figure 12. The main visual quality objectives applicable to the Stibnite area are:

West End Mine and Waste Dump Areas - partial retention
Garnet Creek Mine - retention
Garnet Creek Waste Dump and Tailing Disposal Area - partial retention
Leach Pad Site Areas - retention
Ore Storage and Crusher Site - retention
Housing Site - retention

Retention is a visual quality objective which, in general, means man's activities are not evident to the casual forest visitor. Partial retention means man's activities may be evident but most remain subordinate to the characteristic landscape.

10. Cultural Resources (Archaeologic and Historic)

Section 106 of the National Historic Preservation Act of 1966 and Executive Order 11593 direct federal agencies to consider the effects of federal, federal-assisted, and federally licensed projects on pro-

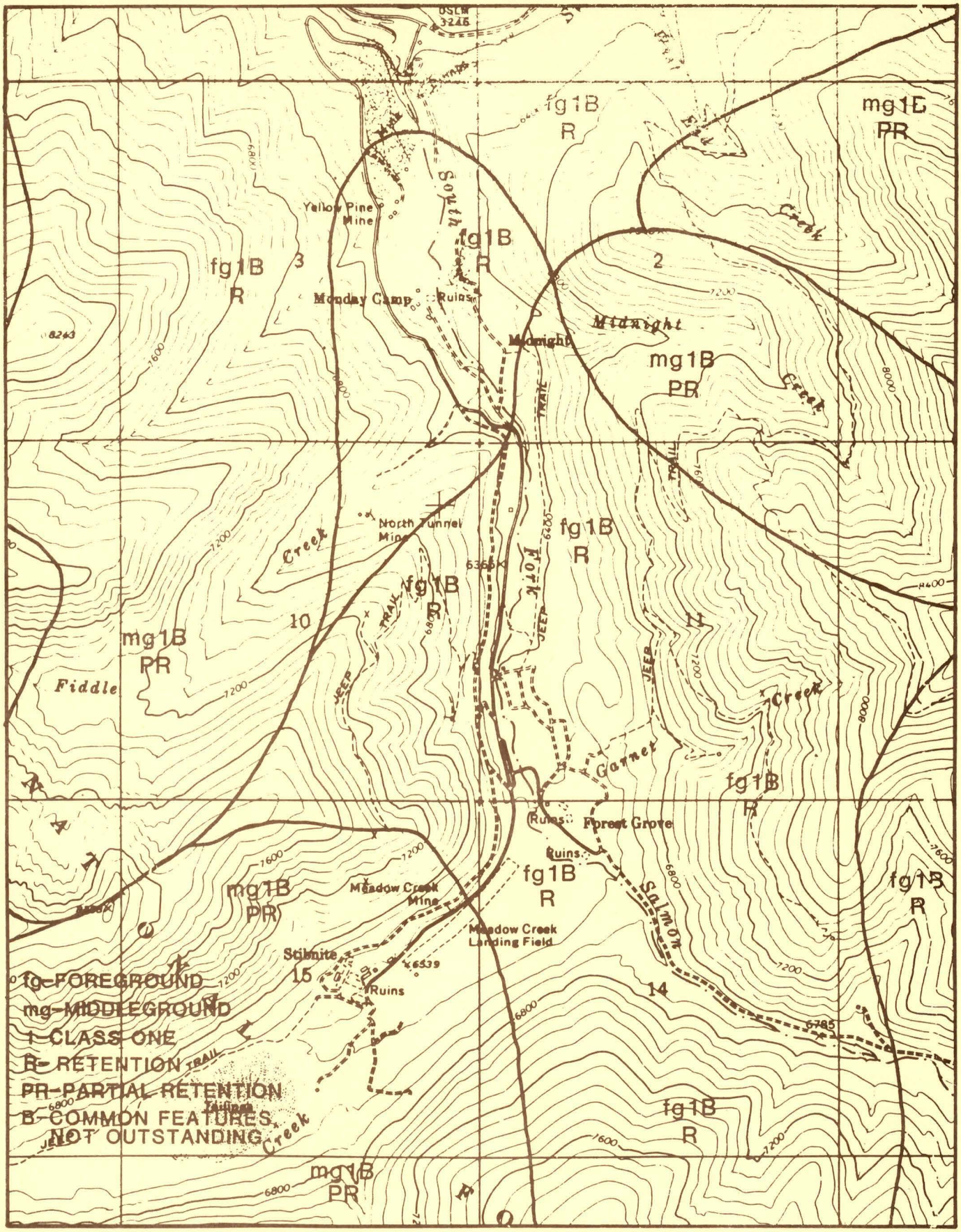


FIGURE 12 VISUAL QUALITY OBJECTIVES MAP, STIBNITE MINING PROJECT AREA.

perties included or eligible for inclusion in the National Register of Historic Places. These regulations also require that the Advisory Council of Historic Preservation be offered the opportunity to comment on such undertakings. Approval of a cultural resources assessment which includes a historical and archaeological resources evaluation by the State Historic Preservation Officer is also required.

Prehistoric Cultural Resources

A prehistoric archaeological survey and site specific field reconnaissance were conducted for the Stibnite project area to determine the existence and/or significance of all prehistoric cultural resources in the area. Background research involved an archival and literature review, field reconnaissance, and cultural resources assessment and report preparation. The full results of the assessment are available in the report Biological and Prehistoric Cultural Resources Evaluation of the Proposed Canadian Superior, Ltd. Mining Project at Stibnite, Idaho, (DRI, 1980). This report is on file at the Forest Service Big Creek Ranger District office at Mcall, Idaho.

A review of previous cultural resource inventories conducted on National Forest Lands east of the study area indicated that few aboriginal archaeological sites and no prehistoric remains have been located in the vicinity of Stibnite (Wylie and Flynn, 1977; Moore and Shank, 1975; Struthers, 1977). Research further west of Stibnite along the Middle Fork of the Salmon River and northeast indicates the existence of numerous prehistoric sites dating between 4,700 and 8,000 years ago (Pavesic, 1978; DeBloois, 1977).

Ethnographic references indicate that the South Fork Salmon River was probably visited by both the Nez Perce and Shoshone hunting and gathering parties, but that this area was not permanently occupied by either group (Josephy, 1965; Spinden, 1964). However, these sources also indicate that the EFSF Salmon River has not been systematically surveyed and information concerning its prehistory must be synthesized from studies conducted in surrounding areas.

Field reconnaissance of the Stibnite project area performed in September 1979 showed no indication of prehistoric cultural resources in the six major areas which would be directly affected by proposed mining activities or in the and four additional secondary impact areas. Subsequently, the study team archaeologist also determined that it is unlikely that prehistoric resources exist at the Meadow Creek Landing Field which has been proposed as a potential site location for the leach pads. However, the possibility that cultural resources do exist within the study area was not precluded. This was due to two primary factors: heavy shrub understory and forest which characterize the study area; and the potential that historic mining activities may mask prehistoric cultural resources.

Historic Cultural Resources

The historical and cultural properties surveys and field inventories were conducted during the 1979 and 1980 field seasons by the study team. The overall methodology was designed in cooperation with the Payette National Forest Archaeologist and State Historic Preservation Officer, to ensure compliance with the Advisory Council on Historic Preservation Protection of Historic and Cultural Properties Final Rules and Regulations (Federal Register, Vo. 44, No.21, January 30, 1979). The studies included the areas of Yellow Pine, Stibnite and Cinnabar, Valley County, Idaho. The full reports, A Historical Summary and Cultural Resource Study of Yellow Pine, Stibnite and Cinnabar, Valley County, Idaho, (Hart, 1979) and Historical Cultural Resources Assessment for the Stibnite Mining Project, (Swanson, 1980) are on file at the Forest Service Big Creek Ranger District Office at McCall, Idaho.

The Town of Yellow Pine takes its name from the Yellow Pine Basin. Early prospectors covered nearly every square mile of the central Idaho mountains after gold was discovered on Orofino Creek in 1860. Published accounts recall prospecting in the basin as early as 1881. Later, in 1897, a rich gold discovery was made at Thunder Mountain, 20 miles to the northeast. By 1902, thousands of miners and propectors had flooded the region, and a permanent settlement was established at Yellow Pine. The production of gold at Yellow Pine was negligible, although prospecting for gold led to the discovery of antimony which would become important later. During this period Yellow Pine remained a small supply center and wintering place. Yellow Pine's historical significance derives from its role as a supply and social center for miners in the area following the 1902 "Thunder Mountain Gold Rush". It was not until 1930 that a plat was filed on the townsite by Albert C. Behue. A number of the structures which currently exist in Yellow Pine were moved to the site from Stibnite after the collapse of the tungsten market caused by the end of the Korean War. Perhaps a quarter of the town is made up of Stibnite houses built between 1940 and 1945, and moved to Yellow Pine in the 1960's. Yellow Pine has been identified as a potential historic district, but will not be clearly eligible for the National Register until the majority of its structures are 50 years old.

The settlement of Stibnite was also prompted by the Thunder Mountain Gold Rush. Due to considerable interest in antimony during World War I, Meadow Creek Silver Mines Co., United Mercury Mines Co., and Hermes Mercury Mine were established in the area. During this time, an average of 10-15 men were employed. In 1927, United Mercury Mines optioned the Cinnabar and Meadow Creek Mines to F.W. Bradley, who was then president of a number of major mining companies including Bunker Hill and Sullivan Mining Company of Wallace, Idaho, and the Yellow Pine Company was formed. A hydroelectric power plant was built, and three mines at Meadow Creek, Cinnabar and Monday tunnels were operated. The complex nature of the gold-bearing ore which included stibnite (antimony and sulfur) made the processing at Stibnite extremely difficult.

It soon became apparent that shipping the gold-bearing concentrate to Salt Lake lead smelters would be more profitable.

With the invasion of Poland by Hitler and the U.S. Bureau of Mines' decision to develop the nation's strategic mineral reserves, antimony and tungsten became the chief minerals produced in the area (Stibnite produced nearly 95 percent of the country's antimony supply). These elements are used in alloys to produce armor-piercing shells, filaments in lamps, x-ray tubes, and radar equipment. Stibnite soon became a boom town of nearly 1000 people with a major milling facility, school house, stores, hospital, over 100 homes, and a recreation hall. The mining effort was headed up by Jack Bradley, who took over the operaton with the death of F.W. Bradley. After the war the tungsten was gone, but the Bradley Company continued expansion to mill low grade gold and gold-antimony ores. In 1948 construction on a smelter to process the concentrate began. Smelter problems plagued the operation. The antimony market collapsed shortly thereafter, and by 1955 the plant was dismantled and most of the houses were moved away (Figure 13).

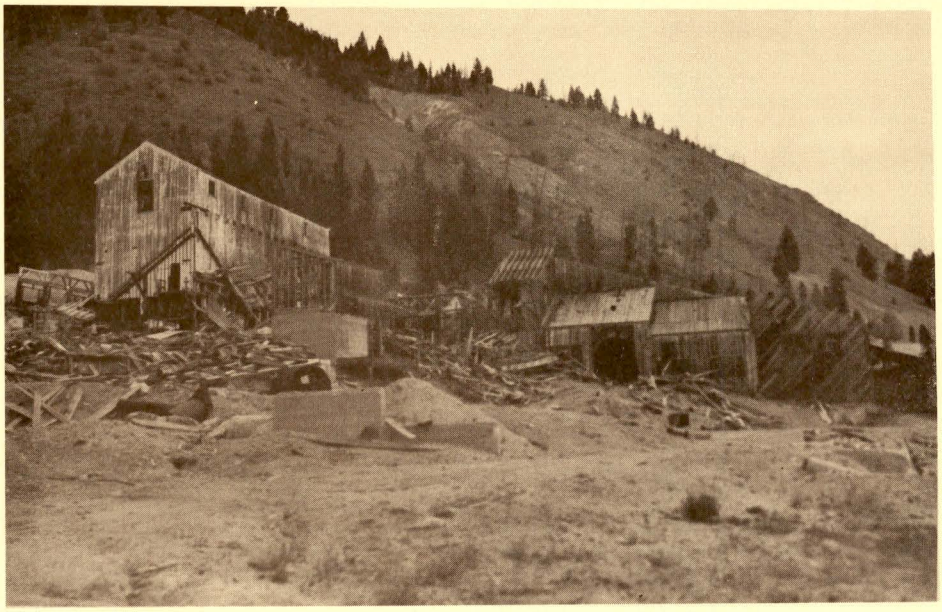
The historic significance of the Stibnite area is also centered around mining activities which occurred in the area between 1920 and 1955. Much of the area has been scavenged and salvaged. The historical/cultural inventory conducted during the 1979 field season by Hart identified two structures: 1) the Olson Cabin; and 2) Mountain Chief Cabin; which should be preserved for their historic and architectural values. Recommendations for documentation of a number of buildings and structures and the Meadow Creek Landing Field, are also included in the full reports and for the establishment of a "Stibnite Historic District" (Figure 14). Effects of the proposed project and alternative are discussed later in this document. A separate Historic Cultural Resources Assessment for the Stibnite Mining Project (Swanson, 1980), has also been submitted to the Forest Service and State Historic Preservation Officer for review and approval as part of the overall cultural resources assessment package.

Cinnabar is not discussed in this report. The area would not be impacted by the proposed Stibnite Mining Project. A summary of the history of the Cinnabar operation is available in the support document prepared by Hart (1979).

11. Recreational Resources

Existing Recreational Activities and Values

The topography, climate and natural resources of Valley County offer a wide variety of outdoor recreational opportunities. Second home development, fishing, boating, swimming, camping, hiking and riding provide a wide range of summer activities. Winter recreation includes skiing, snowmobiling, fishing and hunting.





RUINS OF MONDAY CAMP AND YELLOW MINE PIT

FIGURE 13
REMNANTS OF EARLY MINING ACTIVITIES



LEGEND

POSSIBLE HISTORIC DISTRICT BOUNDARIES BASED ON TOPOGRAPHY

POTENTIAL HISTORIC DISTRICT BOUNDARIES BASED UPON PREVIOUS LOCATED POINTS AS IDENTIFIED BY SHPO

EXTERIOR BOUNDARY CANADIAN SUPERIOR CLAIM BLOCK

FIGURE 14

POTENTIAL HISTORIC DISTRICT BOUNDARY MAP

Based on information supplied by the Forest Service, the major recreational activities for the Stibnite project area are presented in Table 15.

TABLE 15

RECREATION VISITOR DAY ANALYSIS FOR
STIBNITE MINING PROJECT STUDY AREA, 1979

Recreational Use	Visitor Day (RVD)[1]
Automobile	1155
Motorcycle	165
Snow Machine	110
Hiking	110
Horseback	110
Fishing	220
Sightseeing	275
Camping	2145
Hunting	605

[1]RVD = Recreation Visitor Day, 12 hours of activity

From this analysis, it is apparent that camping and automobile driving are the two primary recreational activities in the Stibnite project area. These two activities, combined with hunting, accounted for nearly 79 percent of the total recreation visitor days in 1979. Fishing and sightseeing are also important recreational activities in the area.

The potential for sightseeing, the history of Stibnite, and the close proximity of the mining project to a wilderness use area provide a unique potential to combine previous and proposed mining activities to create an important recreational/educational experience. The opportunities for developing visitor information and experience centers, and considerations which would reduce or eliminate future recreational user/ mining conflicts are discussed later in Chapter 7.

Wilderness and Wild and Scenic River Considerations

The Wilderness Act of 1964 (P.L. 88-577) directed the Secretary of Agriculture to review lands presently classified as "Primitive Areas," determine their suitability for preservation as "Wilderness", and report such findings and recommendations to Congress. Following extensive study by the 96th Congress, President Carter signed the Central Idaho Wilderness Act on July 23, 1980. This Act created the River of No Return Wilderness which involves approximately 2,230,000 acres of

essentially undeveloped lands in the Boise, Challis, Bitterroot, Payette, Nezperce and Salmon National Forests. The River of No Return Wilderness includes the roadless area along the east side of the lower 16 miles of the South Fork Salmon River, due primarily to its importance as an elk winter range for that portion of the Chamberlain Basin elk herd that migrates west to winter. The lower Salmon River through this stretch is also an important migration route for Chinook Salmon bound for the Secesh River, Johnson Creek, and the upper South Fork Salmon River. The Act also designated two segments of the Salmon River as components of the National Wild and Scenic River System. These included:

1. The 46-mile segment from the mouth of the North Fork of the Salmon River to Corn Creek as a "scenic" river; and

2. The 79-mile segment from Corn Creek to Long Tom Bar as a "wild" river.

The Stibnite Mining Project does not involve land included in the River of No Return Wilderness (Figure 15). The Thunder Mountain area (approximately 3600 acres) to the northeast is also excluded from the Wilderness due to previous mining impacts, known mineral reserves, and the large amount of existing patented land.

12. Community Attitudes

In order to gain a better understanding of the local community's knowledge of, and attitudes about the proposed Stibnite Mining Project, an attitudinal survey was developed by JMM and distributed to local residents in Yellow Pine and Big Creek. Approximately 50 surveys were distributed through the Yellow Pine Post Office. A total of 43 surveys were completed and returned. The survey was also completed by seven students attending Yellow Pine School.

The survey included a description of the proposed project, and was designed to identify public priorities concerning the quality of life in the project area, project-related attitudes, and potential acceptable tradeoffs, and to determine evaluation standards for use in comparing alternatives. Key findings of the survey are summarized below.

General

- A large percentage of the respondents represented an older age group (51-60, and over 60).

- All of the people responding resided in the Yellow Pine/Big Creek/Stibnite area, with over 50 percent living in the area for at least six years.

- Approximately 77 percent of the respondents were year-round residents.

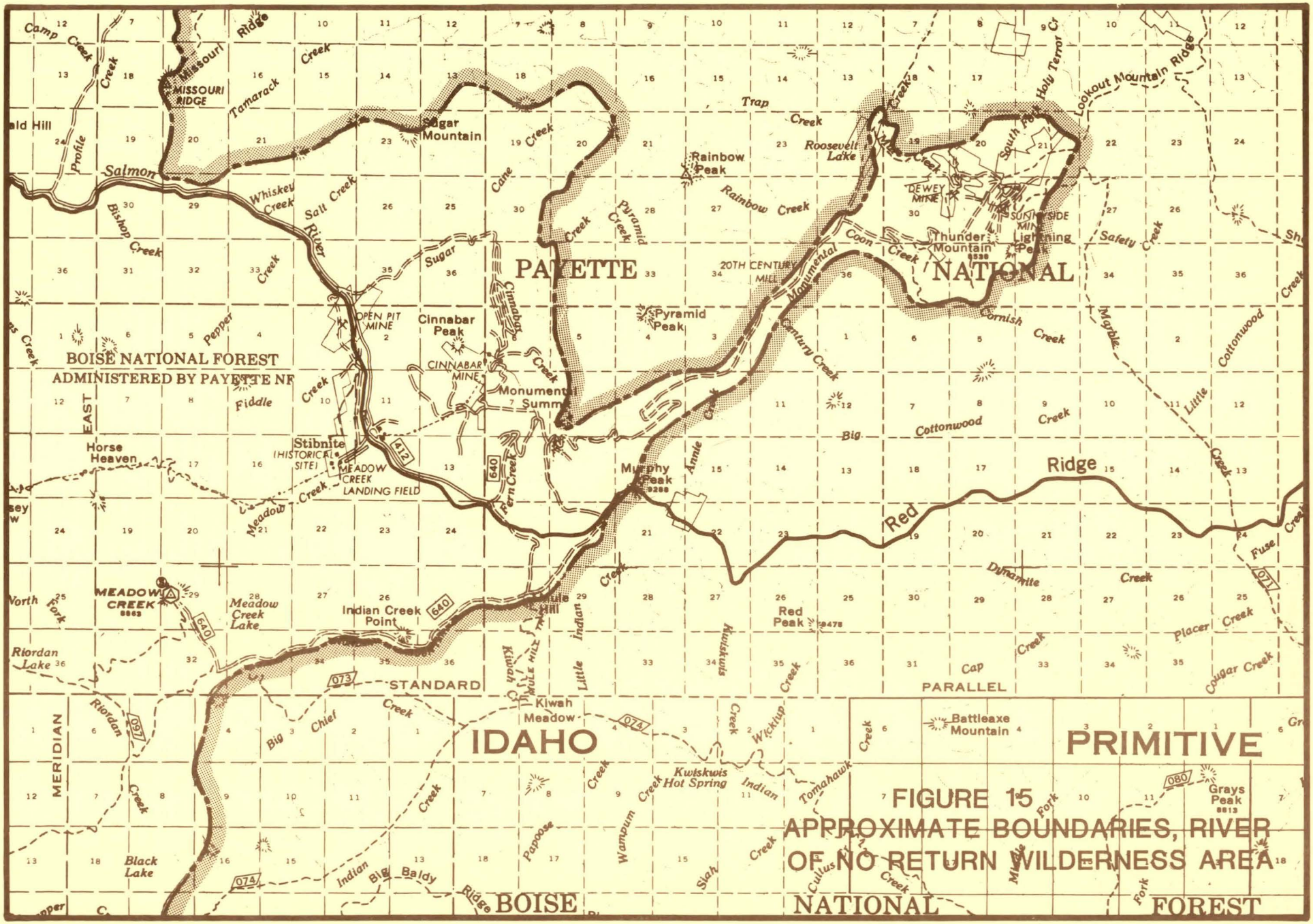


FIGURE 15
APPROXIMATE BOUNDARIES, RIVER OF NO RETURN WILDERNESS AREA

Quality of Life

- A majority viewed clean air and water and the beauty of the area as its most outstanding features.

- Local employment opportunities were regarded as the biggest disappointment about the Yellow Pine/Big Creek area.

- A majority of the respondents viewed natural erosion as the biggest contribution to existing water quality problems in the study area.

- Most of the people interviewed also felt the area would be a better place to live, or not change significantly, if the proposed Stibnite Mining Project was approved. Most of these respondents viewed more employment opportunities and improved public services and facilities as the main contributions of this potential improvement.

- Those who did not favor the project also were not in favor of any other types of "clean industries" coming into the area.

- Increased employment opportunities and improved road and street maintenance were viewed as primary considerations in the area which needed more attention.

- A majority of the respondents favored more future mining and lumbering activities and private businesses in the area, and less wilderness and government-related activities.

Project Related Attitudes

- All of the people surveyed were aware of the project, most being informed by Canadian Superior Mining.

- A majority felt the public meetings conducted by the Forest Service were beneficial. However, a majority of those attending felt more emphasis should have been directed to the positive aspects of the project.

- Major project-related concerns involved providing adequate safeguards to protect local water and air quality.

- Most of the respondents viewed the greatest opportunities related to the project as involving the potential for improvement of the local economy and job market.

- A majority felt that proposed environmental controls were adequate to protect the area's important air and water resources, and fish and wildlife. The concept of continued monitoring of the operation was strongly supported.

- Respondents indicated that they felt the most significant impacts associated with the project were socio-economic. If the project was approved, most felt that the work force housing should be split between Stibnite and Yellow Pine.

- All of the residents surveyed felt that any increased public facilities costs (i.e., schools, roads) required as a result of the project should be paid for through county and state taxes (mine tax revenues generated by the project), or by Canadian Superior Mining.

- All of the respondents indicated that the CSM pilot plant operation had been efficiently run, with no major areas for improvement suggested. A large majority felt that CSM had been a very good neighbor during the six years of exploration work and pilot plant operation in the Stibnite area.

- A large majority of the people responding indicated that they felt the proposed Stibnite Mining Project would have an overall positive effect on the Stibnite/Yellow Pine area, if approved.

STIBNITE MINING PROJECT

GOLD MINE AND MILL

FINAL ENVIRONMENTAL

IMPACT STATEMENT

CHAPTER 3

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CHAPTER 3

EVALUATION CRITERIA

INTRODUCTION

The criteria developed by the Forest Service and its contractor to evaluate the proposed Stibnite Mining Project cover a wide range of performance objectives. Each project alternative is later evaluated against these criteria and a preferred alternative selected on the basis of the evaluation. The criteria were developed based upon the following information and sources:

1. The final issues, concerns, and opportunities identified through the public involvement program, which included interviews and presentations to local residents, agency personnel, and special interest groups.

2. Input from resource managers interviewed during the course of the data collection and agency contact phases of the project.

3. Laws, executive orders, and regulations including the National Environmental Policy Act of 1969 (NEPA).

4. A broad range of management goals and objectives developed for the proposed project through the NEPA process, the National Forest Management Act of 1976, local planning units' land management planning efforts, and the Big Creek District Multiple Use Plan.

5. General technical, environmental, financial, social and political/institutional feasibility.

Development of these criteria also involved substantial efforts and input by Forest Service specialists, and a thorough review of existing federal, state and local laws, standards, and regulations to determine where qualitative or quantitative criteria might be applied.

Initially, a technical memorandum describing the proposed criteria was prepared by the contractor and submitted to the Forest Service for review and comment. Based on this review, these evaluations were refined and ranked by priority, and numerical values were assigned where appropriate. Special attention was directed to balance such natural resources as fish, water quality, and aesthetic/wilderness values with local timber and mineral development opportunities. The Forest Service is charged with the responsibility of insuring this level of balance is maintained, and that all "publics" are considered in the decision-making process on National Forest lands.

The following decision criteria were selected to evaluate the various alternatives being considered for the proposed Stibnite Mining Project.

The criteria were grouped under eight major categories which include, not necessarily by order of priority: I) Technical Feasibility; II) Air Resources; III) Water Resources; IV) Soils and Reclamation; V) Fish and Wildlife; VI) Socio-Economic; VII) Energy/ Resource Allocation; and VIII) Wilderness and Wild and Scenic River Considerations. However, because Wilderness and Wild and Scenic River values are comprised of a number of these criteria, it was decided that the criterion would not be included separately in the evaluation of alternatives but rather inclusive within the context of the overall analysis.

It should be noted that in applying the criteria, it is assumed that the maximum level of mitigation or best management practices for the respective alternative would be employed if that alternative were implemented. The only cases where exact numerical maximums or minimums are identified are when a particular regulation or standard must be met. All alternatives may not satisfy every evaluation criterion. Criteria where compliance is mandatory (as opposed to desirable), are also identified.

I. Technical Feasibility

A. Project is operable, reliable and flexible from an engineering standpoint.

Discussion: This criterion is met when:

1. Project can be engineered to be operable and reliable and have built-in flexibility.
2. A technically feasible alternative must also be environmentally sound.

B. Project is cost-effective.

Discussion: This criterion is met when:

1. CSM and Forest Service agree that project is cost-effective.
2. Project costs include development, operation and maintenance, mitigation, and reclamation.

II. Air Resources

A. Limited effects on air quality.

Discussion: This criterion is met when:

1. State of Idaho Air Quality Regulations for Class II Areas are complied with. Special emphasis will be given to total suspended particulate standards. This criterion is mandatory.
2. Potential state and existing federal Prevention of Significant Deterioration (PSD) requirements are met.

B. Limited effects on local visibility.

Discussion: This criterion is best met when:

1. Suspended particulate concentrations are controlled so as not to cause significant visual degradation.

III. Water Resources

A. Little or no effect on local surface water quality.

Discussion: This criterion is met when:

1. Instream water quality is maintained at or above State of Idaho Water Quality Standards. This criterion is mandatory.
2. Recognized best management practices for controlling mining-related nonpoint source pollution are applied in conformance with Idaho Department of Health and Welfare requirements. This criterion is mandatory.

B. Negligible effects on local hydrological conditions.

Discussion: This criterion is met when:

1. Instream water needs (quantity and quality) are satisfied for streams in and below the project area that are subject to influence from the project.
2. This criterion is best met by those alternatives that demonstrate greatest reduction in pollution to the environment by existing sources of degradation remaining from past development activities in the area. Pollution is measured as sediment, chemical, and pH characteristics in live streams.

C. Little or no effect on groundwater quality.

Discussion: This criterion is met when:

1. Groundwater quality meets applicable federal and state water quality standards.
2. By alternatives which include adequate provisions for groundwater monitoring as an element of the overall water quality monitoring program. This criterion is mandatory.

IV. Soils and Reclamation

A. Minimal effects on the long range natural soil and vegetative conditions.

Discussion: This criterion is met when:

1. The overburden deposits (waste, tailing, etc.) can be certified 90 percent safe from mass failure or liquefaction failure if subjected to a "worst case situation" seismic event, or a storm event that would cause significant damage to existing natural conditions.
2. The combination of soil, slope, location, and amount of area disturbed is that which results in minimal erosion or mass wasting potential.
3. Erosion from disturbed sites will not exceed specified sediment levels and/or will not result in violation of State Water Quality Standards. This criterion is mandatory.
4. Newly disturbed areas are revegetated promptly and effectively following disturbing activities or uses. Proposals which would involve shorter exposure times for denuded areas will receive higher evaluation ratings.

B. Potential for reclamation and improvement of soil stability conditions in the study area.
Discussion: This criterion is best met by:
1. Alternatives that provide for the most stabilization and revegetation of areas currently denuded and actively eroding.
2. This criterion also considers the potential for meeting state and federal reclamation requirements. This criterion is mandatory.

V. Fish and Wildlife
A. Little or no effect on the existing fish resources, particularly anadromous species.
Discussion: This criterion is met when:
1. Toxic substances in fish flesh are maintained at or below those shown present for fish of the same species, length, weight and condition for those analyzed in baseline environmental studies completed for the Stibnite area.
2. Present spawning and rearing conditions are maintained or improved, as determined by monitoring (this criterion will receive special attention in the text, including quantification, as applicable). This includes the amount of bedload sediment that would be generated.
3. Stream flows in the EFSF Salmon River below Sugar Creek, in Sugar Creek near its mouth and in Meadow Creek at the confluence with East Fork are maintained above minimum recorded low flows (this standard deals with operational surface water withdrawals).

B. Little or no effect on local wildlife populations or plant communities, including threatened and endangered species.
Discussion: This criterion will be best satisfied by:
1. Proposals which would cause the least total areal disturbance and impacts on wildlife and plant communities.
2. Proposals which provide for re-establishment of community types which favor the present life forms, and will mitigate any impact on wildlife or plant communities within ten years after operations cease at each project site.

VI. Socio-Economic Resources
A. Moderate effects on local public services and facilities.
Discussion: This criterion is met when:
1. The project has a favorable effect on local tax base.
2. The project does not adversely affect the availability of public services and facilities in the community of Yellow Pine, and, secondarily, Cascade. Duration of the effect will also be considered in the evaluation.

This criterion includes such items as:

a. No increase in tax-supported expenses above those brought into the area by the project.

b. No increase in infrastructure (public services and utilities) which will become a burden to local residents after completion of a project. An example would be a sewage treatment system for Yellow Pine that would be in excess of the town's future needs, once the project was phased out.

c. Positive gains or some public benefit to the communities, such as year-round school, improved roads, water system, etc.

B. Moderate effect on local employment.
Discussion: This criterion is met if:
The project increases local employment opportunities. Both the number of jobs and duration of work season are included in this criterion. Increasing unemployment compensation through attracting resident seasonal workers into the area is undesirable.

C. Accords with local public attitudes and preferences.
Discussion: This criterion is met if:
The majority of the local people generally favor the project. This criterion will be evaluated through the analysis of results of an annual attitudinal survey similar to the one prepared by the contractor, and distributed to local residents as an element of the EIS.

D. Proposal is economically feasible for the community and CSM.
Discussion: This standard considers economic benefits and mitigation costs. The criterion is weighed as follows:

1. Generally the higher the economic benefits to the community and CSM, the more acceptable this project is.
2. The economic analysis also considers publicly financed mitigation costs, as well as loss of other resource values (i.e., fisheries).

E. Minimal effects on identified cultural values.
Discussion: This criterion is best satisfied by:
Protection of maximum area identified as having cultural significance.

VII. Energy/Resource Allocation

A. Project is energy efficient.
Discussion: Efficient utilization of all resources is considered.
Higher rankings will be assigned to alternatives which utilize less petroleum products.

All of the criteria were developed so as not to exclude any reasonable project alternatives from consideration. The criteria should, however, eliminate from consideration those alternatives which could not be feasibly implemented.

The overall determination that an alternative should be given further consideration in the EIS must be, by necessity, somewhat subjective. However, these criteria provide for a comparison of the relative effects of implementation of the various alternatives, with certain criteria obviously more important than others in the final determination of an alternative's merit. Chapter 5 involves a detailed discussion of effects of implemention of the proposed project and alternatives. Chapter 6 assesses the alternatives according to these evaluation criteria and ranks the alternatives.

STIBNITE MINING PROJECT

GOLD MINE AND MILL

FINAL ENVIRONMENTAL

IMPACT STATEMENT

CHAPTER 4

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CHAPTER 4

ALTERNATIVES CONSIDERED

INTRODUCTION

Early in 1979, CSM submitted a "Notice of Intent to Operate: Operating Plan for the Stibnite Project Canadian Superior Mining (U.S.) Ltd.," to the Forest Service (Payette National Forest) which proposed the development of a major gold and silver mining and processing operation at Stibnite, Idaho.

Due to the environmental sensitivity of the area surrounding the Stibnite Mining District, and a number of key management concerns and issues raised in earlier planning proposals made for the Payette and Boise National Forests, a decision was made by the Forest Service to require that a full EIS be prepared for the proposal prior to approval of an Operating Plan. The EIS would be prepared in compliance with the requirements of: the National Environmental Policy Act of 1969 (NEPA); the most recent Council on Environmental Quality regulations (November 29, 1978) of NEPA; and the National Environmental Policy Act Process, Final Implementation Procedures of the Department of Agriculture Forest Service (July 30, 1979).

This chapter provides a more detailed overview of the project initially proposed by CSM, along with the process used in formulating additional options. The discussion also presents a number of "reasonable alternatives" which will be discussed in detail later in this chapter. The format utilized in the discussion can best be summarized as follows:

- Description of alternative operational components (separate elements that, when joined together, form the complete project alternatives).
- Summary of the applicant's proposed action presented in the "Notice of Intent to Operate", with subsequent modifications based on the results of the final mine plan.
- Discussion of all proposed component options, including those eliminated from further consideration, and the reasoning for early elimination (technical, environmental or economical basis for decision).
- Selection and display of feasible component options, and documentation for further consideration as elements of complete alternatives.
- Description of a reasonable range of alternatives, including the no action alternative, to be evaluated in detail in the "Evaluation of Alternatives" chapter of the EIS.

- A summary matrix of the preliminary screening process utilized in the alternative analysis process which highlights key issues and major decision steps.

Management constraints and guidelines, corresponding mitigation measures, and monitoring and control measures needed "to ensure that the final actions conform to all other applicable laws relating to Forest Service activities" are also discussed in this chapter, as directed by the Region 4 NEPA Workbook. The intent of the general constraints and guidelines and mitigation measures is to ensure that adverse environmental impacts are avoided or minimized during construction and operation of the project. These requirements will also aid in the process of determining the preferred alternative. A more detailed discussion of management guidelines and various mitigation measures will be presented in the final Operating Plan prepared by CSM. This plan, which will be developed in cooperation with the Forest Service, will describe detailed "prescriptive" mitigation, including a reclamation plan, for the selected alternative.

OPERATIONAL COMPONENTS

There are a number of separate operational components that must be linked in order to develop complete project alternatives for the proposed Stibnite Mining Project. For the purposes of this discussion, which addresses the proposed action and the development of alternatives, eleven major components were considered critical from the standpoint of the overall mining and processing operation in terms of impact evaluation and potential for implementation. These include:

- Mine areas
- Mining methods
- Waste dump disposal options
- Hauling and material transportation
- Processing facilities locations
- Processing methods and materials
- Stockpiling ore
- Processed ore disposal
- Housing facilities and location
- Power source options
- Access corridors

Each of these components is discussed individually in a preliminary fashion with regard to the proposed project and alternatives in the section that follows. The components are later combined by the Forest Service and its consultant to form a number of reasonable alternatives. Chapter 5, "Effects of Implementation", then focuses on the consequences of implementing these alternatives.

It should be emphasized from the beginning that the geographical location, topography, mineralization and land ownership in the project area restrict the number of potential options for each of the project com-

ponents (i.e., mineralization dictates mine area and mining method options). For these reasons, and the fact that recent NEPA regulations require that the EIS shall be "analytic and concise," the overriding objective of this chapter was to develop a full range of "reasonable alternatives," working within the framework of the local constraints. The major issues, concerns and management opportunities identified by the "public" and resource managers in the scoping process also played an important role in developing suitable alternatives for further analysis.

DESCRIPTION OF PROPOSED PROJECT

General

CSM has made a proposal to the Forest Service for developing a gold and silver mining and processing operation in the EFSF of the Salmon River drainage, 14 miles southeast of the Town of Yellow Pine in the Stibnite Mining District (Sections 1, 2, 11, 12,14,15 and 22, T18N, R9E, and Sections 35 and 26, T19N and R9E). The company has been conducting mineral exploration and pilot plant testing in the region over the last seven years, and has acquired claim blocks of 571 unpatented and 29 patented claims (Figure 10).

The potential mining sites have been extensively drilled and geologically mapped, and have been shown to possess proven ore reserves. Based upon the known reserves currently under their control, CSM has proposed developing a mine and processing facility which would operate over a 10-year period. While the Stibnite area possesses additional mineral reserves on both Forest Service and patented lands, the scope of this EIS is limited to mining and processing the currently available oxide ores. If CSM decides to mine other areas or make significant changes in their Operating Plan, additional administrative actions must be taken.

Mine Areas

A schematic diagram of the project proposed by CSM is shown in Figure 16. The two mining areas, known as the Garnet Creek and West End deposits, cover areas of two and 44 acres, respectively. CSM proposes to mine the Garnet Creek deposit for two seasons, and then reclaim the area. The site is located in a steep (23° plus) west-facing canyon with a small stream transecting the north corner of the proposed mining area. As a result of a previous mineral exploration, land disturbance is extensive and will require some form of reclamation, regardless of the present proposal.

The West End Mine will encompass the north face of the West End Creek drainage between elevations of 6750 and 7300 feet. Previous disturbance in this drainage has been limited to construction of exploration and drilling roads. The area is steep (up to 38°), and densely timbered with lodgepole pine. Two important features of the area are

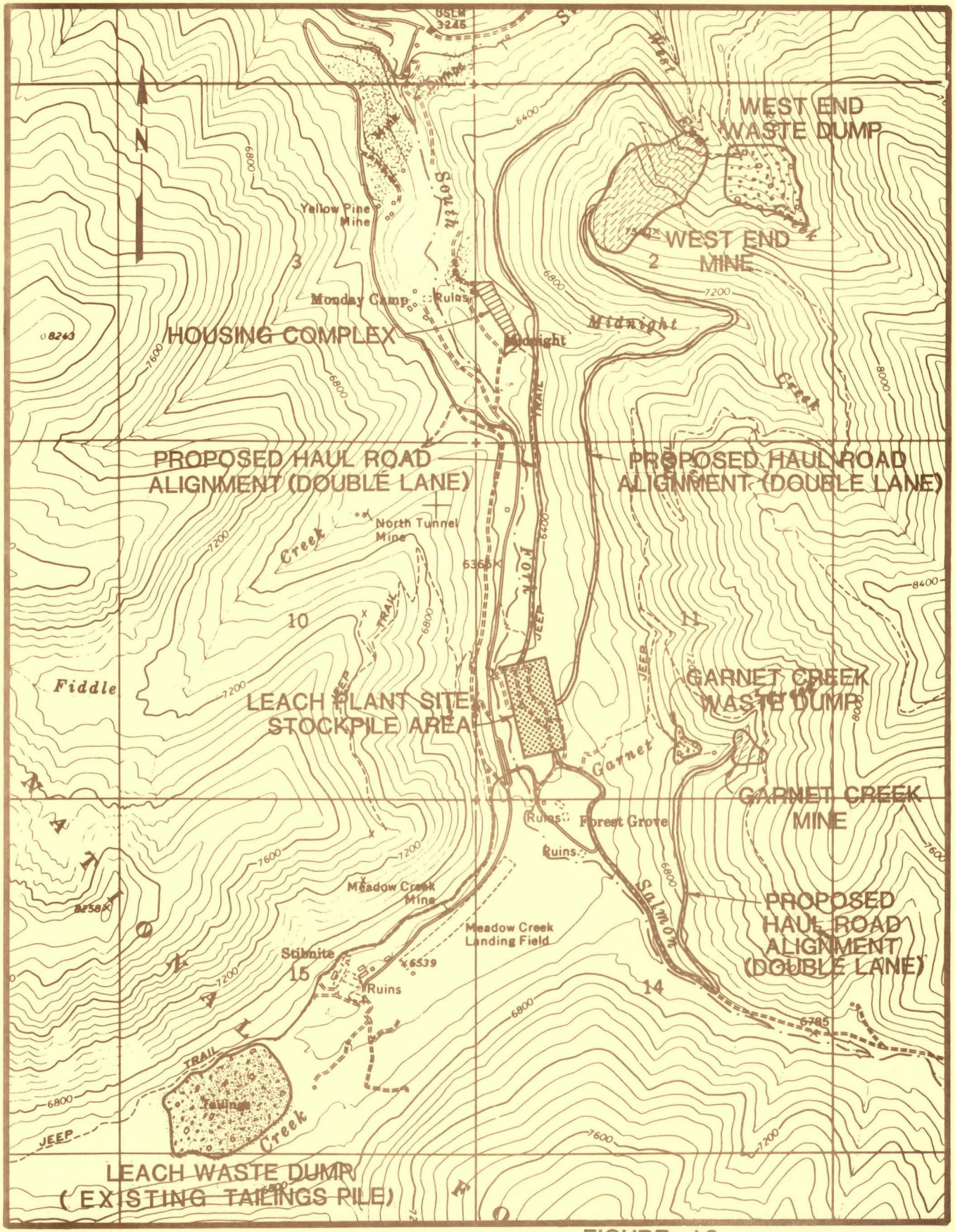

FIGURE 16
ALTERNATIVE 1, PROJECT PROPOSED
BY CANADIAN SUPERIOR MINING

Sugar Creek along the northern border of the drainage, and West End Creek which rises from a series of springs and delineates the east edge of the mining area.

Two distinct types of gold mineralization occur in the proposed mine areas; the oxide ore, which is of major importance to this project, has formed over the years through exposure to geologic and chemical processes and weathering conditions; and sulfide ore which exists, for the most part, below the layer of oxide ores and is more complex in terms of its polymetallic constituents.

Following extensive pilot plant testing, it was found that the gold and silver in the oxide ore bodies are readily extracted by cyanide leaching and that the gold/silver cyanide complex could be further processed to yield the elemental metals. In the sulfide zone, arsenic (primarily in the form of arsenopyrites, antimony, and iron sulfide minerals) competes in the cyanidation processes with gold and silver by retarding the dissolution of these metals, consuming large quantities of cyanide and oxygen. The arsenocyanide complex formed along with the gold/silver complex cannot be processed without extensive controls to avoid the generation of free arsenic. At present, there are no smelting operations in this country capable of processing this material in an environmentally acceptable manner. Because of these problems, CSM is proposing to mine and process only the oxide ores.

Mining Methods

CSM proposes to develop open-pit mines at each of the two sites discussed. Mining will be conducted approximately 150 days each year. A conventional drill-blast-load-haul method will be employed, creating a series of benches 15-20 feet high, and 45° pit walls into the mineralized strata.

It is presently anticipated that the mining will be contracted to a private company, and that from 2,500 to 3,000 tons of ore will be mined each day (400,000 tons/year). An average of 3,500 tons per day (525,000 tons/year) of mine waste (non-mineralized rock) will be mined and disposed of near the mine sites. At the end of each year's operation, sufficient ore will be mined and stockpiled to operate the leaching facility the following season.

Equipment at the mine would include track mounted drilling apparatus, bulldozers, front end loaders, dump trucks, pickup trucks and water trucks for dust control. The use of larger equipment such as electric shovels and scrapers is not anticipated at this time.

Waste rock will be handled in a manner to be discussed in the following section. Overburden will be stored at or near the mine sites and used for reclamation purposes. Overburden will be pushed to the perime-

ter of the excavated areas, and terraced or temporarily stabilized to avoid erosion and slumping into the pit.

Waste Dump Areas Disposal Options

Two waste dump areas would be established at the mine sites. The Garnet Creek waste dump would involve approximately six acres of land immediately west of and adjacent to the proposed mine area. The dump would be designed to accommodate approximately 250,000 tons of waste material, based on the calculated new ore reserves at the mine site. During excavation work, a concrete or permanent metal pipe culvert will be installed to route drainage under the dump. Garnet Creek will also be protected by a permanent culvert and streamside buffer areas to avoid increasing sedimentation during spring runoff.

CSM has proposed permanently storing the internal waste from the West End Creek deposit in West End Canyon above the perennial spring source. The waste dump would involve approximately 25 acres of land in the canyon. The problem of stabilizing this material has been reviewed by both a private geotechnical engineer and Forest Service personnel. Preliminary evaluations by both sources have indicated that by utilizing proper precautions, a stable structure can be constructed at the site. The dump, as proposed, would be designed to accommodate approximately 2.2 million cubic yards of waste material. Major potential problems involve: 1) maintaining the permeability of the core material, to ensure that no hydraulic pressure build-ups occur which would cause the structure to become unstable; 2) providing drainage facilities to accommodate spring flows through or beneath the waste dump; and 3) maintaining the integrity and water quality of West End Creek. These problems and potential mitigation are discussed in more detail later in this chapter.

Hauling and Materials Transport

According to the CSM proposal, all mine and mill materials will be transported by truck. Two new haul roads will be required, as well as improvements to a portion of the existing roadways. Figure 4-1 shows the general alignments for approximately two miles of existing and 3.5 miles of new haul roads necessary to serve the two mining sites. The West End Mine would require construction of an improved two-lane (approximately 60 ft. wide) lower haul road which would generally follow the existing drilling/ exploration road alignment, and a new upper haul route through the Midnight Creek drainage to Adkin's Flat to complete the loop. Access to the Garnet Creek mine would be provided by a new two-lane haul road off the Monumental Summit Road. The existing service road to the tailing pile would be improved to a 60-ft., two-lane haul road for disposal of processed ore waste. Haul roads would be built to Forest Service specifications. Construction of up to two bridges and several culverts would also be required.

Processing Facilities Location

Due to the limited amount of available flat land in the Stibnite area, there are few alternative locations for siting the processing and ancillary facilities. Under the proposed project the major elements of the processing facility (i.e. leach pads, cyanide recovery facility, laboratory, power plant and crusher) would be located in a relatively level area north of the Stibnite ruins known as Adkin's Flat. Since the topography is relatively flat and existing vegetation is limited, the area provides one of the only suitable sites large enough for the development.

Processing Methods & Materials

The processing technique proposed by CSM involves hauling ore to a crushing facility where the rock would be crushed to less than one inch and stockpiled. Crushed ore would then be moved to the leaching area and chemically processed (cyanidation) to remove gold and silver. An option involving the processing of "pit-run" or uncrushed ore was also considered by CSM. "Pit-run" ore does not involve crushing and associated environmental problems (i.e., particulate generation, noise, energy consumption). However, due to the present inability to predict the nature of the ore deeper in the ore body, the need to process crushed ore is anticipated.

Figure 17 provides a schematic diagram of the proposed chemical process. Ore is piled on impervious pads (less than 10^{-7} cm/sec penetration), and saturated with water. As proposed, the piles are stacked approximately 15-20 feet high (45,000 tons/heap). The pile is saturated with fresh water. A weak solution of sodium hydroxide is then sprinkled on the pile, and the pH of the wetted pile is adjusted to approximately 11. A dilute alkaline sodium cyanide solution (1000 mg/l) is then sprinkled or irrigated over the ore. The solution passes through the pile, dissolving the gold and silver. The metal-laden solution is then captured in the pregnant solution pond. The solution is pumped through the extraction apparatus where the gold and silver cyanide complex is adsorbed onto activated carbon. The stripped process solution is adjusted with fresh sodium cyanide and sodium hydroxide, and returned to the system for reuse. The liquid portion of the process is a closed circuit. No cyanide liquid waste is discharged to the environment. Makeup water (approximately 15-20 gallons per ton) is required to replace the amount absorbed by the rock and lost through evaporation.

The gold and silver-bearing carbon is further processed by stripping the metal cyanide complex from the carbon with hot caustic, then plating the gold and silver in the resultant solution onto steel wool (electrowinning). The plated steel wool is then melted in a small furnace to separate the steel from the gold and silver. The complete process will be carried out on site.

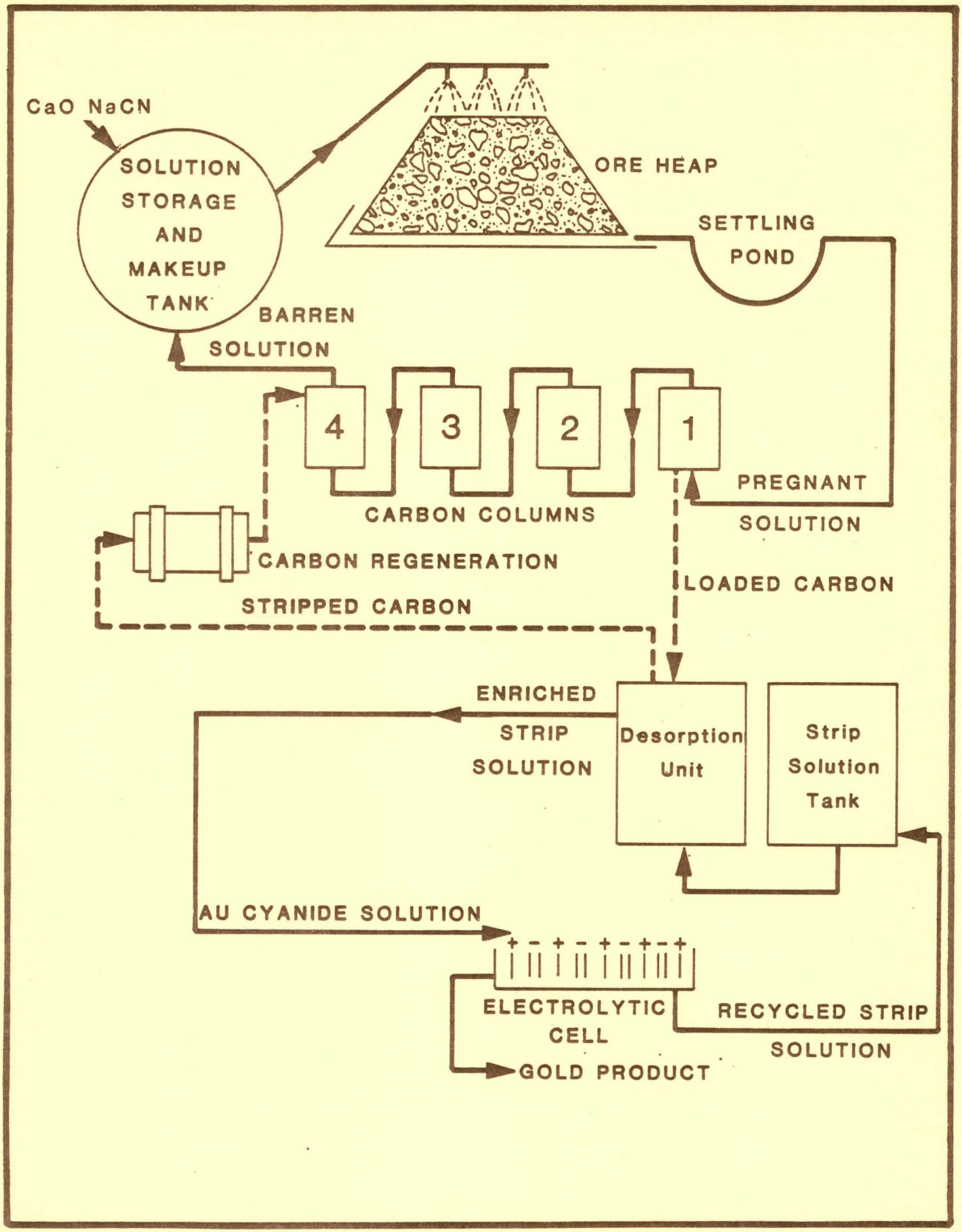

FIGURE 17
CYANIDE LEACHING PROCESS

It is anticipated that four 300-foot-square impervious pads, constructed of membrane liners with a bentonite coating and protected with 1½-2 feet of sand, would be constructed. Two 150 by 50 foot washwater and safety ponds and a pregnant solution pond would also be required. The ponds would be constructed of a membrane material suitable for their intended use. All pads and ponds would be hydraulically tested each season for leakage prior to beginning operation. Detailed design drawings and specifications would be submitted for review to the appropriate agency(s) (i.e. Forest Service, Idaho Department of Health and Welfare) prior to beginning construction. Adequate construction inspection and materials testing would be conducted prior to beginning the actual operation.

The leaching cycle is a four week cycle which generally involves one week of leaching and three weeks of washing and neutralization (depending on rock type, size of materials, etc.). Spent ore is washed with a calcium hypochlorite (HTH) solution until the cyanide concentration of the tail water is below 0.2 milligrams per liter (mg/l), and saturated with a dilute acid hypochlorite solution to convert any remaining cyanide into the cyanate form. The washwater, which is collected separately, is processed through the activated carbon apparatus to remove any residual gold and silver values, and returned to the washwater basin for later reuse. Any washwater that is disposed of would be: superchlorinated to insure cyanide destruction; neutralized; and sprayed on the waste dump or pre-selected area, with appropriate consideration given to local environmental conditions. No direct stream discharge would be permitted.

CSM currently maintains permits to withdraw surface water from Meadow Creek, the EFSF Salmon River, and Sugar Creek. It is expected that the peak daily water withdrawal would occur seven times per operating season. Estimated total withdrawals during these periods would be approximately 765,000 gallons (1.18 cfs).

Stockpiling Ore

Climatic conditions at Stibnite limit the proposed operation to approximately 150 days annually, due to freezing problems at the leach plant in early spring and late fall. CSM is proposing to stockpile a sufficient amount of ore from the mine sites (approximately 50,000 tons) at the end of the season to start up the following season's processing operation. Ore would be stockpiled at Adkin's Flat near the proposed leach plant. This would expedite "early season" start-up and minimize increased erosion and sedimentation which occurs during early spring runoff conditions.

Processed Ore Disposal

Over 400,000 tons of processed ore would be washed and neutralized and disposed of each year under the plan presented by CSM. This volume presents a significant disposal problem due to existing topography and limited available flat land in the area. After analyzing a number of

potential alternative disposal sites, CSM proposes to utilize the existing tailing pile located approximately ¼ mile southwest of the Stibnite ruins. The pile is approximately 1200 to 1500 feet wide, 2200 feet long, and varies in thickness up to approximately 50 feet. The tailing material occupies the entire width of the valley, and has effectively dammed Meadow Creek (Figure 18).

By using the tailing waste pile to dispose of processed ore following heap leaching, an opportunity exists to stabilize the pile. The existing pile is highly susceptible to "liquefaction" (the capacity of the soil mass to behave as a liquid), and as such the potential for mass failure caused by seismic activity is considered significant (NTL, 1979).

CSM has proposed using waste rock from the Garnet Creek Mine to construct a retaining berm to minimize the potential for mass failure at the tailing pile, and covering the pile with processed ore to further reduce erosion from surface runoff and wind action. Preliminary revegetation studies conducted by the Forest Service indicate that once the drifting action of the sand on the surface of the tailing deposit is stabilized, the area could be reclaimed with adaptable plant species.

Under the proposed plan, Meadow Creek would be rerouted and the eroding streambank would be stabilized with gabions or rip-rap material. Partial or complete draining and reclamation of the existing pond that has formed behind the tailing deposit is also being considered.

Housing Facilities and Location

The proposed operation would employ approximately 60 persons for normal production. As proposed, CSM would locate a mobile home subdivision at Stibnite, on a flat bench near the mouth of Midnight Creek (Figure 16). The facilities would accommodate about 40 personnel, and any possible families. The area would be planned and constructed to meet applicable Valley County Mobile Home Subdivision Standards, and provided with approved water and wastewater systems, and other necessary facilities and utilities. Approximately 15-20 CSM administrative and supervisory personnel would be housed in Yellow Pine in existing facilities.

Power Source Options

The CSM proposal would involve the installation of two diesel or propane generators at the site. A 600 kw unit operating 16 hours per day would provide power to the processing facility, and a 300 kw unit would supply to the residential units. Both units would operate 24 hours per day.

Approximately 50,000 gallons of diesel fuel would be stored at the site. An estimated 3,500 gallons of fuel per day would be required to





CHANNELLING OF MEADOW CREEK
ACROSS THE FACE OF THE
EXISTING TAILING DISPOSAL PILE

FIGURE 18

provide power to the processing facilities and residential units, and for the operation of necessary mining and hauling equipment. Power transmission lines would be localized in order to minimize effects on the visual character of the area.

Access Corridors

Primary access would be provided via the Warm Lake Road/Johnson Creek route (Cascade to Yellow Pine), then northeast along the EFSF Salmon River to Stibnite. Engineering studies are presently being conducted to determine bridge load limit requirements and potential restrictions. CSM does not propose undertaking any major improvements to these roads. The Warm Lake/ Landmark Road project, which involves widening, paving and stabilization, was initiated in 1977, and is scheduled to be completed by 1981 prior to start-up of this project. The road from Yellow Pine to Stibnite will require some limited widening and surface grading for safe access and operation of equipment. Traffic control and general dust control measures (i.e. watering, surfacing) will be conducted in the Stibnite vicinity and other areas, as necessary, to provide uninterrupted transportation. Improvements to the Meadow Creek landing field bridge are also being planned.

FORMULATION OF OPTIONS

On November 29, 1978, the Council on Environmental Quality issued "Final Regulations for Implementing the National Environmental Policy Act" (Federal Register, Vol. 43, No. 230). In July, 1979, the U.S. Department of Agriculture Forest Service issued "Final Implementation Procedures for the National Environmental Policy Act," which further defines Forest Service procedures. The regulations are intended to provide federal agencies with efficient, uniform procedures for translating the law into practical action. The regulations direct that a reasonable range of alternatives is developed, and that alternatives are fully and impartially developed.

A number of steps were taken by the Forest Service and JMM to ensure that a full range of operational criteria were considered in the development of a reasonable range of alternatives for the proposed Stibnite Mining Project. Initially, a series of public meetings were held, and a "scoping document" was developed to identify all significant issues, concerns and opportunities to lead the study team through the EIS process. The scoping document served to encourage affected parties to identify crucial issues raised by the proposal, and to ensure that agency and consultant resources were not spent on the analysis of issues not considered significant. The scoping process also aided the Forest Service in defining and allocating responsibilities for preparing and reviewing the EIS. A pilot plant (or scaled-down version of the actual milling/extraction operation) project was also operated for two years and provided valuable information on potential process and operational modifications, environmental safeguards, and potential mitigation measures to be used in formulating a reasonable range of alternatives.

Personnel from the Forest Service and JMM also visited other mining and milling operations in Nevada and Idaho. These visits provided more insight into the variety of component options available to CSM for the proposed Stibnite Mining Project.

As previously discussed, all the proposed Stibnite project alternatives to be considered must incorporate each of the eleven individual implementation components (i.e., mining areas, mining methods, etc.) into the overall operational plan. While many of these elements are utilized identically for several of the project alternatives presented later in this chapter, the variations and options, when combined, provide an opportunity for developing a project with the least negative impacts on the affected environment. Only those alternatives that provided a comprehensive proposal were considered in this analysis. All elements of the mining and milling processes, plus ancillary functions, were dealt with in order to establish a complete project. Variations in location and geographic setting were considered for all components except in the actual mine sites, which are fixed by the ore bodies and claim ownership and control.

The operational components analysis and formulation of alternatives utilized two separate evaluation methodologies. An initial screening of the individual critical alternative components was conducted to eliminate those variations that were not considered technically and economically feasible or implementable. The individual elements that were acceptable under the initial screening criteria were then incorporated in the formation of alternative project proposals, for further consideration and impact analysis. While numerous combinations of the individual components may exist, only those few that represent significant variations are discussed in detail in this chapter.

OPERATIONAL COMPONENTS

Introduction

The formulation of alternatives to the action proposed by CSM in the "Notice of Intent to Operate: Operating Plan for the Stibnite Project Canadian Superior Mining (U.S.) Ltd." is of critical importance. The responsible agency can significantly alter the effects of the proposed project on local environmental conditions. Besides prescribing specific mitigation measures for the accepted project, assisting in the development of alternatives provides the Forest Service with an early opportunity to provide input into the proposed project.

The following discussion summarizes a large range of possible options for each operational component and identifies the rationale for not evaluating certain components in great detail. As described earlier, only limited options are available for locating waste dumps, processing facilities, and housing and access corridors due to the problems associated with the local topography (adequate available flat land) and existing land ownership. Only those options that were shown to be

technically and economically feasible are discussed in the section that follows.

MINE AREAS

As previously discussed, there are no feasible alternative mine sites other than the proposed Garnet Creek and West End deposits. The geology and mineral deposits of the Stibnite area have been extensively studied over the past six years. Necessary contractual agreements to mine these areas have been secured. Approximately $2.3 million has been invested by CSM in exploration and metallurgical testing. The ore bodies which exist at these sites have been identified as oxide ores which can be readily processed by the cyanidation process.

Levels of Mining. While there are no feasible alternatives to the two sites proposed by CSM, there are several different levels of mining which can be discussed as potential alternatives. The first level, a No Action Alternative, has three options with regard to the present proposal. First, the Forest Service could elect not to approve any mining operations in the area of the Stibnite Mining Project. In this case, the CSM's proposal could not be implemented in any form. A second variation of this level would involve restricting the proposal to the size of the pilot plant operation (approximately 1,500 tons/yr). The third variation of the No Action Alternative would involve an interim moratorium on the proposed mining project until completion of the Forest Plan, which is scheduled for late 1982 or early 1983.

It is necessary to point out that in evaluating these variations of the No Action Alternative, the Mining Law of 1872 governs the prospecting, locating and claiming of most valuable metallic and related nonmetallic minerals on National Forest lands. This law essentially allows the miner or person exploring for minerals relatively unrestrained access to national forest lands. The Forest Service has also promulgated regulations (36 CFR, Part 252, 9/1/74) which require potential mining operations to file a "Notice of Intent to Operate" with the local national forest office. If the authorized Forest Service officer determines that the proposed operations will result in significant environmental disturbance, the operation must submit a proposed plan of operations. All operations are to be conducted to minimize adverse environmental impacts and conform to federal, state and local air and water quality standards. Mining practices are also required to be in harmony with scenic values, to provide for the protection of water and air quality, fish and wildlife habitats and other resources, and to minimize road construction damage.

While it is possible to recommend specific mitigation and require that other resource values are protected, the outright banning of mining by the Forest Service is in direct conflict with the Mining Law of 1872. The Forest Service does not have the authority to disapprove an operating plan for an operation which is operated in an environmentally sound manner (CEQ, 1977; USFS 1980).

Following extensive discussion and deliberation on these variations, the decision was made by the Forest Service to define the No Action Alternative as denial of the project proposed by CSM. The decision was primarily based on the fact that this approach would provide a baseline alternative against which all other options could be weighed. While the apparent conflicts between the Mining Law of 1872 and NEPA were acknowledged, it was agreed by both the Forest Service and CSM that this alternative would be the most feasible to analyze. This option is given detailed consideration in the detailed evaluation. Both the significantly reduced (pilot plant size) operational level and the interim moratorium would essentially have the same effects as the no mining variation to the mining company because of existing lease requirements and capital investment. These variations were not considered feasible by CSM for obvious economic reasons, and will not be considered further in this discussion.

A second alternative included under the "levels of mining" category of operational components would involve a specific reduced level of mining, and/or curtailed mining in sensitive areas. For example, the Forest Service could elect to limit mining to the West End deposit, and reduce the amount of material mined each year to 1500 tons per day or 250,000 tons per year (the proposed action involves mining approximately 400,000 tons/ year). Under this proposal, the Forest Service could also restrict mining of the Garnet Creek area. The Garnet Creek mine area is considered particularly sensitive due to steep slopes and the presence of Garnet Creek which flows throughout the year to the EFSF Salmon River. As previously discussed, the Forest Service could also reduce the proposal to mining Garnet Creek only. The 44-acre West End Mine area is estimated to contain 3.4 million tons of new gold ore reserves. The Garnet Creek Mine, which would involve approximately two acres of area, contains only an estimated 250,000 tons of new gold ore reserves. However, the grade of ore is substantially higher at this deposit. It should be noted that the Forest Service has, in the past, restricted numerous proposals in the National Forests which would be incompatible with, or harmful to, the areas' resource values. The precedent for this action has been set on numerous occasions with regard to timber harvest and road construction activities.

CSM has indicated that based on the current gold economics, a scaled-down mining operation involving either the West End or Garnet Creek Mine may be only marginally feasible. However, from an economic standpoint, the company also indicated that any decision to pursue either of these options would be totally contingent on existing gold economics and associated capital investment and infrastructure requirements for such an operation. Land ownership and leasing agreements involving royalty payments for property mineral values further complicate the Stibnite situation. It would also appear that any attempt to limit the size of the operation would be in conflict with the Mining Law of 1872 and Forest Service regulations (36 CFR 252) which define policies for administering and managing forest land. For these reasons, these options will not be given further consideration in the development of project alternatives.

A third potential variation would involve reducing the annual level of production and extending the life of the mining activities. In this option, the Forest Service could elect to reduce the amount of material mined each year from the two mine areas to 1500 tons per day, and extend the overall operation to a 15-year, rather than 10-year development program. The primary advantage to this "reduced production level" option would be scaled-down haul road and equipment requirements. Under the variation, haul roads would be reduced to approximately 25 feet in width, and 25-ton trucks would be utilized. Overall surface cuts for the road system would be reduced by less than 20 percent. Disadvantages would involve longer term areal disturbance, increased haul trips (TSP concentrations), additional energy requirements, etc. For those reasons this option will not be considered in a detailed evaluation.

Mine Areas Considered for Detailed Evaluation

- West End Canyon and Garnet Creek (project proposed by CSM)
  1. Levels of Mining Considered for Further Evaluation:
     a. No Mining
     b. West End Canyon and Garnet Creek (project proposed by CSM)

Options Eliminated From Detailed Evaluation

- Alternate Mine Sites
- Reduced Levels of Mining at the West End Canyon and Garnet Creek Sites
  1. Pilot Plant Level (approx. 1,500 tons/year)
  2. Reduced Level (1,500 tons/day) With No Mining of Garnet Creek Deposit
  3. Reduced Level (1,500 tons/day) With Extended Project Life

MINING METHODS

There are a number of proven mineral extraction techniques which have been used in hard rock mining. However, due to the local terrain and nature of materials proposed to be mined in the Stibnite area, few options exist for mining the ores.

For example, auger mining, which is often utilized to mine soft-bedded deposits of uniform thickness and grade such as coal, could not be applied in the Stibnite area due to the erratic nature of the oxide ore, and cost considerations. Similarly, in-situ leaching involving dissolving the metal content of the ore in place with solution and pumping the solution to a recovery unit for extraction is not a feasible solution at Stibnite due to the highly fractured and faulted nature of the rock, and other existing physical conditions.

Underground Mining. Underground mining was initially considered as a potential method for mining the West End and Garnet Creek deposits. However, because the oxidized gold-bearing rock in the area does not occur in distinct deep veins but is interspersed in deposits within layers of waste rock, underground mining was not considered practical. The soil overburden between the ore deposit and surface is shallow at both of the mining areas. Gold mineralization at the West End deposit is controlled by a 250-to-500-foot-wide, northeast-striking, southeast-dipping fault zone. Underground methods would encounter extreme difficulty and excessive costs with the erratic mineralization which occurs in this location. The Garnet Creek deposit occurs in limestone along the axis of a fold, also limiting the underground method. Therefore, underground mining was eliminated from further consideration.

Phased Mining. In a phased mining operation, only one area of an open pit mine is operated at a time, while other areas are not disturbed, or are in the process of being reclaimed. The West End Mine area is also relatively small (approximately 44 acres) as compared to other mining operations being proposed in the west. For example, the Jerritt Canyon Project in Nevada will involve approximately 26,800 tons of overburden and gold ore per day for over 200 days each year during the 25-year development program , as compared to an estimated 2,500 tons per day (150-day per year operation) for the Stibnite project. Plans in southeast Idaho to develop approximately 15,800 acres of land under federal phosphate lease will involve some 2,900 acres of mine pits and 3,000 acres of waste dumps. In the case of these large-scale operations, simultaneous mining and reclamation can be accomplished, reducing the total surface area exposed to erosion and providing for early reclamation and revegetation. The Garnet Creek deposit, because of its small size (approximately two acres), does not lend itself to this application. If mined, Garnet Creek would be developed over a two-year period, and reclamation activities would begin as soon as practical. The West End Mine area would be mined from benches cut into the slope, and the pit would be mined from the bottom and top, simultaneously. Steep slopes and limited area of the site create significant problems in terms of limited area for equipment movement and operator safety. For these reasons, phased mining will not be considered for detailed study.

Mining Methods Considered for Detailed Evaluation

- Open Pit Mining (project proposed by CSM).

Options Eliminated From Detailed Evaluation

- Auger Mining
- Underground Mining
- Phased Mining

WASTE DUMP DISPOSAL OPTIONS

A total of seven primary alternative mine waste disposal options were identified by the Forest Service and JMM. These included: 1) internal replacement of mine waste material; 2) disposal of Garnet Creek mine waste at the existing tailing pile, and construction of a mine waste dump in West End Canyon; 3) reduced West End dump in combination with disposal at the existing tailing pile; 4) disposal of all mine waste at the tailing pile; 5) fill at the Yellow Pine Mine Pit ("Glory Hole"); 6) sidehill or valley fill disposal within the project area in combination with reduced West End Canyon mine waste dump; and, 7) hauling waste material to a location outside the project area for disposal. The critical criteria used to examine these options were:

1. Topography
2. Location
3. Ownership/size
4. Geotechnical stability

Internal Replacement of Waste Material. This waste disposal option would involve stockpiling mine waste material in a location adjacent to the area being mined, and replacing the waste overburden and rock in the pit following removal of the ore deposit. This method was not considered feasible for either the Garnet Creek or West End Mine areas due to steep slopes and unavailability of sufficient land area in close proximity to the mines suitable for stockpiling. The limited area of the mine and the desirability of working the top and bottom of the deposit simultaneously further limit the feasibility of internal replacement due to safety considerations, and the potential for burying future mineral values in the lower end of the canyon at the West End deposit. The size of the Garnet Creek Mine area (approximately two acres) altogether precludes internal replacement at this site. This option will not be considered for detailed study.

Disposal of Garnet Creek Mine Waste at the Existing Tailing Pile, Construction of a Mine Waste Dump in West End Canyon. Under this option, mine waste material would be hauled approximately 1.5 miles from Garnet Creek to the tailing pile and wasted with processed ore. No waste disposal facilities would be established at Garnet Creek due to steep slopes at the site and the location of the dump over Garnet Creek. Mine waste from the West End deposit would be disposed of in a narrow 25-acre canyon located immediately east of, and adjacent to, the mine. Soil cover in the canyon is very thin, and overall stability at the dump area is good. Drainage problems associated with routing the passage of spring flows through the waste dump would be major considerations with this option. Preliminary geotechnical evaluations conducted as a part of this study indicate that a drainage system could be designed to pass runoff waters and spring flow beneath the fill. This option will be considered for detailed study later in Chapter 5 of this report.

Reduced West End Mine Waste Dump in Combination with Disposal at the Tailing Pile. Based on the final geotechnical analysis of the completed West End pit plan, it may be possible to reduce the size of the West End dump and/or haul a portion of the waste material to the existing tailing pile. Preliminary calculations indicate that the approximately 4.4 million tons or 2.2 million cubic yards of internal waste rock the company proposes to mine could be stored in West End Canyon. However, based on the potential requirement for additional stable fill material needed to construct the berm structure at the existing tailing pile and the results of the final mine pit plan which will provide more refined information of waste/ore ratios, cut-off grades, etc., it may be feasible to reduce the size of the West End dump from the 2.2 million cubic yard proposal. Selection of fill placement techniques which result in segregation of the material during placement would be a critical factor in the design of the dump. This would involve the placement of an open graded rock mass through which water could freely pass in the bottom of the fills. Pipe underdrain systems have also been utilized in similar applications (NTL, 1979). Drill logs completed by CSM indicate that the majority of the waste rock is quartzite. The rock appears to be quite stable, and would also provide a solid foundation for the berm at the tailing pile. This option will be considered in the detailed evaluation.

Disposal of All Mine Waste at Existing Tailing Area. CSM has proposed utilizing the tailing pile as a site for the disposal of process waste. With proper planning, the tailing area could also be utilized as a mine waste disposal area for material from both West End and Garnet Creek. This proposal would involve utilizing waste rock from the Garnet Creek Mine site to construct a retaining berm or buttress across the face of the tailing pile (the pile has inherent mass stability problems which are discussed in more detail later in Chapter 5), and hauling mine waste material from the West End Mine area to cover the pile. Preliminary cross sections of the tailing pile shown in Figures 19 provide a graphic presentation of the proposal. Initial calculations indicate that the tailing area is large enough to dispose of all the mine waste material from both mine areas. As shown in the figures, the pile would be gradually contoured into the upper Meadow Creek drainage which is presently ponded. The soil layer covering the pile would range from approximately 40 to 90 feet at the buttress to some 25 to 85 feet at the upper end of the pond area depending on the configuration (Figure 19). The pond located at the upper end of the tailing area would be completely filled in. Meadow Creek would be rerouted around the tailing area. Streambanks would be stabilized by lining the banks with gabions or rip rap material. Mine waste material and process waste would be utilized as a cover layer for reclamation and revegetation. The option would require the transport of approximately 2.2 million cubic yards of West End internal waste material 3.5 miles to the tailing pile. The option will be considered for detailed evaluation later in this report.

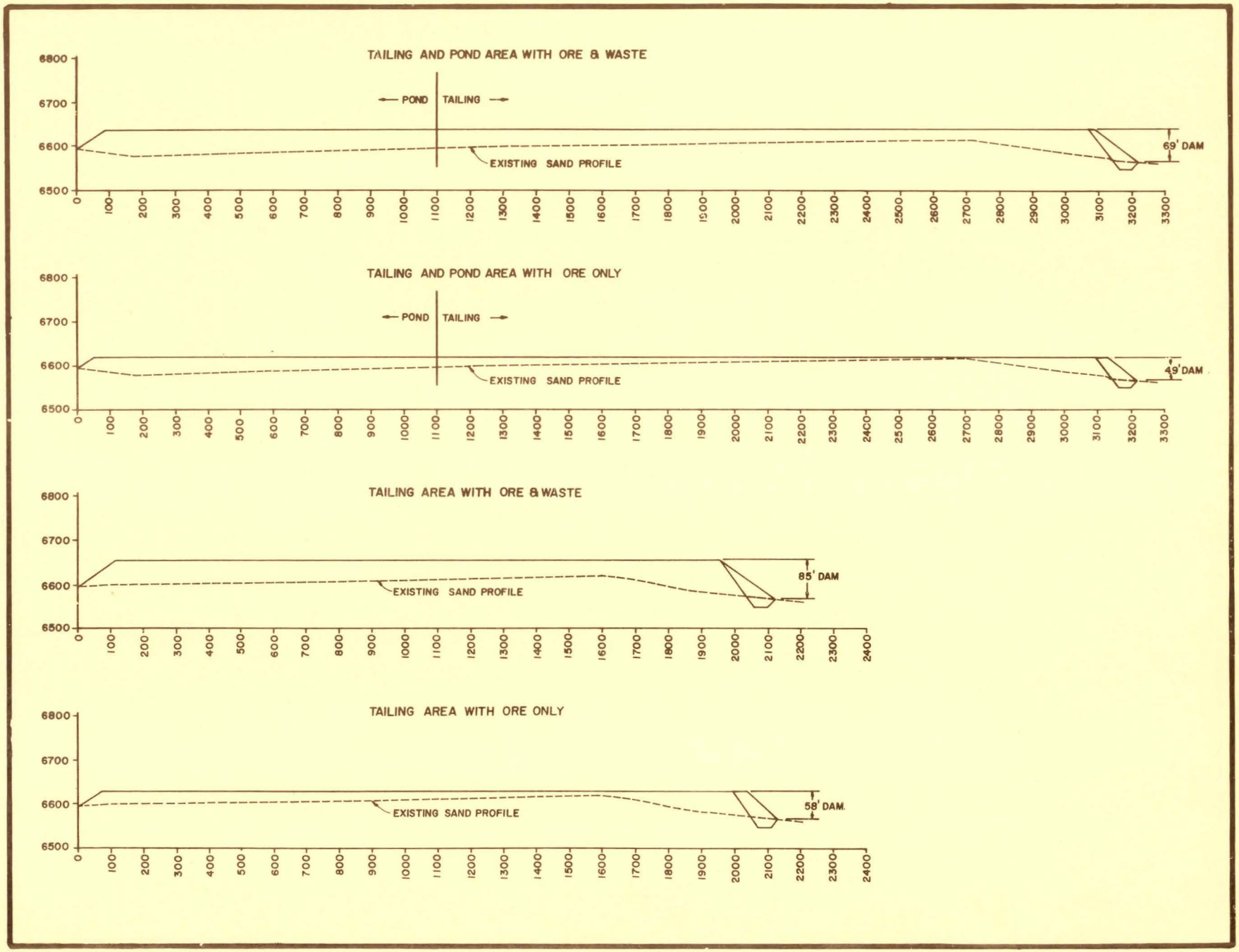

FIGURE 19

TAILING DISPOSAL AREA

Fill at the Glory Hole. An estimated 16 million tons of material were removed from the "Glory Hole" (the open pit associated with the Yellow Pine Mine) during the early gold, silver, antimony, and tungsten mining operations which occurred between 1933 and 1952. During the period of mining, the ESFS Salmon River was diverted out of the canyon bottom through a tunnel into the Sugar Creek drainage. Over the years, the diversion was sealed off, and the stream reverted to its original course. The pit now contains approximately 50 feet of water with a spillway at the north end. Preliminary calculations indicate that the pit is large enough to contain the waste output of the proposed CSM mining operation, and would appear to offer a potential solution for rehabilitating the area. However, three major problems preclude this option: 1) Canadian Superior Mining has no legal control over the pit which is located on patented land; 2) sufficient mineral values still remain in the pit to the extent that the present owner has indicated he does not support the concept; and 3) major rerouting and stream channel alterations would be required. Modifications to the existing diversion structure would also be necessary prior to any waste disposal in the pit. For these reasons, this option was eliminated from further consideration.

Valley Fill or Sidehill Disposal Within the Project Area. Valley fill or sidehill disposal were both considered as potential techniques for waste rock disposal for the proposed Stibnite mining project. Only limited valley fill areas are available in the Stibnite area. The head of Midnight Creek offers the largest potential site (excluding the proposed West End Canyon) for end dumping of waste material. Preliminary calculations indicate that the Midnight Creek Canyon does not provide sufficient area for disposal of all the waste rock generated by the proposed West End mining operation. However, it may be feasible to utilize the Midnight Creek drainage in conjunction with West End Canyon as waste dump areas. Waste rock material would be hauled to the location and placed in layers (lifts) moving vertically up the valley. Drainage facilities would be required to insure an unrestricted flow through the toe of any embankments. Contouring and stabilization of the slopes following placement of material would also be required. This option will receive additional consideration in the detailed evaluation of alternatives.

Sidehill disposal, where waste rock is dumped directly down a slope from the pit area, has limited application for this project. Geotechnical and environmental considerations (primarily water quality protection) place substantial restrictions on utilizing this technique at both the West End and Garnet Creek mine areas. Based upon an extensive analysis of the area, no other suitable sites exist adjacent to either of the proposed mining areas. For these reasons, sidehill disposal will not be evaluated in detail in the Evaluation of Alternatives chapter of this report.

Haul Waste Material to a Location Outside the Project Area for Disposal. Hauling mine waste to a site outside the project area was also

given preliminary consideration in the operational criteria. However, this option was dismissed from further consideration due to the remote location of the Stibnite mining area, limited access, excessive energy requirements associated with hauling, and unavailability of candidate sites located in reasonable proximity to the mining areas which would provide adequate storage volume. This option would also require extensive modifications and improvements to the existing road system in the study area.

Primary Waste Dump Disposal Options Considered for Detailed Evaluation

- Disposal of Mine Waste at Garnet Creek and West End Mine Sites (project proposed by CSM)
- Disposal of Garnet Creek Mine Waste at the Existing Tailing Pile, Construction of a Mine Waste Dump in West End Canyon
- Reduced West End Dump in Combination with Disposal at the Existing Tailing Pile
- Disposal of All Mine Waste at Tailing Dump Area
- Limited Valley Fill Utilizing Midnight Creek Drainage/Reduced West End Canyon Waste Dump

Options Eliminated from Detailed Evaluation

- Internal Replacement of Waste Material
- Fill at the Glory Hole
- Sidehill Disposal Within the Project Area
- Haul Waste Material to a Location Outside the Project Area for Disposal

HAULING AND MATERIAL TRANSPORTATION

Several options were considered for hauling ore and waste rock from each of the proposed mine sites. The option proposed by CSM for the West End Mine site entails utilizing two one-way haul roads, an improved (60-ft. wide) lower road following the existing access road, and construction of a new upper access two-lane road through the Midnight Creek drainage to form a loop. Additional alternatives considered for the West End Mine in the preliminary analysis included:

1. A single two-lane lower haul road following the route of the existing road
2. A single one-lane lower haul road following the existing route, with traffic controls and turnouts. In areas where minimal construction problems exist (i.e. flat areas), two-lane haul roads would be utilized
3. Single lane (30-ft. wide) one-way loop system involving improvements to the lower existing road and an upper loop alignment through Midnight Creek drainage
4. Reduced width (25-ft.) loop haul road option to accommodate smaller 25-ton haul vehicles

5. A conveyor belt system to transport material off the mine face in combination with a single lane haul road with traffic controls and turnouts
6. Slurry pipeline
7. A complete conveyor belt or bucket tramway system from the mine to the processing area

The hauling option proposed by CSM for the Garnet Creek Mine specified a two-lane haul road following the existing access route across the Garnet Creek drainage to the base of the ore deposit. Alternatives which were considered by the Forest Service and JMM included:

1. Improving the existing single-lane (30-ft. wide) route to include provisions for traffic control and turnouts to handle two-way hauling
2. A new double-lane (60-ft. wide) route up the Garnet Creek drainage from Adkin's Flat
3. Slurry pipeline
4. Conveyor or bucket tramway from mine site to the processing facility

From the preliminary analysis of transportation methods, it would appear that neither a slurry pipeline nor aerial conveyor transportation are practical or feasible. A slurry pipeline option would require that the rock be crushed to less than 0.3 mm, and that the slurry be approximately 50 percent water by volume. Major reasons for eliminating this option include the cost for pipeline and ancillary equipment, water requirements for the slurry, the need to dewater at the mill, and the potential for line breaks and spills and associated water quality impacts, system breakdowns, and associated interruption of other phases of the operation. A slurry pipeline also would not eliminate the need to improve access roads to the mine sites and pipeline (for maintenance).

Based on the results of the preliminary study, both conveyor belt and bucket tramway systems were also eliminated from detailed evaluation. Because of the small size and short mine life of the Garnet Creek operation, it was not considered feasible to construct an aerial belt conveyance system from the mine to the proposed milling site. The cost of a 36-inch conveyor or aerial tramway is estimated at $250-350 per lineal foot on normal terrain. With additional engineering and excavation costs for clearing and steep slope construction, total costs are estimated at $400 to $500 per foot ($2.5 million/mile) for application at the West End site. This compares to approximately $50,000 per mile for single lane roads in the Stibnite area.

Additional factors which would preclude the use of conveyors and tramways are the increased potential for spills and mechanical problems, energy requirements, and "snow creep" problems which would be encountered during the winter. Based on the slopes at the mine sites, belt conveyors or tramway systems would also require conveyor towers as high

as 200 feet, and would not eliminate the need for access roads to service the mine area and conveyor or tramway systems. Preliminary engineering analysis also indicates that the terrain at the West End Mine site is too steep to effectively utilize a conveyor belt system. Belt conveyors generally cannot be operated at slopes which exceed 15° Potential equipment breakdown could also result in substantial interruption of the operation. These options will not be considered for detailed study.

On the basis of this preliminary analysis, only truck hauling was considered to be a feasible method of material transportation. This mode of transportation was selected primarily on the basis of capital costs, flexibility and predictable efficiency. Table 16 presents a preliminary analysis of alternative haul road options. Because the area of the proposed operation is limited, these options are very similar.

West End Alternatives

Construction of haul roads from the West End Mine site to the proposed processing facility at the Adkin's Flat/Landing Field area would require routing through two different geological formations. Construction requirements for the initial portion of the routes (from Adkin's Flat area to the transition point for the upper Midnight Creek Road), would be common for all options, and present no major construction problems or environmental hazards. The route follows an existing road through relatively flat terrain. A two-lane (approximately 60-ft. wide) road would be constructed through this area under all alternatives.

Routing requirements for the other portions of the West End options present more difficult problems, primarily because of the steep slopes and the width of the road cuts required for the haul vehicles. In order to reduce erosion and accelerated sedimentation potential, the Forest Service and CSM have agreed that side casting of road material on steep side slopes (60° and greater) would not be an acceptable method of road construction for alternate routes. CSM would be required to remove the cut material from the mountain for any proposals involving end hauling, and all fill areas would be contained or minimized.

Single Two-Lane (60') Lower Haul Road. A single two-lane lower haul road option would allow simultaneous two-way traffic, but would require a horizontal cut of at least 60 feet and result in significant amounts of surface disturbance (Table 16). Waste disposal would also be a major problem. Approximately 400,000 cubic yards of material would have to be hauled to a satisfactory site (presumably the existing tailing area) for final disposal if side casting and on-site fill is prohibited. CSM has indicated that this alternative presents additional operational problems from the standpoint that it does not provide safe access to the upper ore deposits. However, this option

TABLE 16

PRELIMINARY ALTERNATIVE HAUL ROAD ANALYSIS,
HAULING AND MATERIALS TRANSPORTATION[1]

Location/Option	Major Road Construction Total Road (feet)	Haul Profile Elevation (feet)	Mine to Mill Site, Average Grade (percent)	Approximate Total Surface of Road Cut ($sq.ft. \times 10^6$)	Total Volume of New Road Cut (cu.yd.)
West End Mine					
Double-lane (60') loop through Midnight Creek Drainage (Proposal Project)	22,600	6500-7200	5.5/7.0	2.43	798,000[2]
2-lane (60') haul road over existing route	12,600	6500-7200	5.5	1.23	404,000[2]
Single-lane (30') lower haul road over existing route with traffic controls	12,600	6500-7200	5.5	0.64	150,000
Single-lane road loop system through Midnight Creek drainage	22,600	6500-7200	5.5/7.0	1.16	223,000
Reduced width (25') single-lane loop road	22,600	6500-7200	5.5/7.0	0.99	190,000
Garnet Creek					
Double-lane haul (06') road off Monumental Summit Road (proposed project)	4,200	6800-7200	9.5	0.47	212,000
New double lane route up Garnet Creek	4,800	6500-7200	8.3	0.50	160,000
New single-lane (30') haul road off the existing Monumental Summit Road.	4,200	6800-7200	9.5	0.21	40,000

[1]Detailed staking and road surveys are presently being completed

[2]All cut slopes assumed at 1:1 or 1:1.5 (worst case assumption)

will be given additional consideration in the detailed evaluation of alternatives.

Single One-Lane (30') Lower Haul Road. The single one-way option with turnouts and traffic controls utilizing the existing access road would involve the least surface disturbance of the options being considered (approximately 150,000 cubic yards). Improvements would have to be made to the existing road, involving widening by an estimated 10-12 feet in certain areas. The major drawback to this option is that it provides no access to the top portion of the pit area. The extent and configuration of the ore deposit in the upper portion of the pit makes truck access to the top of the West End drainage necessary in order to remove ore. CSM has indicated that the size of the mine area and existing slopes would severely restrict the feasibility of an internal double road system using switchbacks to get the haul trucks to the upper ore deposits. However, this option will be evaluated in detail due to the fact that it requires the least amount of new road construction and surface cut of the major alternatives studied.

Single-Lane (30') Haul Road Loop System. CSM has proposed improving the existing lower access road and constructing a new upper haul road through portions of the Midnight Creek drainage. Both roads would be single-lane (approximately 30-ft. wide), and would provide for a continuous flow of traffic. Empty vehicles would travel up the new Midnight road, and the loaded trucks would come down the single-lane lower road. Neither of the proposed routes is suitable for extensive side casting of material. Therefore, most of the waste material would need to be removed to a suitable disposal site. This option will be considered in the detailed evaluation of alternatives.

Reduced Single-Lane (25') Haul Road. This option would involve constructing a reduced 25-ft. wide single-lane haul road from the processing facilities to the West End Mine site. By utilizing 25-ton haul capacity road dump trucks in place of the proposed 35-ton haul vehicles, the total volume of cut for the overall one-way loop system could be reduced by approximately 18 percent (Table 16). The overall horizontal road width requirements would also be reduced by approximately four to five feet if a standard 8-foot highway truck were used in place of 13-foot off-road hauling vehicles. However, the use of smaller trucks would require approximately 30 percent more trips each mining season, or the extension of the project life to 14 or 15 years if the same amount of material were to be processed. This alternative would utilize a single-lane loop system incorporating an improved existing lower West End road along with a new upper road through the Midnight Creek drainage. Since the alternative does not provide a significant reduction in the surface area or volume of road material moved, and would require increasing the number of trips each year for the overall project life and postponing initiation of the reclamation program, it was determined that there is little advantage to the option. This alternative will not be evaluated in detail.

Garnet Creek Alternatives

Construction of new haul roads from the Garnet Creek Mine site will require crossing several small intermittent drainages. The hillsides to be traversed are steep and have a thin soil cover of mostly competent rock. Stability for the proposed alignments is generally good. Where roads will cross stream or channel crossings or colluvial slopes where soils are deeper, erosion and sedimentation control measures such as mulching and netting may be required. These measures are discussed in more detail later in this chapter and the Conceptural Reclamation Plan presented in Appendix E of this report.

New Single-Lane (30') Haul Road. Under this option, a new single-lane haul road from the old Monumental Summit Road to the base of Garnet Creek would be constructed. Turnouts and traffic controls would be provided to facilitate safe truck travel. Culverts and drain structures would be installed to protect water quality and the integrity of the Garnet Creek drainage during spring runoff and storm events. This option will be considered for detailed study.

New Double-Lane (60') Haul Road. A new two-lane (60-foot) haul road up Garnet Creek from the Adkin's Flat area was considered for removing overburden and ore from the Garnet Creek mine. This alignment would provide direct access to the proposed crushing and stockpiling site at Adkin's Flat. This option will not be considered in the detailed evaluation due to the fact that it would require substantial new areal disturbance (approximately 160,000 cubic yards) and does not provide any advantages over the Monumental Summit route.

Mine Hauling and Material Transportation Options Considered for Detailed Evaluation

West End Mine

- Improved Two-Lane (60-ft. wide) Lower Haul Road Following the Existing Access Road Alignment, and, a New Upper Two-Lane Haul Route Completing a Loop System Through Upper Midnight Creek to Adkin's Flat (project proposed by CSM)
- A Single Two-Lane (60-ft. wide) Lower Haul Road Following the Existing Access Road Alignment with Turnouts and Traffic Control
- A Single One-Lane (30-ft. wide) Lower Haul Road Following the Existing Access Road Alignment, and a New Single Lane Upper Route through the Midnight Creek Drainage Completing the Loop

Garnet Creek Mine

- New Two-Lane (60-ft. wide) Haul Road Off the Existing Monumental Summit Road (project proposed by CSM)
- New Single-Lane (30-ft. wide) Haul Road Following the Same Alignment as proposed by CSM

Options Eliminated From Detailed Evalution

West End Mine

- Reduced Single-Lane (25-ft. wide) Haul Road and 25-Ton Haul Trucks

Garnet Creek Mine

- New Double-Lane (60-ft. wide) Haul Road From Adkin's Flat to the Garnet Creek Mine

PROCESSING FACILITIES LOCATIONS

Areas for locating milling, leaching and processing facilities are limited by the availability of sufficient flat land in the canyon bottom. Land ownership and mineral claims are complex (Figure 10), further restricting areas suitable for developing processing facilities. After preliminary evaluation, two alternative sites to the CSM proposal appear to be available and potentially feasible. These locations include: 1) Meadow Creek Landing Field; and 2) the existing tailing pile. A third potential location, the site of the existing smelter, is under private ownership. There is presently no indication that this land would be available to CSM. The possibility of locating the processing facilities at a location outside the project area was not considered feasible due to access problems and the lack of suitable sites in reasonably close proximity to the mine areas.

Meadow Creek Landing Field. The Meadow Creek Landing Field was constructed in the early 1930's and includes an area approximately 350 feet wide and 2,000 feet long. The landing field is located approximately 2.5 miles south of the West End deposit and 1.5 miles west of the Garnet Creek Mine site. The landing field is composed of heavily compacted gravel material which appears to be very stable. No substantial vegetation occurs on the airfield. Construction of processing facilities over the runway would not be expected to create any major additional erosion or sedimentation potential. Sufficient land area is presently controlled by CSM to accommodate three 300-x 500-foot leach pads. A portion of the southern end of the runway is under private ownership. An additional five acres of land located on the east side of the EFSF Salmon River approximately ½ mile south of the airstrip (Adkin's Flat) would also be required to house the additional processing facilities (crusher, maintenance shop, etc.) and to stockpile ore. This option will be considered for detailed study.

Existing Tailing Pile. Under this option, the existing tailing pile would be utilized as a location for the processing facility and ore storage area. Approximately 20-25 acres would be required for the leach plant and related facilities. The existing tailing pile and pond include approximately 75 acres. The pile is comprised of very fine-grained material (silt to fine sand size range), and is essentially void of any vegetation. Geotechnical studies indicate that under present static conditions the pile is stable. However, serious poten-

tial stability problems exist related to "liquefaction." The soil particles composing the pile have no cohesive strength and would be subject to mass failure if disturbed by shaking conditions (i.e., seismic activity). Erosion and sedimentation potential is also significant, as evidenced by several large eroded gullies which characterize the tailing pile. Prior to constructing the processing facilities on the tailing area, the pile would have to be stabilized in a manner similar to that discussed earlier for utilization as a waste dump area. This would require hauling in the necessary material to construct a berm around the base of the pile. Meadow Creek would have to be rerouted and stabilized, with special provisions provided for controlling spring runoff. It would also be necessary to cover the pile with materials which would reduce wind erosion and surface runoff activity. Locating the leach plant on the tailing pile will be given further consideration in the detailed evaluation due to the limited number of locations with sufficient area on which to construct the leach plant.

Processing Facilities Locations Considered for Detailed Evaluation

- Adkin's Flat (project proposed by CSM)
- Meadow Creek Landing Field and a Portion of Adkin's Flat
- Existing Tailing Pile

PROCESS METHODS AND MATERIALS

Extraction Processes

In 1970, the extraction of gold from ore by amalgamation with mercury was discontinued at the request of the Federal Water Pollution Control Administration. Since that time, increased gold prices have led to advances in various cyanidation processes for extracting gold from low grade ores (0.02-0.10 oz. Au per ton). The heap leaching - carbon adsorption - electrowinning technique proposed by CSM is one variation of the cyanidation process analyzed in this evaluation. Other processes which were considered included:

- Long-term, One-Time Heap Leaching.
- Modified Vat Leaching, Carbon Adsorption, Electrowinning.
- Agitation Leaching with Carbon-in-pulp Electrowinning.
- Agitation Leaching, Countercurrent Decantation.

The option of processing concentrates at a location outside the study area was not considered in this evaluation due to unavailability of processing site locations, inherent problems associated with separating phases of the project increased energy consumption related to longer hauling distances and low recovery effectiveness in attempting to concentrate low grade ores.

Long-Term One Time Heap Leaching. This option is similar to the method proposed by CSM, but does not involve moving ore on and off the leach pads.

Instead, uncrushed (screened) ore is placed on sealed pads. The material is usually placed in heaps shaped to resemble truncated pyramids 20-30 feet high, ranging in volume from 10,000 to two million tons. The cyanide solution is generally applied by ponding. Typical application rates vary from five to 75 gallons per square foot of surface area per day (solution strengths of 0.5 to 1.0 lb. of sodium cyanide per ton of solution). The leach cycle is measured in months. Heaps are leached until it is no longer profitable to continue operation (as long as five years). Carbon adsorption is generally the preferred method for recovering precious metal values. The heaps are then reclaimed in place. A preliminary analysis indicates that sufficient land is not available at the project area to support long-term one-time heap leaching. Land ownership problems further limit its application at Stibnite. This option will not be given further consideration in the detailed evaluation.

Modified Vat Leaching, Carbon Adsorption, Electrowinning. This method involves crushing the ore to minus 200 mesh to increase contact exposure, and leaching in a vat or tank on a continuous basis. The method would also involve a desorption and electrowinning process similar to that described for the proposed alternative. Modified vat leaching is considerably less expensive to build and operate than conventional vat leaching or agitation leaching (Table 4-2). The process can also be achieved without construction of elaborate pads required for the heap-leaching option. However, problems related to safe disposal of fine tailing material are significant. The larger waste tailing from a heap leaching operation also provides improved reclamation opportunities. The modified vat leaching, carbon adsorption, electrowinning process will not be given further consideration.

Agitation Leaching With Carbon-in-pulp, Electrowinning. Following a two-staged operation which reduces crushed ore to finely pulverized particles approximately 0.012 inches in diameter, the ore is agitated in a series of tanks with about 0.1 percent sodium cyanide and 0.2 percent lime. After dissolution, the gold is recovered by the carbon-in-pulp process which involves adding activated charcoal to the gold solution. A series of tanks are used to agitate the slurry. Activated carbon is added to the last tank, and moved countercurrently to the flow of slurry which results in the highest loaded carbon being in contact with the highest grade solution. Stripping is accomplished by passing hot sodium hydroxide and sodium cyanide through the carbon-gold slurry. The gold-bearing solution is then passed through a zinc precipitation unit, and smelted in a small unit. The agitation leaching, carbon-in-pulp electrowinning process is more costly than either the heap leaching or modified vat leaching processes. Environmental constraints which limit its application for the Stibnite project involve: increased water and chemical use; increased total suspended particulate concentrations related to crushing and grinding; tailing disposal problems associated with final disposal of slurry material; tailing disposal requirement for both the liquid and solid portions of waste; and impaired reclamation opportunities. This option would also require

TABLE 17

RELATIVE ECONOMIC AND ENVIRONMENTAL ANALYSIS OF ALTERNATIVE PROCESSING METHODS[1]

Process	Capital[2]	Operating Direct & Indirect	Major Environmental Considerations
Conventional agitation leach	1.00	1.00	Two-staged crushing, finely-pulverized, increased particulate concentrations with crushing; requires slurry pipeline for tailing disposal; reclamation opportunities reduced.
Agitation leach w/charcoal-in-pulp-electrowinning	0.75	0.94	Additional crushing; increased water use requires special tailing disposal facilities; potential for slurry line spills; reclamation requirements increased.
Modified vat leaching-charcoal adsorption-electrowinning	0.52	0.79	Requires crushing and grinding to minus 200 mesh; increased water, chemical use.
Heap leaching (with crushing) charcoal adsorption-electrowinning	0.32	0.66	Coarser material (potential for screening only); reduced air quality impacts; increased area requirements for pads; less water and chemical use; tailing material optional between alternatives for reclamation; tailing disposal options improved.

[1]Source: Bhappu and Lewis, 1975

[2]All process costs are a comparative evaluation utilizing the conventional agitation, with CCD-Merrill Crowe (zinc parcipitate) method as a base.

the development of a special tailing spill management program. This option will not be given further consideration in the detailed evaluation.

Conventional Agitation Leaching Counter Current Decantation. This process is similar to the agitation leaching process described earlier, and involves crushing, grinding and milling circuits, and associated tailing disposal problems. A zinc dust precipitation and refining process is utilized. The comparative cost analysis presented in Table 17 shows this process to be the most expensive of the four analyzed (capital investment for heap leaching-carbon adsorption is estimated to be about 30 percent of the cost of a conventional countercurrent decantation cyanide plant; operating costs are about 60 percent that of a leaching operation). This option will not be given further consideration.

Processed Ore Treatment Options

A primary concern in the overall gold and silver extraction process is the final destruction and disposal of residual cyanide in the stripped ore and process solutions at the end of each operating season. Oxidation of cyanide is the most effective method to provide for safe disposal. For this process, cyanide is converted to cyanate (1/1000 as toxic), which is further degraded to carbon dioxide (CO_2) and ammonia (NH_3) in the environment (EPA, 1976). Cyanate can then be safely disposed of by controlled spray irrigation on the surrounding hillsides or the spent leach ore piles at the end of each processing season.

Treatment By Chlorination. The most widely used method for reducing free cyanide and heavy-metal cyanide concentrations in waste streams involves chemical treatment with chlorine. Chlorine may be furnished in bulk as either a chlorine gas or in the hypochlorite form. Chlorination is effective in treating solutions such as wastewater, and for end of the year cyanide solution destruction. This option will be considered in detail.

Treatment By Ozonation. Ozone (O_3), a much stronger oxidizing agent than chlorine, has also been used in the destruction of cyanide compounds. Ozone is difficult to handle, cannot be stored or transported, and must be generated on site. It is extremely toxic in low concentrations (one minute of exposure to 1000 ppm can be toxic to humans), and must be handled very carefully. In order to utilize ozone as an effective oxidizing agent for cyanide solutions, a reaction vessel or inline mixing arrangement would be necessary. Since ozone leaves no residuals, once cyanide destruction is achieved the washwater could be immediately disposed of by land application. If excess power were available, ozone could be utilized to treat the liquid process stream. However, chlorine or some other more stable oxidizing agent would be required to wash and neutralize the ore pile before removing it from the pads. It may also be possible to spread the washed and neutralized ore in thin lifts and allow for natural ambient radiation and oxidation

to treat the washed ores. This option will be considered for detailed study.

Treatment By Solar Radiation. Natural solar radiation and aeration are both effective methods for destroying cyanide. Shallow ponding or pond spraying and recirculation would, with sufficient time and exposure, provide for the treatment of liquid cyanide solution. However, these procedures would require additional land area, which is limited. These options will only be considered in the detailed evaluation in terms of potential joint application with chlorination or ozonation.

Process Methods and Materials Considered for Detailed Evaluation

- Cyanide Heap Leaching (crushing and screening options considered in the project proposed by CSM).
- Processed Ore Treatment Options Involving Chlorination and Ozonation, in Combination with Natural Solar Radiation and Aeration.

Options Eliminated From Detailed Evaluation

- Long-Term One Time Leaching
- Modified Vat Leaching, Carbon Adsorption, Electrowinning
- Agitation Leaching with Carbon-in-pulp, Electrowinning
- Conventional Agitation Leaching Counter-Current Decantation
- Treatment by Chlorination
- Treatment by Chlorination in Combination with Ozonation and Solar Radiation

STOCKPILING ORE

As previously discussed, climatic conditions at Stibnite limit the proposed operation to approximately 150 days annually due to freezing problems at the leaching facility in late fall and early spring. Heavy snowfall through the winter, slow snowmelt and periods of heavy spring rainfall also extend the period of inaccessibility to the mine sites in the spring. During the period of October through early December, CSM proposes to stockpile approximately 150,000 tons of ore to expedite startup for the following operational season. Potential for disturbance to vegetation, and erosion problems related to "early season" mining would also be reduced by stockpiling. Techniques for temporary control of erosion (silt barriers, berms, and drainage controls) will be utilized at the mine pits and stockpiling areas to protect local water quality.

For this reason, it was decided to consider two locational options for stockpiling ore as a means of maximizing the operational period of the proposed project. These locations include Adkin's Flat and the Meadow Creek Landing field site. The option of no stockpiling is also discussed. The option of stockpiling new ore on the leach pads over the winter was eliminated from consideration, due to the need to retest the

permeability of the leach pads each season prior to start up of leaching operations.

Stockpiling at Adkin's Flat. Sufficient area is available on the valley floor west of the Garnet Creek Mine (Adkin's Flat). Foundation soils are stable, and the gradient is generally moderate. Natural vegetation in the area would further reduce potential erosion problems. The area is centrally situated, with good access to both mine sites, the tailing pile and airstrip, which are also being considered for locating the processing facilities. This site will be considered for detailed study as an option for locating an ore stockpile.

Stockpiling at the Meadow Creek Landing Field. Sufficient area is also available at the Meadow Creek Landing Field, depending on the decision to locate any of the processing plant facilities at the field. The landing field is flat, the surface base is stable, and ore stockpiles could be placed on areas adequately buffered from Meadow Creek to reduce the potential for increased sedimentation during periods of high spring runoff. No unusual operating procedures would be required for this option, which will be considered for detailed study later in this report.

No Stockpiling. A third option would involve no ore stockpiling. Mining would cease in late October, when freezing conditions affect the leaching operation. Prior to shutdown, processed ore would be washed and neutralized, and moved off the pads for disposal at the leach waste dump. This option would result in major startup delays at the beginning of each operating season, but little if any increase in environmental problems would be anticipated as a result of stockpiling ore. The option will not be considered for detailed study.

Stockpiling Options Considered for Detailed Study.

- Stockpiling Ore at Adkin's Flat (project proposed by CSM)
- Stockpiling Ore at the Meadow Creek Landing Field

Options Eliminated From Detailed Evaluation

- Stockpiling Ore on the Leach Pads Over the Winter for Early Spring Startup
- No. Stockpiling of Ore

PROCESSED ORE DISPOSAL

A number of leach waste disposal options were studied during the summer of 1979 by the Forest Service and JMM. Options for disposal of processed waste ore were then formulated, considering physical limitations (overall stability, erosion and sedimentation potential, drainage, etc.), hauling distances and economics, and reclamation capabilities. In addition to the CSM proposal to utilize an area of the existing tailing impoundment, five main alternative sites were also considered. These include: 1) returning the ore to the mine sites; 2) dumping the

ore at the Yellow Pine Pit ("Glory Hole"); 3) contouring waste material into the hillsides and valley bottom; 4) raising the Meadow Creek landing field; and 5) hauling material to a site outside the immediate area. The feasibility of utilizing processed ore waste for road surfacing was also considered in conjunction with all of these options.

Criteria which influenced the formulation of these options were land ownership, proximity to the milling facilities, geotechnical and hydrological considerations, and mineral reserves. The area which is selected for processed ore disposal must have sufficient land available to dispose of the waste material and must be located close to the processing facilities. The site must also be geotechnically stable, not susceptible to major drainage problems, and should not be underlain by commercial quanitities of mineable ore. It is currently projected by CSM that approximately four million tons of ore will be processed during the operating life of the project. The proper disposal of the material is therefore a critical aspect of the overall project.

Of the five options considered, disposal in the "Glory Hole" and hauling to a site outside the Stibnite area were dismissed from further study. In the case of the "Glory Hole", CSM does not control the pit or adjacent lands. Hauling to a dump site removed from the area is impractical from both a cost and logistical standpoint. The remaining options are discussed below.

Returning Processed Ore to the Mine Site. Topography (slope and configuration), mine size, foundation conditions (soil mechanics), and mining schedules control the feasibility of returning waste ore to its original mine site. The size of the proposed mine and topography at Garnet Creek restrict its potential as a waste disposal area for processed ore. The Garnet Creek mine site is located in the steep west-facing slope of the drainage and includes approximately three acres. The West End Mine is also relatively small (44 acres) in comparison to other surface mining operations in the West. The major difficulty in disposing of waste ores within the working pit involves the need to keep the mining operation in production throughout the six-month operational period. If disposal practices severely interrupt mining (either by physical interference or delays in timing and scheduling), the alternative is no longer feasible.

It is also important to consider the safety aspects of a potential in-pit disposal operation. A profile of the proposed mine is shown in Figure 20. The profile indicates that the mine will resemble a cut across the face of the mountain. Due to the limited area of the mine and the desirability to work the top and bottom of the deposit simultaneously, it would be hazardous to attempt to replace loose, broken rock during the periods when excavation is occurring in the pits. Another consideration which effectively precludes this option as a feasible alternative involves the potential for burying future mineral value in the lower end of the West End Canyon with the processed ore waste material. While the technology for processing sulfide ores is

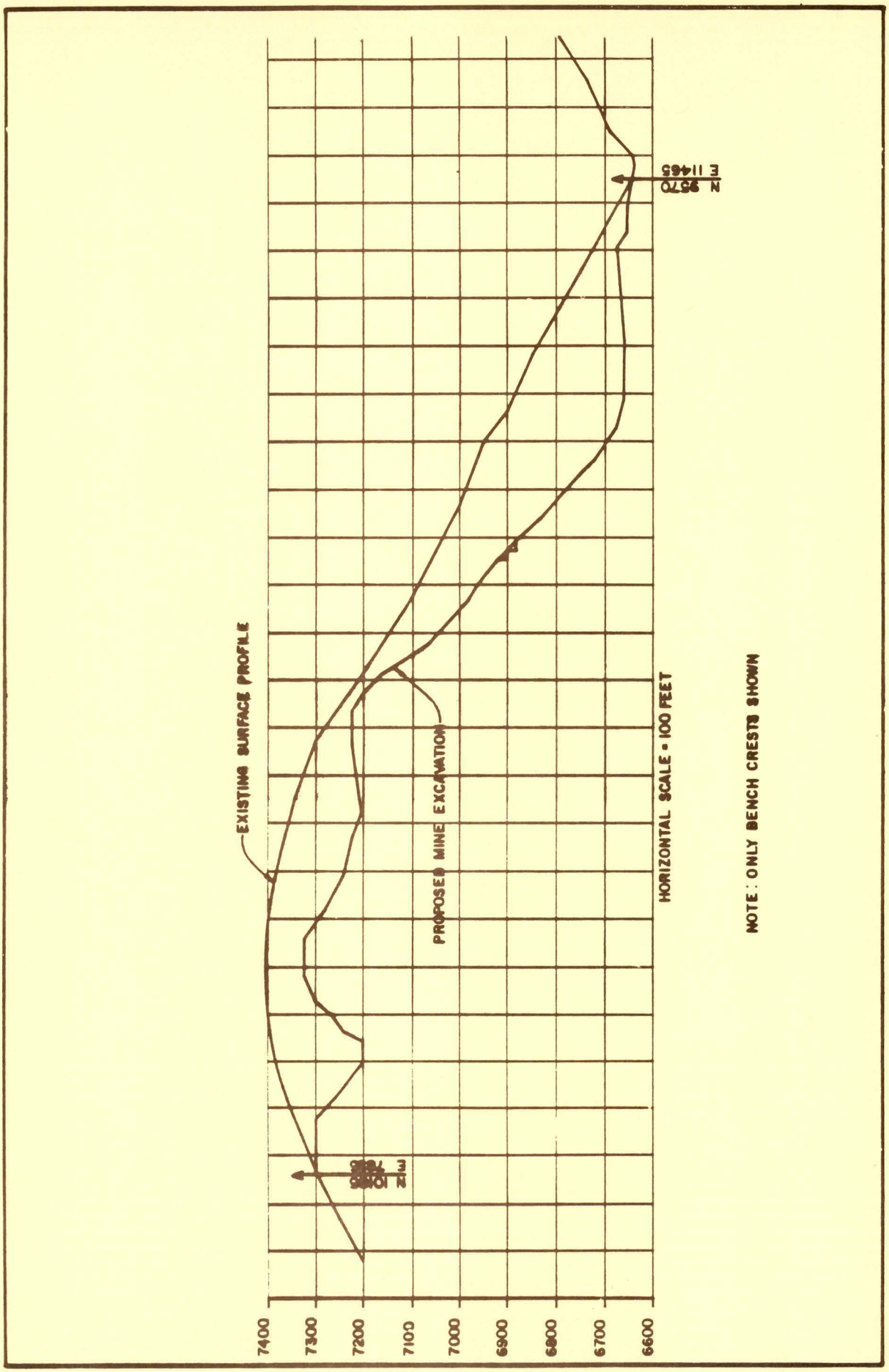

FIGURE 20
WEST END PIT SECTION A-A

not currently available, future advances in metallurgical processes may provide feasible methods for treating sulfide ores. This option will not be considered for detailed study.

Contour Processed Ore into the Valley Bottom and Hillsides. Disposal and reclamation of processed ores in the valley and along the face of the hillsides presents several problems in the Stibnite area. The availability of sufficient land controlled by CSM (leased or claimed) is limited. Significiant amounts of vegetation would need to be cleared or covered to provide adequate space for disposal. The visual impacts of such an operation would be difficult to mitigate, and the reclamation potential would be limited. However, this type of option is the least costly from an operational standpoint, and secondary hauling would be reduced during the initial years of activity. Potential valley fill and sidehill disposal areas were selected based primarily on ownership and physical conditions (slope, drainage, etc.). This option will be considered for detailed study.

Raising the Meadow Creek Landing Field. The feasibility of utilizing the Meadow Creek landing field for processed ore disposal was also examined. Based upon the amount of ore that will be processed and the available area, preliminary calculations indicate that the airstrip cannot physically accommodate the amount of waste material which would be produced by the operation. An area over four times the length of the existing landing field would be required for disposal of the estimated 2.2 million cubic yards of waste which would be processed over the ten year mine life. This option will not be considered for detailed study.

Utilizing Processed Waste Material for Road Surfacing. Preliminary chemical and metallurgical analyses performed on processed waste ore from the pilot plant operation indicate that the treated waste material does not contain leachable toxic chemicals or metals (Table 18). Tests were designed to simulate exposure to rain water. The material, which is crushed to minus one inch prior to leaching, was also subjected to stress and compaction tests to determine feasibility for use in road surfacing. These tests indicate that the material is competent in nature and would serve as a good base for haul road surfacing, or could be stockpiled and used in surfacing timber sale roads or county roads. Utilizing the material for road surfacing would also suppress dust emissions from the haul roads. The potential for utilizing waste tailing material for road surfacing in conjunction with the other primary processed ore disposal options will be considered for detailed study in the evaluation of alternatives.

TABLE 18
WEATHERING TEST TO SIMULATE EXPOSURE TO PRECIPITATION
(ELAPSED TIME 5 DAYS)

Reagent or Metal	Expected Concentration in Tailing Material (mg/l)
Arsenic	1.58
Antimony	0.13
Cadmium	0.02
Chromium	0.03
Iron	0.18
Lead	0.10
Mercury	0.03
Tungsten	0.15
Zinc	0.26

Processed Ore Disposal Options Considered for Detailed Study

- Utilize Existing Tailing Pile (project proposed by CSM)
- Contour Processed Ore Into the Valley Bottoms and Hillsides
- Utilize a Portion of the Processed Waste Material for Road Surfacing in Conjunction with all of the Primary Alternatives

Options Eliminated from Detailed Evaluation

- Returning Processed Ore to the Mine Sites (in-pit disposal)
- Raising Meadow Creek Landing Field

HOUSING FACILITIES AND LOCATION

Support facilities would include a housing complex to accommodate approximately 60 mining personnel. In addition to the proposal by CSM to locate approximately 40 seasonal workers (and any families) on site near Stibnite and 10 to 20 administrative personnel at Yellow Pine, several other options were also screened. These included: 1) housing all of the work force at one of four alternate sites located near the proposed mining operation; and 2) locating all of the work force at Yellow Pine.

The first housing site considered is near the ruins of the Stibnite sawmill. During the late 1930's and 1940's, when most of Stibnite's 160 houses and many of the mine and mill buildings were constructed, the mill operated at full capacity. The area is flat and has been extensively disturbed by previous mining-related activities, and would appear to be a potentially feasible location for housing the work force. The second site at Stibnite is located southeast of the Stibnite ruins on the upper EFSF Salmon River in a relatively flat undisturbed meadow area (approximately 40 acres). The area is removed from the proposed mining and milling operations. Other potential sites include the Stibnite Recreation Hall area located just north of the airfield, and the eastern edge of Adkin's Flat. Both of these sites

have been disturbed by previous mining activities, and would provide adequate space to accommodate the necessary housing facilities.

As planned, the housing complex would be designed to include necessary sewer and water systems and other utilities, and fencing and screening. Disturbance by mining, blasting, hauling and related activities would be expected to be minor at all of the sites. However, due to the relatively "pristine" nature of the upper EFSF site, only the sawmill, recreation hall and Adkin's Flat locations will be considered in the detailed evaluation.

The second major option studied would involve housing the entire work force at Yellow Pine. Personnel would be housed in existing houses and hotel/motel facilities, or in a new trailer park located in the immediate vicinity of the town. Based on a housing survey and evaluation of sewer and water facilities, this option does not appear to be feasible. In addition, local residents have expressed some concern about housing the entire work crew at Yellow Pine. The option would also require a daily commute of approximately 30 miles (round trip) to the mine site, result in increased local traffic, and would require additional fuel and energy. This option will not be considered for detailed study.

Housing Facilities and Location Options Considered for Detailed Study

- Split Housing of Personnel Between the Midnight Creek/Stibnite location and Yellow Pine (project proposed by CSM)
- Splitting the Work Force Between Yellow Pine and Stibnite at an Alternate Location to the Midnight Creek Proposal (Abandoned Saw Mill Site, Recreation Hall Area, or Adkin's Flat Location)

Options Eliminated From Detailed Evaluation

- Housing the Entire Work Force at the Upper EFSF Salmon River Site at Stibnite
- Locating the Entire Work Force at Yellow Pine

POWER SOURCE OPTIONS

CSM initially proposed generating their own power at the site utilizing diesel generators. Propane generators could also be installed at the site to reduce ambient air emissions. The cost for these options is comparable. Both of these options would also require the location of fuel storage facilities at the site. The options will both be considered for detailed study.

In 1944, Idaho Power completed an electrical transmission line corridor from Johnson Creek which was utilized by the earlier mining operation. The initial physical preparation for the line involved clearing major vegetation , making surface cuts, constructing access facilities, etc.

With substantial improvements to the corridor and related facilities, a transmission line to the site could be restored. However, this would require that CSM enter into a contract with Idaho Power Company to supply the necessary power and pay all the costs related to installation of the line (Idaho Power currently estimates power line replacement costs at approximately $10,000 per mile). For these reasons this option will not be considered in the detailed evaluation of alternatives.

The on-site development of power by hydroelectric generation was also considered. At least three hydroelectric systems were operated at Stibnite during the earlier mining operations. These systems were plagued by innumerable operating problems including freezing and blockage by fish and boulders. However, recent advances in small scale and low head generating units make this type of energy source very attractive for a number of applications. A 1979 report published by the Corps of Engineers identified a power generating potential of approximately 27 megawatts for the EFSF Salmon River at Stibnite. A better indication of the hydroelectric generating potential at the site is shown by the fact that two of the three facilities discussed earlier (a 900 kw unit and 420 kw unit) were previously licensed at Stibnite by the Federal Power Commission (now Federal Energy Regulatory Commission).

Hydroelectric generation at Stibnite would require the construction of facilities in the river for regulating the flow, and providing a diversion structure to divert water through the generating facilities during the late summer and fall. This option would not only be effective in supplementing fossil fuel generating capacity, but would also itself be capable of supplying the total power requirement of the proposed project based on a preliminary analyses of the site. This option will not be considered for detailed evaluation in the EIS process due to existing licensing requirements and timeframes and equipment delivery schedules. However, CSM has indicated a desire to study the option in more detail at a later date.

Power Source Options Considered for Detailed Study

- Diesel and/or Propane Generators Located at the Site (project proposed by CSM)
- Future Detailed Study and Potential for Application of Small Scale Hydroelectric Generating Facilities

Options Eliminated From Detailed Evaluation

- Construction of an Electrical Transmission Line from Yellow Pine to Stibnite over the Existing Corridor

ACCESS CORRIDORS

In addition to the Warm Lake Road/Johnson Creek route (Cascade to Yellow Pine) proposed by CSM, two alternative routes were studied in the preliminary analysis of access corridors. Two proposals for alternative levels of reconstruction of the Yellow Pine to Stibnite Road were also evaluated. Emphasis was directed to analyzing the feasibility of existing corridor routes.

The South Fork Salmon River Road, which generally follows the South Fork Salmon River for approximately 23 miles to Krassel, then approximately 17 miles east along the EFSF Salmon River to Yellow Pine, was reviewed (Figure 11) The road has undergone extensive road maintenance and repair during the past three years to correct drainage and erosion and sedimentation problems. State-of-the-art advances in road design and construction, slope stabilization, and road maintenance have been implemented in an effort to control problems created by previous logging and road construction activities in the drainage. The overall travel distance for this option is approximately nine miles longer than the Landmark/Johnson Creek option. However, the feasibility of utilizing this route is restricted by narrow road conditions and presence of a binwall over an approximate ½ mile section of the road which was constructed in 1975 to prevent sloughing to the South Fork. This route also has the most direct exposure to the South Fork Salmon River, which is an important consideration in the transport of hazardous materials for the processing operation because of the effects of potential spills on anadromous fish. This route has no overall advantage over the Landmark/Johnson Creek Road and therefore will not be considered further in the detailed evaluation of alternatives.

The Lick Creek Road was also studied in the preliminary analysis. This access corridor is shorter in distance than the South Fork Salmon River Route (approximately 50 miles from McCall to Yellow Pine). The road is steep, narrow, rough and inaccessible during a large portion of the year. While the route does have less exposure to major streams than the Landmark/ Johnson Creek option, it would require major improvements in order to serve as the main access route for the proposed project. Access over this route is also the most heavily restricted by seasonal weather conditions of the options being considered. This option will not be considered in the detailed evaluation.

Two options dealing with varying levels of reconstruction of the Yellow Pine to Stibnite Road were also screened in the preliminary analysis. This road is owned by the Forest Service and maintained by Valley County through a cooperative agreement. All of the bridges and major sections of the road were reconstructed following extensive flooding which occurred in 1974. During this period, the Tamarack Bridge was washed out, and an estimated 4,000 cubic yards of sediment washed into the EFSF Salmon River.

Because any major improvements or reconstruction of the existing Yellow Pine to Stibnite Road could result in significant water quality-related impacts on the EFSF Salmon River and possibly even require a separate environmental analysis, it was determined that this option would not be given further consideration. Only minimal improvements to the existing road and bridge systems were determined to be necessary to support the proposed action.

Access Corridor Options Considered for Detailed Study

- Warm Lake Road/Johnson Creek Route (Cascade to Yellow Pine); Existing Yellow Pine to Stibnite Road with Only Minor Improvements and/or Reconstruction (project proposed by CSM)

Options Eliminated From Detailed Evaluation

- South Fork Salmon River Road (Cascade to Yellow Pine)
- Lick Creek Road (McCall to Yellow Pine)
- Major Improvements to the Existing Yellow Pine to Stibnite Road

FORMULATION OF PROJECT ALTERNATIVES

Figure 21, "Preliminary Screening Matrix," summarizes the results of the initial screening process utilized to reduce the number of options considered for detailed evaluation. Based upon the preceding analysis and preliminary screening of operational criteria or project components, six major project alternatives including the No Action Alternative were developed for detailed evaluation. The effects of implementation of the alternatives will be documented in Chapter 5. The individual alternatives will also be evaluated in detail in Chapter 6.

Within this section of the Alternatives Considered chapter, the individual component options are logically assembled to represent complete project alternatives. The alternatives are described in a summary format by major project component to reduce the amount of text and simplify the presentation in compliance with NEPA regulations. Emphasis is placed on describing major differences between the alternatives which would result in significantly different effects or impacts. Components which are similar for all alternatives (i.e., power source options and major access routes) are not discussed in any detail.

DESCRIPTION OF PROJECT ALTERNATIVES

Alternative 1 - Project Proposed by Canadian Superior Mining in the "Notice of Intent to Operate: Operating Plan for the Stibnite Project, Canadian Superior Mining (U.S.) Ltd."

As previously discussed, this option involves mining the West End (44 acres) and Garnet Creek (three acres) deposits over an approximate

FIGURE 21 PRELIMINARY SCREENING MATRIX OPERATIONAL COMPONENTS, PROPOSED STIBNITE MINING PROJECT

OPERATIONAL CRITERIA OR PROJECT COMPONENTS (THESE COMPONENTS ARE LINKED OR COMBINED TO FORM PROJECT ALTERNATIVES FOR THE PROPOSED STIBNITE PROJECT)	PRELIMINARY SCREENING RATING RATING LEGEND + GENERALLY COMPATIBLE WITH APPLICABLE PRELIMINARY SCREENING CRITERIA; WILL BE CONSIDERED IN DETAILED EVALUATION. — NOT COMPATIBLE WITH APPLICABLE PRELIMINARY SCREENING CRITERIA; ELIMINATED FROM DETAILED STUDY.	DISCUSSION SUMMARY AND REMARKS NOTE: PRELIMINARY ALTERNATIVES OPERATIONAL CRITERIA OR COMPONENTS WERE SCREENDED ON THE BASIS OF: 1) ENVIRONMENTAL CONDITIONS AND CONSTRAINTS 2) ENGINEERING AND GEOTECHNICAL FEASIBILITY 3) COST EFFECTIVENESS 4) OTHER MAJOR LOCAL CONSIDERATIONS (OWNERSHIP; PUBLIC ACCEPTABILITY; ISSUES, CONCERNS AND OPPORTUNITIES)
MINE AREAS		
WEST END AREA	+	MINERALIZATION, OWNERSHIP AND CONTRACTUAL AGREEMENTS LIMIT THE PROPOSED MINING ACTIVITIES TO THIS AREA.
GARNET CREEK	+	LOCATION OF KNOWN OXIDE ORE DEPOSITS, AND PATENTS AND CONTRACTUAL AGREEMENTS RESTRICT MINING TO THIS AREA.
LEVEL OF MINING		
NO ACTION OR NO MINING	+	REQUIRED BY NEPA; PROVIDES A BASELINE AGAINST WHICH ALL OTHER OPTIONS CAN BE WEIGHED.
WEST END AND GARNET CREEK	+	PROPOSED PROJECT IDENTIFIED BY CSM.
WEST END ONLY (LIMITING IN SENSITIVE AREAS)	—	INFRASTRUCTURE INVESTMENT FOR W. END ONLY, SUBSTANTIAL; COMPLICAT. BY CONTRACT. AGREEMENTS ; FINANCIAL IMPACTS TO CSM.
PILOT PLANT LEVEL (500 T/YR)	—	DETERMINED TO HAVE THE SAME EFFECTS AS THE NO MINING OPTION.
REDUCED MINING LEVEL (LIMITING AMOUNT OF ORE MINED)	—	FLUCTUATING GOLD MARKET REDUCES THE FEASIBILITY OF THIS OPTION; APPARENT CONFLICT WITH MINING LAW OF 1872.
MINING METHODS		
OPEN PIT MINING	+	ONLY FEASIBLE METHOD DUE TO NATURE OF MINERALIZED ZONES; MAIN DEPOSIT CONTROLLED BY DIPPING FAULT ZONE; DEPOSIT CLOSE TO SURFACE; MOST ECONOMICAL TECHNIQUE.
UNDERGROUND MINING	—	THE ORE BODY IS LOW GRADE; DEPOSITS ARE CLOSE TO THE SURFACE; COSTS FOR UNDERGOUND MINING IN THIS APPLICATION ARE PROHIBITIVE.
PHASED MINING	—	SIZE OF GARNET CREEK DEPOSIT DOES NOT LEND ITSELF TO THIS APPLICATION; SIZE OF W. END WOULD ALSO CREATE OPERATIONAL AND SAFETY PROBLEMS; POTENTIAL FOR COVERING FUTURE MINEABLE ORE.
WASTE DUMP DISPOSAL OPTIONS		
WEST END AND GARNET CREEK WASTE DUMPS	+	ORIGINAL PROPOSAL BY CSM; GEOTECHNICAL EVALUATION INDICATES FEAS. WITH ADEQ. IMPLEMENTATION SAFEGUARDS; GARNET CREEK PART. SENSITIVE.
INTERNAL REPLACEMENT WASTE MATERIAL	—	AREAL SIZE OF MINE SITES AND TOPOGRAPHY MAKE THIS OPTION UNFEASIBLE; POTENTIAL FOR COVERING MINEABLE ORE DEPOSITS.
DISPOSAL OF GARNET CREEK MINE WASTE AT EXIST. TAILING PILE, CONSTR. OF MINE WASTE DUMP IN W. END CANYON	+	OUTGROWTH OF EIS PROCESS; INCREASED HAULING; MAJOR CONSIDERATIONS INVOLVE DRAINAGE CONTROL IN W. END CANYON, OVERALL STABILITY CONSIDERATIONS.
DISPOSAL OF ALL MINE WASTE AT EXIST. TAIL. AREA	+	MAJOR INCREASE IN HAULING; REQUIRES STABILIZATION OF TAILING PILE, FILLING IN OF MEADOW CREEK POND, RE-ROUTING MEADOW CREEK.
FILL AT GLORY HOLE	—	CSM DOES NOT OWN OR CONTROL PIT; GLORY HOLE PRESENTLY SERVES AS SEDIMENT TRAP; POTENT. FOR FILLING OVER MINERAL VALUES; MAJOR STREAM CHANNEL ALTERATIONS WOULD BE REQUIRED.
LIMITED SIDEHILL OR VALLEY FILL DISPOSAL	+	LOCATIONS LIMITED; VALLEY FILL POTENTIALLY FEASIBLE; WOULD REQUIRE IMPROVED DRAINAGE FACILITIES; RECLAMATION REQUIREMENTS MORE EXTENSIVE.
HAUL WASTE MATERIAL TO LOCAT. OUTSIDE THE PROJECT AREA FOR DISPOSAL	—	ENERGY INTENSIVE; INCREASED TSP EMISSIONS; NO OTHER LOCATIONS IN REASONABLY CLOSE PROXIMITY; HAULING COSTS FURTHER PROHIBIT
HAULING AND MATERIAL TRANSPORTATION		
TWO-LANE LOOP HAUL ROADS	+	MAXIMUM CUT AND FILL REQUIREMENTS; INCREASED EROSION; IMPROVED SAFETY; INCREASED FLEXIBILITY.
TWO ONE-LANE HAUL ROADS	+	SERVE BOTH W. END AND LOWER MIDNIGHT CREEK (PROC. WASTE DISP.); ULTIMATE FLEXIBILITY; GOOD OPERATIONAL EFFICIENCY.
SINGLE ONE-LANE HAUL ROAD (WITH TURNOUTS)	+	WILL DISTURB LESS LAND THAN OTHER TWO TECHNIQUES; REQUIRE CONSTRUCTION OF ROAD UP FACE W. END MINE; REQUIRE TURNOUTS AND SIGNALIZATION.
SINGLE TWO-LANE HAUL ROAD		REQUIRE MORE CUTS AND FILL; INCREASED EROSION POTENTIAL; IMPROVED SAFETY, INCREASED FLEXIBILITY.
CONVEYOR BELT OR TRAMWAY	—	OPERATIONAL PROBLEMS; ALSO REQUIRES MAINTENANCE ROAD; FAILURE SHUTS DOWN ENTIRE SYSTEM; HIGH CAPITAL COSTS; ENERGY INTENSIVE.
SLURRY PIPELINE	—	WATER REQUIREMENTS SIGNIF.; INCREASED CRUSHING; DEWATERING REQUIRED AT MILL; HIGH COSTS; SYSTEM FAILURE CUTS OFF SUPPLY TO MILL.
PROCESSING FACILITIES LOCATIONS		
ADKIN'S FLAT	+	ORIGINAL PROPOSAL BY CSM; SUFFICIENT AREA; CLOSE PROXIMITY TO BOTH MINE SITES AND PROPOSED TAILING DISP. AREA; PREV. DISTURB.
MEADOW CREEK LANDING FIELD	+	TECHNICALLY FEASIBLE; CONSTRAINED BY MEADOW CREEK; WOULD REQUIRE PORTION OF ADKIN'S FLAT FOR PROCESS. FACIL.; NO SUBST. VEGET.
EXISTING TAILING PILE	+	POTENTIALLY FEASIBLE; WOULD REQUIRE STABILIZATION PRIOR TO USE, ALSO RE-ROUTING OF MEADOW CREEK; LIMITS USE FOR MINE WASTE, TAILING DISPOSAL.
EXISTING SMELTER LOCATION	—	PRIVATE OWNERSHIP; AVAILABLE LAND MARGINALLY ADEQUATE.
PROCESS METHODS AND MATERIALS		
HEAP LEACHING	+	PILOT PLANT OPERATION HAS PROVEN PROCESS FEASIBLE; ENVIRONMENTALLY SOUND PROCESS (CLOSED PROCESS); TAILING HANDLING MINIMAL; METHODS FOR DECONTAMINATION PROVEN; MOST ECONOMICALLY FEASIBLE.
LONG-TERM ONE-TIME LEACHING	—	LAND INTENSIVE (OWNERSHIP AND LAND AVAIL. LIMITS); INCREASED WATER, CHEMICAL REQUIREMENTS; RECLAMATION REQUIR. ALSO INCREASED.
MODIFIED VAT LEACHING	—	REQUIRES CRUSHING AND GRINDING (0.012 INCHES DIAM.); INCREASED WATER AND CHEMCIAL USE; TREATMENT OF LIQUID AND SOLID TAILING.
VARIATIONS IN AGITATION LEACHING	—	ADDITIONAL CRUSHING; REQ. SPECIAL TAILING DISPOSAL FACILITIES; INCREASED COSTS; RECLAMATION OPPORTUNITIES REDUCED
CRUSHING OPTIONS CRUSHING (MINUS 1 INCH)	+	PROPOSAL BY CSM; PROVEN IN PILOT PLANT OPERAT.; ADDIT. TSP; OPTIM. RECOVERY.
SCREENING (MINUS 6 INCHES)	—	RECOVERIES NOT AS GOOD; INCREASED LEACH TIME; CRUSHING MUST BE PLANNED ON.
PROCESSED ORE TREATMENT BY COMBINATION OF CHLORINATION,	+	MOST WIDELY USED METHOD; PROVEN EFFECTIVE IN PILOT PLANT OPERAT.
OZONATION, AND	+	HANDLING PROBLEMS (REQUIRES SPECIAL SAFETY CONSIDERATIONS); ENERGY INTENS.; LEAVES NO RESIDUALS.
SOLAR RADIATION	+	POTENTIALLY FEASIBLE IN COMBINATION WITH OTHER OPTIONS.
STOCKPILING ORE		
ADKIN'S FLAT	+	SUFFICIENT AREA AVAILABLE; FOUNDATION SOILS STABLE; AREA CENTRALLY LOCATED; ALLOWS EARLY STARTUP; REDUCES EARLY SPRING EROSION PROBLEMS AT MINE AREAS.
MEADOW CREEK LANDING FIELD	+	SUFFICIENT AREA AVAILABLE; MINIMAL DISTURB. VEGET.; CENTRALLY LOCATED; NO RUNOFF PROBLEMS ANTICIPATED WITH ADEQ. BUFFER; ALLOWS EARLY STARTUP.
NO STOCKPILING	—	NO APPARENT ADVANTAGES; WOULD RESULT IN MAJOR STARTUP DELAYS, REDUCE OPERATING SEASON.
PROCESSED ORE DISPOSAL		
EXISTING TAILING PILE	+	PROPOSED OPTION BY CSM; PRELIM. STUDIES INDICATE GOOD RECLAM. BASE, MEDIUM FOR STABIL. WIND EROSION, WATER QUALITY AND AIR QUALITY BENEFITS.
RETURNING ORE TO THE MINE SITES	—	SIZE (LIMITED) OF MINE AREAS RESTRICTS FEASIB.; INTERRUPT. IN MINING; SAFETY PROBLEMS; POTENTIAL FOR COVERING FUTURE MINEABLE ORE.
DUMPING ORE IN THE OLD PIT(GLORY HOLE)	—	OWNERSHIP PROBLEMS PROHIBIT; HYDROLOGICAL CONDITIONS FURTHER LIMIT.
CONTOURING INTO VALLEY BOTTOMS/ HILLSIDES	+	ADEQUATE AREA AVALIABLE; LEAST COSTLY; POTENTIAL FOR COVERING FUTURE MINEABLE AREAS; RECLAMATION REQUIREMENTS INCREASED.
RAISING MEADOW CREEK LANDING FIELD	—	AREA NOT SUFFICIENT TO ACCOMODATE TOTAL PROJECTED PROCESSED ORE WASTE VOLUME; POTENTIAL DRAINAGE/RUNOFF PROBLEMS.
HAULING TO LOCATION OUTSIDE AREA	—	OVER 4 MILLION TONS WOULD HAVE TO BE HAULED; LIMITED AREAS AVAILABLE; INCREASED TSP CONCENTRATIONS, ENERGY CONSUMP. RELATED TO HAULING.
UTILIZING FOR ROAD SURFACING (COMBINATION)	+	PRELIMINARY TESTING INDICATEDS COMPOSIT. GOOD FOR ROAD SURF. USE; NO LEACHABLE TOXIC CHEMICALS; POTENTIAL MARKET TO COUNTY, USE IN TIMBER SALES; REDUCED AIR QUALITY EFFECTS.
HOUSING FACILITIES AND LOCATION		
SPLIT HOUSING, Y.P. AND STIBNITE (MIDNIGHT CREEK LOCATION)	+	PROPOSAL BY CSM; SOME CONCERN OVER LOCATION IN RELATION TO W. END MINE SITE; LAND AREA ADEQUATE; WOULD REQUIRE PUB. FACIL. AND UTIL.
SPLIT HOUSING, Y.P. AND STIBNITE (SAW MILL, REC. HALL, UPPER EFSF SITE, ADKIN'S FLAT LOCATIONS)	+	OPTIONS EVOLVED THROUGH EIS PROCESS; SAWMILL SITE PREF.; REMOVED FROM MINING ACTIV.; REDUCED NOISE, DUST, ETC.; AREA PREV. DISTURB. (UPPER EFSF SITE ELIMINATED)
ALL WORKERS HOUSED AT STIBNITE (ANY OF THE ALTERNATE LOCATIONS)	—	POTENTIALLY FEASIBLE; INCREASED PROBLEMS WITH COMMUNICATION; INCREASED PUBLIC FACIL. AND UTIL. REQUIRE. INCLUD. SCHOOLS, POLICE, FIRE.
ALL WORKERS HOUSED AT Y.P.	—	HEAVY IMPACT ON COMMUNITY FACILITIES, INCREASED COMMUTING REQUIREMENTS, ENERGY UTILIZ.; PUBLIC OPINION VARIED ; TRAFFIC/SAFETY PROB.
POWER SOURCE OPTIONS		
ON-SITE DIESEL/PROPANE GENERATORS	+	PROPANE GENERATORS WOULD REDUCE OVERALL EMISSIONS; UTILIZED IN PILOT PLANT OPERATION; INCREAS. NOISE IMPACTS; REDUCED CONSTRUCT. REQUIREMENTS.
RE-ESTABLISH TRANSMISSION LINE	—	SIGNIF. CONSTRUCTION IMPACTS (VEG. REMOVAL, SURF. CUTS AND EXCAVAT.); MOST COSTLY; UNINTERRUPTED SUPPLY DOUBTFUL.
HYDRO-ELECTRIC FACILITIES	+	REQUIRE STREAM CHANNEL ALTER.; AND/OR DIVERSION STRUCTURE; POTENT. ADVERSE EFFECTS ON FISHERIES. LICENSING AND EQUIP. SCHED. PROHIBIT DETAILED EVAL. IN DEIS (WILL BE STUDIED IN DETAIL LATER).
ACCESS CORRIDORS		
WARM LAKE/LANDMARK	+	SHORTEST ROUTE; HAS UNDERGONE MAJOR IMPROVEMENTS; LESS EXPOSURE TO WATERCOURSE (HAZ. WASTE TRANSPORT).
SOUTHFORK SALMON RIVER ROAD	—	MAX. EXPOSURE TO SOUTH FORK SALMON RIVER; LONGEST ROUTE; MOST SENSITIVE ROUTE FOR TRANSP. HAZ. MATERIALS.
LICK CREEK ROAD	—	STEEP GRADES; NARROW; INACCESSIBLE DURING LARGE PORTION OF YEAR; WOULD REQUIRE MAJOR IMPROVEMENTS.
LIMITED RECONSTRUCT, Y.P. TO STIBNITE ROAD	+	DISCUSSIONS WITH FS AND CSM INDICATE LIMITED IMPROV. NECESSARY; MAJOR BRIDGES GOOD CONDIT., WITH RELAT. MINOR IMPROVEMENTS REQUIRED.
MAJOR IMPROVE., Y.P. TO STIBNITE ROAD	—	POTENTIAL FOR SIGNIF. IMPACTS ON EFSF SALMON RIVER; SIGNIF. ACTION, REQUIRE. SEPARATE ENVIR. REVIEW AND ANALYSIS REQUIRED.

10-year period utilizing conventional surface mining techniques. The physical layout of the project components for this alternative are shown on Figure 16 (following page 69). An estimated 2,500 to 3,000 tons of ore would be mined each operating day for 150 days each year (400,000 tons/year). A heap leach extraction process would be utilized to recover metal values. The operation would employ approximately 60 people. As planned, approximately 40 seasonal workers would be housed at Stibnite, and 10-20 administrative personnel would be located at Yellow Pine. The Stibnite housing complex would be located at one of the three locations discussed earlier in this chapter. Power for the processing facilities and housing complex would be provided by diesel or propane generators. Two waste dump locations would be utilized to dispose of mine waste generated by the operation. These include the 25-acre West End Canyon dump and a six-acre site located west of, and immediately adjacent to, the Garnet Creek Mine site. The West End Mine haul road would require construction of a two-lane (60-ft. wide) improved lower corridor and a new two-lane "loop" upper haul road through Midnight Creek drainage. Access to the Garnet Creek mine would be provided by a two-lane haul road off the existing Monumental Summit Road. The processing facilities, which would include the leach plant, crushing plant, conveyors, feeders, maintenance building, etc., would be located at Adkin's Flat north of the Meadow Creek Landing Field. All buildings would be prefabricated Butler type. Ore would also be stockpiled at Adkin's Flat adjacent to the existing tailing pile. Processed ore would be utilized to stabilize and reclaim the tailing area.

Alternative 2 - No Action Alternative

The No Action Alternative would involve denial of the proposed Stibnite Mining Project. This alternative would provide a baseline alternative against which all other options can be weighed. Under this alternative, even the existing level of mining (the 500 ton/year CSM pilot plant operation) would be prohibited. It is recognized that a decision to implement this alternative would be in conflict with the Mining Law of 1872, and 36 CFR 252 which charges the Forest Service with administering and managing Forest lands. Mining is an approved use under the Big Creek District Multiple Use Plan, and the South Fork Salmon River, Warren and Landmark Land Management Plans. While the Forest Service can require or impose reasonable environmental conditions upon an operating plan, they do not have authority to disapprove an operating plan for a reasonable operation to be operated in an environmentally sound manner (CEQ, 1977; USFS, 1980).

Alternative 3 - Meadow Creek Landing Field Processing Facilities Alternative

Alternative 3 represents a significant variation of Alternative 1, as shown in Figure 22. The mine areas, ore stockpile location, and housing site would be the same as described for the proposed project. However, under this option, a number of major operational and loca-

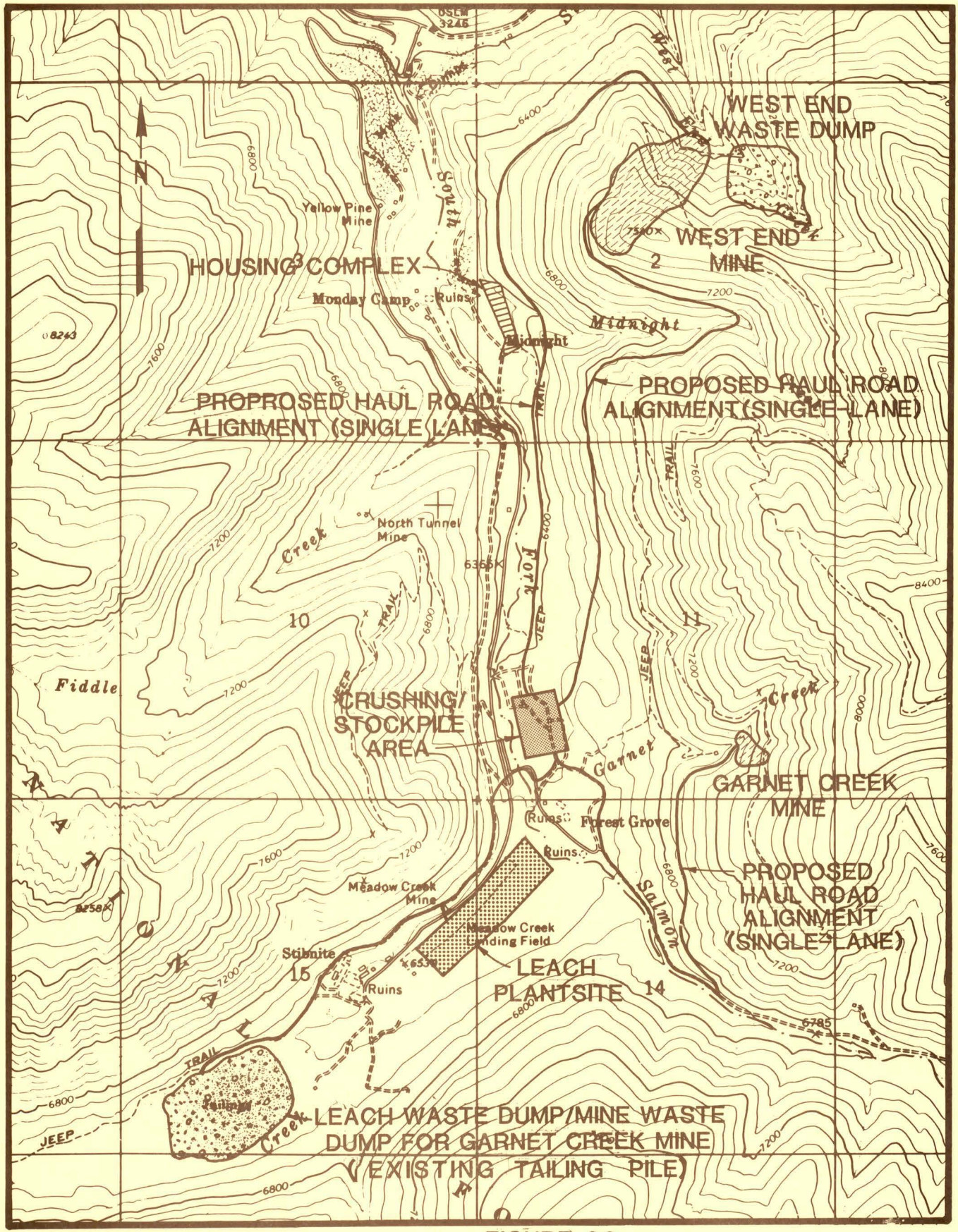

FIGURE 22
ALTERNATIVE 3, MEADOW CREEK LANDING FIELD PROCESSING FACILITIES LOCATION ALTERNATIVE

tional modifications would be implemented. All of the mine waste would be hauled from the Garnet Creek Mine to the existing tailing pile for use in constructing a support berm across the toe of the tailing dam for stabilization. Mine waste from the West End deposit would be disposed of in a waste dump located in the canyon immediately east of and adjacent to the mine site. The West End (Mine) haul road would involve a single-lane (30-ft. wide) loop road utilizing the existing lower corridor and an upper alignment through Midnight Creek drainage. Access would be provided to the Garnet Creek Mine by a single-lane haul road leading from the old Monumental Summit road. Under this alternative, the leach plant would be located on the Meadow Creek landing field. The crushing plant and maintenance buildings would be located at Adkin's Flat.

Alternative 4 - Existing Tailing Pile Processing Facilities Location Alternative

This alternative represents a slight modification to Alternative 3. Figure 23 shows the physical layout of the project components. Under the alternative, the mine areas, West End waste dump location, and haul road location and design would be the same as described for Alternative 3. The alternative would involve locating the leach plant at the existing tailing pile. The crushing facilities and ore stockpile area would be located at the Meadow Creek landing field immediately north of the leach plant. Processed and treated ore would be contoured into the available valley bottom and hillsides and utilized for road surfacing (including potential contract sales). Potential locations for sidehill or valley fill disposal are also shown in Figure 23. The housing complex would be constructed at either the sawmill or recreation hall site. This modification would be required due to the projected amount of waste rock which would be dumped into the Midnight Creek Canyon.

Alternative 5- All Mine and Process Waste Material Disposed of at the Existing Tailing Pile

Under this alternative, the major modification would be that all of the mine and process waste material from the operation would be hauled to the existing tailing pile, including approximately 2.2 million cubic yards of mine waste from the West End Mine (Figure 24). Haul road location and design corridors would be identical to Alternatives 3 and 4, and would involve a 30-ft. wide loop road to serve the West End Mine, and a single-lane access off of the old Monumental Summit road to the Garnet Creek Mine. The leach plant would be constructed at the Meadow Creek landing field, while the crushing plant and stockpile area would be located at Adkin's Flat. Processed ore would also be disposed of at the tailing pile. Housing would be split between Yellow Pine and Stibnite at either the Midnight Creek or sawmill sites discussed earlier in this chapter.

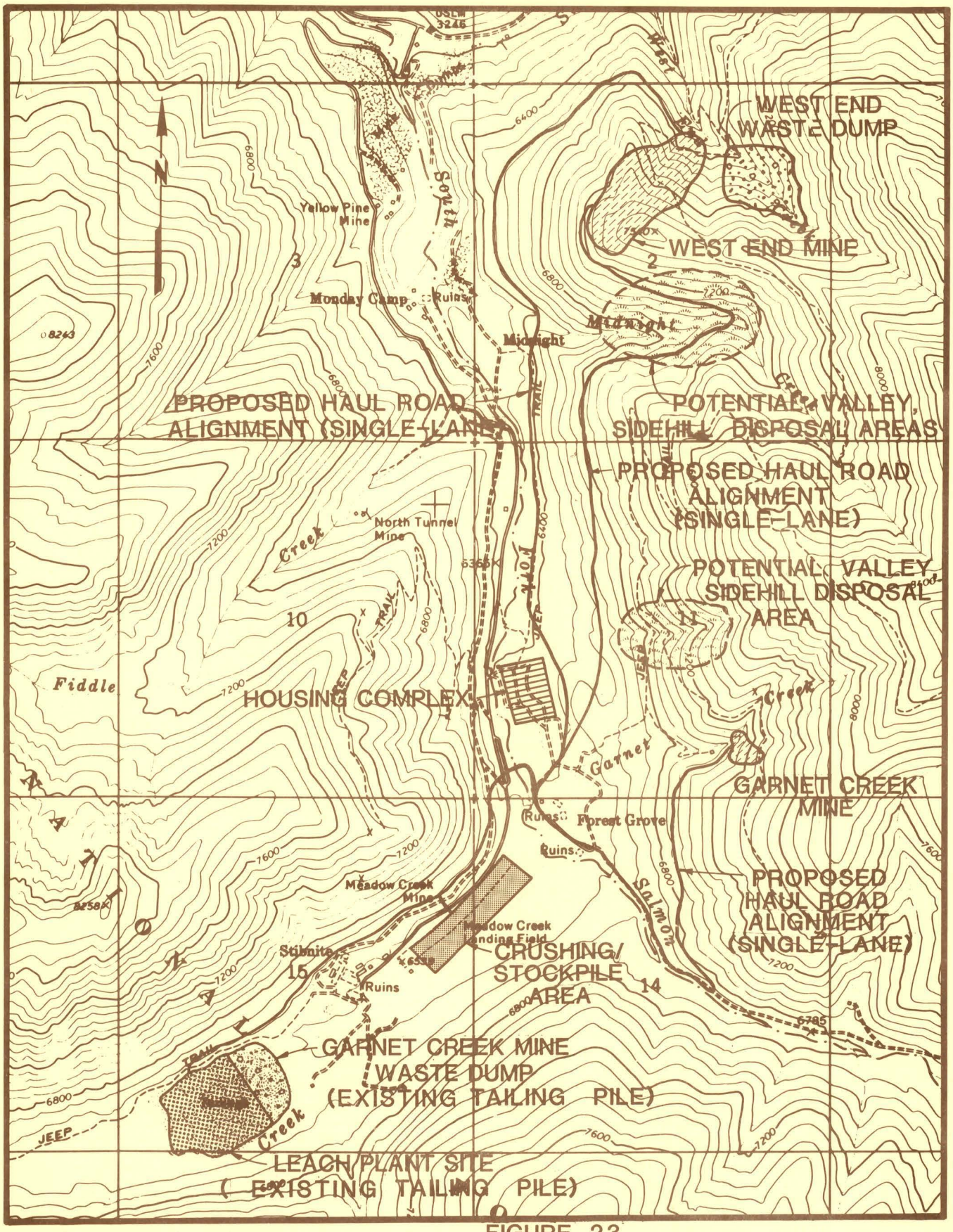

FIGURE 23
ALTERNATIVE 4, EXISTING TAILING PILE
PROCESSING FACILITIES LOCATION ALTERNATIVE

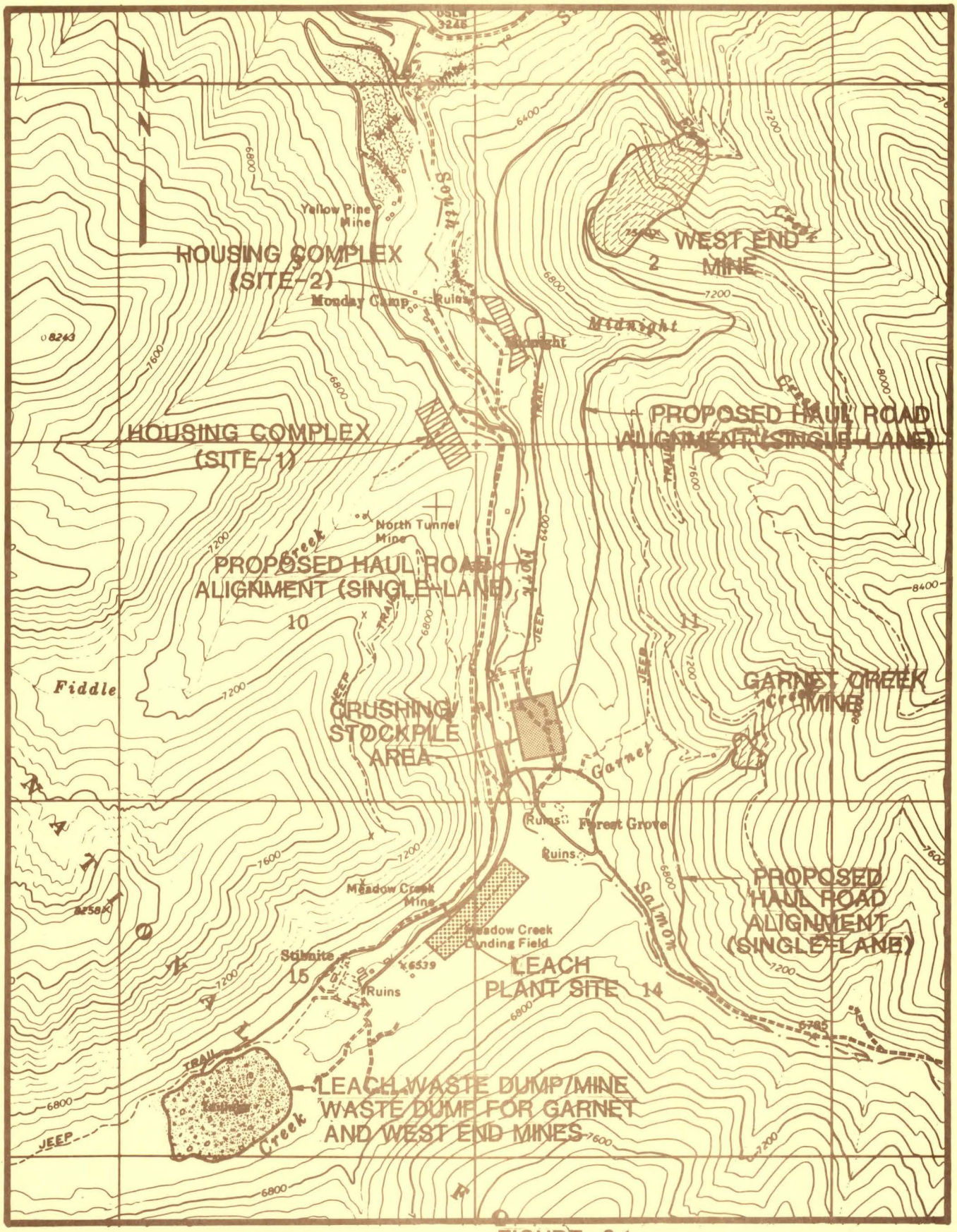

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FIGURE 24
ALTERNATIVE 5, ALL MINE AND PROCESS WASTE DISPOSED AT EXISTING TAILING PILE

Alternative 6 - Reduced West End Canyon Waste Dump with Limited Valley Fill Alternative

Alternative 6 represents a slight modification to Alternative 3. Figure 25 shows the physical layout of the project components. The major difference involves a reduced West End Canyon waste dump, which would utilize valley fill and sidehill disposal for a portion of the 2.2 million cubic yards of West End Mine waste rock. The housing complex would be located at the sawmill site. The remaining project components would be the same as for those described under Alternative 3.

MANAGEMENT CONSTRAINTS AND GUIDELINES

The intent of the following constraints and guidelines is to provide a framework for avoiding adverse environmental effects during the construction and operation of the project, and to conform to all other applicable laws relating to Forest Service activities. This section describes general mitigation measures and management programs that will be implemented by CSM and the Forest Service to minimize or eliminate impacts, regardless of the alternative selected. Other details of more specific programs will be finalized following selection of the preferred alternative by the Forest Service, and will be incorporated in the Operating Plan and other programs, permits, etc., which CSM must finalize prior to initiation of major construction activities. The enforcement of certain basic laws and regulations will also reduce or mitigate the separate and cumulative impacts on several of the specific resource values and the Stibnite environment in general.

CSM will develop a "Concept Development Plan" for the selected alternative which will define overall management goals and policies for mine areas, the processing plant, waste dumps, transportation and access routes, and utilities in relationship to environmental protection and maintenance and public safety, project timing, etc. The primary objective of this plan will be to provide a basic policy directive for developing the Stibnite Mining Project over the 10-year operation and a mechanism against which accomplishments can be weighed. The "Concept Development Plan" will also be used by CSM as a policy guide to base decisions on concerning mine development and operation.

CSM will develop a corridor plan for Forest Service approval for the roads, pipelines and utilities. The plan will blend major engineering design considerations and best management practices to produce a management framework which minimizes erosion and related effects on water and air quality and land resources during the construction of these facilities. Ongoing maintenance activities for corridors will be described. The plan will also identify potential "cleanup programs" and CSM/Forest Service responsibilities regarding previously disturbed corridors and areas affected by corridors not involved in the mining proposal but currently contributing to existing environmental and/or safety problems.

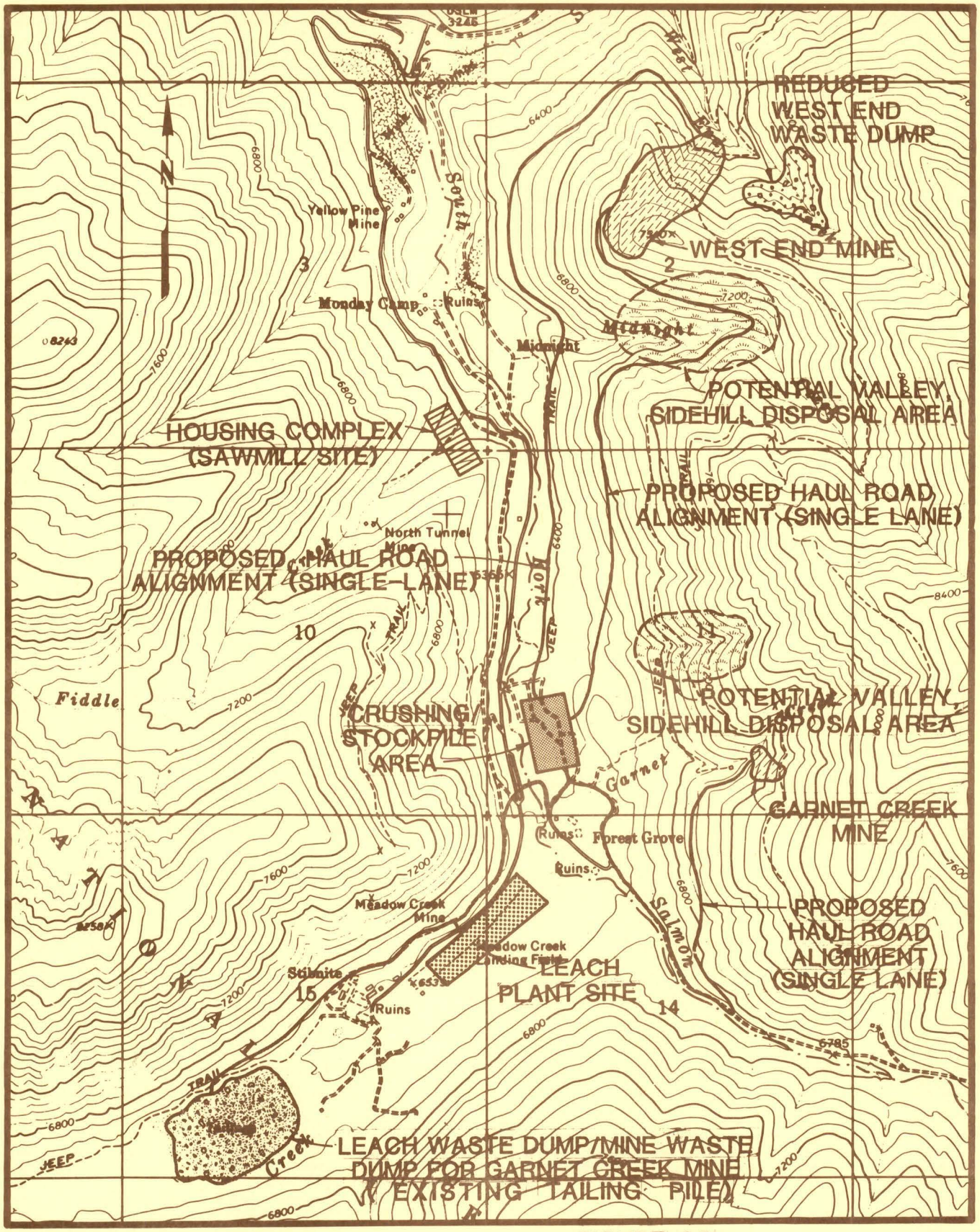

FIGURE 25

ALTERNATIVE 6, REDUCED WEST END CANYON WASTE DUMP WITH WASTE DUMP WITH LIMITED VALLEY FILL ALTERNATIVE

CSM will develop a reclamation plan, as a part of the Operating Plan, for reclamation of all areas on Forest Service land. The reclamation plan will be implemented according to Forest Service guidelines and constraints described in the EIS. The plan will also meet the requirements of Title 47, Chapter 15, Idaho Code, Idaho Surface Mining Act. A "conceptual" version of this plan is included as Appendix E of this report.

The plans and requirements discussed above will incorporate the following management constraints and guidelines:

AIR RESOURCES

- Require dust control for all mining and related construction activities including mine excavation, road construction, crushing, ore and processed waste hauling, and access roads.
- Reclaim the existing tailing pile to reduce surface wind erosion and total suspended particulate concentrations.
- Conduct all mining-related activities in accordance with applicable state and federal air quality standards and regulations.

WATER RESOURCES

- Implement State of Idaho Guidelines for Mine and Mill Waste Disposal to protect local surface water and groundwater quality. These guidelines will also be supplemented by a project-oriented "best management practices guide" designed to further protect water quality.
- Comply with applicable State of Idaho requirements for stream channel alterations and safety of mine tailing impoundment structures.
- Develop a Spill Prevention and Control Countermeasure Plan which addresses storage of petroleum products, and contingency provisions for coping with emergency spills.
- Make special provisions for controlling emergency situations involving potential leakage or spill of cyanide compounds at the leaching pads.
- Establish adequate stream buffers for operating any equipment and facilities to prevent potential water quality contamination. Roads will also be located away from streambeds, wherever possible, to reduce sedimentation impacts on surface waters.
- Construct sedimentation basins and associated storm drainage facilities as necessary to control sediment movement from mine areas, waste disposal areas, roads, housing facilities, etc. Passage of runoff waters beneath or through the proposed West End waste dump will receive special design and construction considerations.
- Coordinate water withdrawals for operation of the processing facilities with streamflows and aquatic habitat needs to minimize impacts on the aquatic ecosystem.

- Develop design criteria for the leaching pads that will meet applicable state and federal requirements for leakage and total containment.

FISH AND WILDLIFE

- Maintain or improve existing spawning and rearing conditions by controlling sediment production through structural and nonstructural controls.
- Stabilize the existing tailing pile, and realign the Meadow Creek stream channel to reduce existing sedimentation and potential heavy metal accumulation in fish.
- Study the feasibility of constructing artifical spawning channels for the anadromous fish above the confluence of the EFSF Salmon River and Sugar Creek.
- Provide adequate treatment of domestic sewage to ensure that no increased nutrient enrichment will result which could affect the benthic or fish community.
- Upon completion of mining and related activities, reclaim those areas utilizing native plant species which have the least impact on present wildlife species and their required community types.
- Protect humans and wildlife by fencing the processing facilities and other portions of the mining operation as necessary.
- Post notices in conspicuous places informing employees, residents and contractors of all applicable laws and regulations governing hunting, fishing and trapping.

RECLAMATION AND REVEGETATION

- Initiate on-site pilot studies to determine most adaptable plant species for the reclamation program.
- Reduce surface disturbance to the minimum level possible for mine areas, roads, waste dumps and related activities.
- Minimize cut slopes (heights and widths) as much as possible in road construction activities.
- Implement an overall reclamation program designed to reclaim the existing tailing pile, mine sites and other disturbed areas with native plant species (to the maximum extent possible). This will involve strategic location and use of available topsoil, a seeding program, native plant species, transplant stock, and the most current application techniques (hydromulching, broadcast seeding, steep slope planting, etc.).
- Require a performance bond to be held by the Forest Service until reclamation requirements, in compliance with 36 CFR 252 and the Federal Land Policy Management Act, are satisfactorily met. These requirements will be addressed in the reclamation plan, to be submitted and approved as part of the final Operating Plan.

SOLID WASTE

- Remove all hazardous or special wastes (oil and petroleum products) to an authorized sanitary landfill or approved hazardous waste disposal site. Domestic refuse will also be hauled to an approved landfill.
- Adhere to the following siting and design criteria for waste disposal:
  1. Drain and stabilize the existing tailing pile, including draining of the Meadow Creek Pond.
  2. Design overburden deposits (mine waste material) to be 90 percent safe from mass failure or liquefaction failure if subjected to a 100-year storm event on top of saturated soil conditions.
  3. Combine soil, slope, location and amount of area disturbed so that which results in the lowest erosion and mass wasting potential occurs.
  4. Treat all processed waste materials effectively treated to destroy residual cyanide in the stripped ore prior to disposal.

RECREATION AND PUBLIC ACCESS

- Ensure that corridor construction or use does not prevent or unreasonably disrupt the use of existing public roads, particularly as related to sportsman access.
- Regulate public access and public vehicular traffic to facilitate mining operations and protect the public and, to the extent possible, wildlife from hazards associated with the proposed Stibnite Mining Project.
- Include interpretive sign displays where appropriate to promote the information/educational aspects of the project.

HOUSING, FIRE AND SAFETY

- Comply with all applicable Valley County requirements for mobile home parks.
- Meet health district standards for sewer and water systems
- Restrict company employees and contract labor living at Stibnite to living in CSM planned and maintained facilities in order to provide adequate security and safety
- Comply with the requirements of the Federal Mine Safety and Health Act as amended in 1977.
- Provide and maintain fire protection equipment at the site. Spark suppression devices will also be installed on all equipment and vehicles.
- Require designated personnel to attend and successfully complete emergency medical training. Maintain emergency medical supplies and facilities at strategic locations within the project area, and make special efforts to ensure that the main communication system and an emergency back-up unit are also maintained in good operating condition.

- Store explosives and potentially hazardous materials in a manner which conforms to the requirements of The Federal Mine Safety and Health Act.

VISUAL AND CULTURAL RESOURCES

- Construct roads associated with the mine sites as narrow as applicable safety standards and operational requirements will allow to keep contrasting vegetation lines and edges to a minimum.
- Cover cutbanks and road sides with darker soils, and plant roads to stabilize and to break up the solid color of road cuts.
- Design all activities to repeat the form, line and color frequently found in the landscape.
- Spread out all new deposits of waste materials as much as possible on the tailing pile to conform to the immediate natural surroundings of the broad valley floor, then re-vegetate to provide screening of the past and proposed mining actitivies.
- Initiate a tree planting program to screen the leach pad facilities.
- Utilize earth tone colors for painting facilities installed by CSM.
- Plan the housing site design and layout to assure as little disturbance as possible, including maximum retention of existing screening vegetation.
- Screen all maintenance and equipment storage areas will be screened to minimize visual impacts.
- Catalog cultural resources which will be adversely impacted by the undertaking to allow for the recovery of the maximum amount of data prior to impacting the resources.
- Halt mining operations in the event that any objects of historical or archaeological interest are discovered, and retain a qualified professional to inspect and inventory the site.

OTHER SOCIOECONOMIC CONSIDERATIONS

- Effort will be made by CSM to hire from the local available work force, and to support the local economy to the maximum extent possible.

MITIGATION MEASURES

The final Operating Plan (to be developed by CSM once a selected alternative is agreed upon) will present a detailed discussion of the various mitigation programs CSM will initiate during the construction, operation, and abandonment phases of the project. Perhaps the most significant element of the program involves the proposed stabilization and reclamation of the tailing pile. Other details of CSM's mitigation

program will be included in the Corridor Plan and Reclamation Plan. As previously discussed, a summary of the reclamation procedures is presented in Appendix E of this report. Where relevant, mitigation programs will be designed to conform to Mine Safety and Health Act requirements. Mitigation measures will include the programs summarized below.

MINING METHODS AND WASTE DUMPS

Erosion Control and Drainage Provisions

Engineering design will allow passage of runoff waters beneath or through the fill. Sedimentation from exposed mined areas and the waste dump fill will be largely controlled through the use of temporary sediment collection ponds and existing natural barrier slopes. Diversion facilities (culverts, ditches, etc.) will be constructed to divert runoff around the mine pits and back into the natural drainages below the mine area. Other temporary sedimentation control techniques including silt fences, brush barriers, straw mulching, matting and netting, etc. will also be applied as appropriate to help stabilize exposed surface during the off season. Any groundwater flow into the pits will be routed to the sediment ponds and settled prior to discharge to West End Creek or Garnet Creek.

Mine Reclamation and Revegetation

Adverse environmental effects at the mine sites will be minimized by the use of 15-20 foot bench heights and by moderate overall pit wall slope angles. Seeding and transplanting programs will also be implemented.

HAULING AND MATERIALS TRANSPORTATION (CORRIDORS)

Runoff and Erosion Control

Roads will be constructed using techniques developed by the Forest Service designed to reduce erosional impacts. Emphasis will be placed on minimizing road mileage and disturbed areas. High hazard areas will be avoided. Runoff and increased sedimentation from roads will be controlled by berms and ditches to prevent uncontrolled erosion. Road grades will also be varied to reduce concentrated runoff flows. Roads will be located far enough above or away from streams to provide adequate buffer areas or to allow catchment of sediment moving downslope below the road. All cut and fill slopes will be re-seeded to control erosion.

Dust Control

Appropriate methods including watering of roads and the pit, and road surfacing with treated processed waste material will be utilized to control dust from the project.

Reclamation And Revegetation

Road fill will be generally treated like the mine sites. Reclamation of abandoned haul roads and access roads will involve ripping hard surfaces as necessary and reseeding. Seeding (with native species) will involve broadcast seeding and planting using a steep-sloped planter. Some transplanting in draw areas will also be required.

PROCESSING FACILITIES

Design criteria for the leaching pads will meet applicable state and federal requirements for leakage and total containment. The pregnant solution and wash water ponds will be designed to contain the 100-year storm event. All surface drainage facilities will be designed for the 100-year flood; surface runoff will be isolated from the solution ponds and leach pads. At the completion of the project, all man-made structures will be removed from the area. The processing area will be reseeded and planted to vegetate the disturbed area.

ACCESS CORRIDORS

All main access roads will be improved and maintained as necessary to provide safe and efficient travel to and from the Stibnite Mining Project area. A Spill Prevention Control Countermeasure Plan will be developed with contingency provisions for emergency spills involving petroleum products or toxic chemicals.

SUPPORT FACILITIES MITIGATION

Fencing, security patrols and signs to warn the public about dangerous and hazardous areas will be provided. Water tanks and other fire protection equipment will be strategically located throughout the complex. At the completion of the mining and milling operation, all man-made structures will be removed from the area. The mill complex area and housing facilities location will be planted and revegetated.

MONITORING PROGRAMS

NEPA regulations direct that implemented actions are monitored to ensure that "(1) environmental safeguards are executed according to plan, (2) necessary adjustments are made to achieve desired environmental effects, and (3) anticipated results and projects are reviewed." Responsible officials may provide for monitoring to assure that their decisions are carried out, including mitigation and conditions in permits and approvals. The results of relevant monitoring must also be made available to the public upon request.

Baseline environmental data has been collected in the Stibnite project area for the last two seasons. Studies have addressed surface and groundwater quality, fisheries resources (including heavy metal analyses), and aquatic habitat surveys. The water quality sampling

program was also continued through the 1980-81 field season. If the project is implemented, the Forest Service will have the obligation to continue overall supervision of the monitoring program designed for the project.

Appendix C presents a proposed monitoring plan outline and sampling program for the Stibnite Mining Project. The details of this plan will be worked out jointly between responsible Forest Service officials and CSM. The purpose of the monitoring program is to detect harmful changes in environmental conditions in time to take corrective actions.

A summary monitoring and analysis report will be prepared by CSM at the end of each operating season, for review by the Forest Service. The responsibility for preparing a basic format of this document will be established prior to initiating any road building, mining, or processing activities.

The basic elements of the recommended monitoring program are summarized below:

Surface Water Flow - A gaging station should be established at the confluence of the EFSF Salmon River and Sugar Creek. This station would be used to determine critical streamflow measurements, particularly during periods of surface water withdrawals for the leaching operation.

Water Quality - A modified water quality monitoring program would be continued, based upon the information already collected by CSM. This program would include, as a minimum, the parameters listed in Appendix C for both surface and groundwater. A separate evaluation should be conducted every two years to assess any changes in the heavy metal concentrations in fish flesh. A continuous water quality monitoring program would also be designed at the leach plant to detect potential pad leakage and/or other project-related effects on surface and groundwater quality. The monitoring network will include 12 wells and a number of selected surface water stations. The major parameters measured will include cyanide, heavy metals, and pH.

Fish and Aquatic Habitat - A periodic survey (every two years) identifying fish species, numbers, and location would be continued. The program design would be similar to that described in the Stibnite Mining Project Baseline Environmental Report (JMM, 1979). In addition, a detailed stream habitat conditions survey conducted in conjunction with the heavy metal analyses of fish flesh would also be initiated. Special attention will be given to detecting potential changes in the aquatic environment resulting from the mining project. The program will include both biological sampling (benthic macroinvertebrates), and core sampling of pre-designated areas of the EFSF Salmon River determined by Forest Service personnel to represent potential salmon spawning areas.

STIBNITE MINING PROJECT
GOLD MINE AND MILL
FINAL ENVIRONMENTAL
IMPACT STATEMENT

CHAPTER 5

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CHAPTER 5

EFFECTS OF IMPLEMENTATION

INTRODUCTION

This chapter analyzes the effects of implementing the proposed project and each of the five alternatives that were described in the preceeding sections. The analysis describes both the positive and negative aspects of each alternative. Anticipated environmental effects from implementing the various alternatives were quantified as much as possible. Where special conditions made quantification extremely difficult, additional effort was made to accurately describe differences in terms of significance, magnitude, or duration of environmental effects. An evaluation of all the options is presented in Chapter 6. This evaluation compares the attributes and weaknesses of each alternative within several basic categories.

The narrative in this chapter discusses the characteristics of each option as they relate to the three major topic headings incorporated in the Affected Environment chapter: 1) Physical Environment; 2) Biological Environment; and 3) Socio-Economic (Human) Environment.

The discussion of effects is primarily directed to those issues and concerns which were considered of major importance, or which surfaced as significant issues in the initial "scoping sessions" and throughout the remainder of the study. The "significant" determination was made after the Forest Service evaluated public and agency comments, and after review by Forest Service resource specialists and the EIS consultant. The process of prioritizing issues from public and agency comments is in accordance with the goals of the National Environmental Policy Act (NEPA) and Department of Agriculture Forest Service Final Implementation Procedures (F.R., Vol. 44, No. 147) which require that an environmental impact statement be comprehensive, and concise, and understandable to the general public.

Primary impacts are considered at the beginning of each subsection, followed by a summary of the secondary impacts of each alternative where applicable. Primary impacts are those actions with a direct cause and effect relationship. For example, increased road traffic will result in increased levels of dust and particulate matter in the air. Secondary impacts are more indirect and difficult to determine and assess. For example, an increase in the level of mining would stimulate the economy of Yellow Pine, but this in turn could also cause housing/rental prices to increase and negatively impact other elements of the community infrastructure (i.e., sewer and water facilities). Often the secondary impacts of a project can be as severe as primary impacts, and must be carefully analyzed and presented in a manner that will not prejudice the reader.

Impacts of the various alternatives have been presented in such a manner that major differences between alternatives are readily distinguishable. Where possible, these have been quantified and costs of implementation (both economic and environmental) have been documented. Elements that, because of their intrinsic character, could not be quantified are discussed in more detail in order to provide the reader sufficient information to evaluate the relative differences between alternatives. In situations where the effects of one alternative are similar to those of another, a detailed discussion follows the first alternative and is referenced for the second, similar alternative.

Assumptions/Project Criteria

In order to analyze and develop a comparative format to discuss the effects of implementing the alternatives, a number of assumptions were developed. These assumptions do not change or alter the description of alternatives or operational components, but are used to restate important project criteria on which the analysis and evaluation are presented. This is necessary for assessing short-term (construction) versus long-term (operational and beyond) impacts, and in evaluating potential resource commitments resulting from the proposed project and the alternatives.

Key assumptions and project criteria include :

- Only two potential mine sites, Garnet Creek and West End Creek, were considered.

- Based on recent exploration efforts, estimates of the known new gold ore reserves for these sites are:

Garnet Creek Mine	252,000 tons
West End Creek Mine	3,016,000 tons

- These estimates do not take into account recoverable reserves, form of mineralization (oxides versus sulfides), and mining and mineral economics.

- The project life will be approximately 10 years.

- The operation will employ approximately 60 people.

- During the operating season the mine will operate 12-16 hours each day, and the extraction or leaching process will be continous.

- The mine and milling complex will operate only 6-8 months a year (climate dependent).

- No cyanide wastes of any type will be knowingly discharged to surface waters. No cyanide wastes will be disposed of to the terrestrial environment without neutralization of free cyanide.

- The costs for the continued monitoring program (outlined in Appendix C) throughout the life of the project will be borne by the mining company.

- The cost for all agreed upon reclamation efforts (as identified in the Reclamation Plan) will also be borne by the mining company.

- Construction of necessary roads, mine and mill sites, and appurtenant structures will be completed within a single season.

- All federal, state and local laws, regulations, and planning and zoning requirements will be adhered to. All permits, the final Operating Plan and Reclamation Plan will be submitted for approval prior to the commencement of the operation.

- All public safety, hazardous materials, Mine Safety and Health Act, Resource Recovery Act and Clean Water Act requirements will be met prior to commencement of operations.

- It is anticipated that the final mine and reclamation plan will be developed by CSM following a determination by the Forest Service of their preferred alternative.

Project Timing

There are four critical periods during the life of this project when the potential for creating adverse impacts is the greatest. These periods occur during initial construction, the first two years of ore processing, the final two to three years of operation and during the final reclamation and rehabilitation period. The types of concerns described in the following section were considered throughout the initial planning phases of the project by CSM and the Forest Service. The effects of implementing the various project alternatives weigh heavily on these concerns and how they are addressed during and after the project.

During the first year of road construction, stripping of mine overburden and facilities installation, the potential for sediment transport and erosion associated with land disturbance is extremely high. Newly exposed surfaces are more susceptible to erosion from early spring rains and runoff. Material eroded during this period may gradually work its way down through the watershed during successive hydrological cycles, but may not show up in a surface drainage for a number of seasons, depending upon the distance from point of origin. It is, therefore, critical that the prescribed management practices and mitigation measures presented in the previous chapter are strictly adhered to during this period.

The processing of ore during the first two seasons is another period when the potential for environmental degradation will be increased. While the heap leach process is a technologically accepted technique for gold extraction and the basic design criteria were established during the pilot testing phase of the operation, the initial operational period will be critical in terms of establishing a reliable operating and monitoring routine.

The third critical period would occur toward the end of the operation when the overall interest in the project by both the mining company and responsible agencies may be low. Complacency often results in a temporary disregard of established operating procedures. This will require that the results of the monitoring program are carefully analyzed each year, and that the responsible parties strictly adhere to procedures and responsibilities outlined in the operating plan.

The final critical period of the project will occur during the reclamation phase of the project. It is important that a carefully planned reclamation program be prepared and properly funded for immediate implementation once mining activities have ceased. Early reclamation of Garnet Creek should be encouraged. As demonstrated throughout the country, some of the major adverse impacts resulting directly from mining activities occur years after all mining is terminated because inadequate reclamation was provided. It is also important that the impacts on the local communities (economics) are adequately planned to minimize the effects of the project on the local community infrastructure after the operation is completed.

ENVIRONMENTAL CHANGES

PHYSICAL ENVIRONMENT

Soils/Geophysical

Surface soil erosion, sedimentation and all the subsequent effects that result from these phenomena have become important issues in central Idaho. The visual, water quality and fishery resource impacts that arise as a result of accelerated erosion are well documented in the Salmon and Payette River drainages. Many problems that have been associated with soil stability in these areas were the results of past logging activities, particularly road construction. However, mining can create similar conditions which can result in increased erosion if adequate management constraints and/or mitigation are not implemented.

Two categories of construction-related soils stability problems have been identified for the areas: 1) surface erosion; and 2) mass failure (Megahan 1972). Surface erosion, according to Megahan, is controlled by three factors. These include detachability of soil particle, the forces applied to these particles, and the protective surface cover. Detachability is the ease with which soil particles can be detached from the substrate, and is an inherent characteristic of any particular

soil. Force applied is the strength or potential of the forces of transfer (i.e., wind, water, etc.). Surface cover refers to the material that protects the surface from these forces (vegetation, rocks, etc.). Mass failure occurs when larger masses of earth material (soil, rock, debris, etc.) are cohesively transported by gravity from one place to another. Mass failure and/or landslides of roads, high embankments and fill areas is most common, but steep gradient hillsides under sufficient hydrostatic pressure such as rain on snow can be subject to mass failure. The major potential areas for surface erosion and mass failure resulting from the proposed project and the alternatives are the two mine areas, (Garnet Creek and West End Canyon), the haul roads, the leach pad site, and the existing tailing area.

An independent geotechnical evaluation (NTL 1979) of the proposed mine areas concluded that the sites are stable, even though the slopes at both areas are steep. This stability is due primarily to the competent, durable nature of the rock. The thin soil cover and the stability of the base rock make the Stibnite area generally more sound and less susceptible to erosion than much of the surrounding area of the South Fork Salmon River Drainage, which has been the subject of many years of research related to sedimentation and geotechnical stability.

In total, approximately 140 - 190 acres of land (including roads, mines and processing sites) would be disturbed to some extent if a project involving both Garnet Creek and West End Canyon where implemented, regardless of the alternatives selected. Figure 26 presents the expected annual increase in sediment/erosion resulting from mining at the West End and Garnet Creek deposits, assuming that the total surface area is disturbed at one time.

Sediment yields were calculated following the methodology presented by Rosquist (1980) for the Lolo National Forest, based upon research by Megahan (1972; 1975) and Anderson (1969; 1975). These calculations are considered to be conservative and represent "worst case" situations.

Based upon the Forest Service information used to calculate sediment yields, sediment production projected from mining the Garnet Creek and West End deposits appears to be minimal. The potential for significant mass failure within the mines themselves is low, due to the characteristics of the rock structure and the type of mining anticipated (bench cuts).

Figure 27 shows the expected increased sediment yield from the various haul road options considered. The first three years following surface disturbance have been shown to have the greatest potential for sediment production resulting from a combination of erosion and mass failure (Megahan, 1974). The effects on soil and the potential for increased erosion and mass failure are relatively equal for all of the haul road options considered for the mining sites. Erosion and mass failure hazards within the project area are generally low compared to the surrounding batholithic soils of the Payette and Boise National Forests.

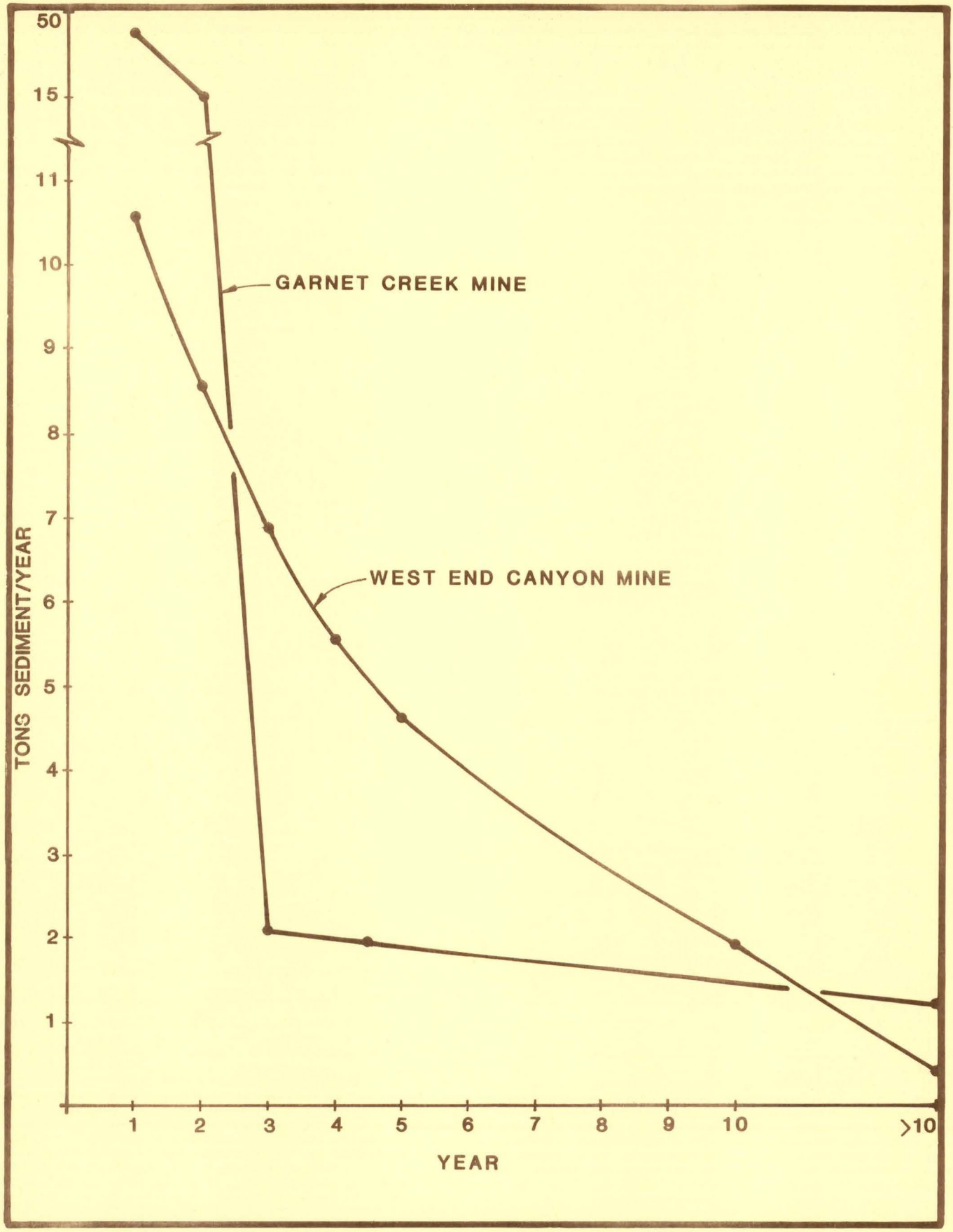

FIGURE 26 ANNUAL SEDIMENT/EROSION INCREASE RESULTING FROM WEST END CANYON AND GARNET CREEK MINE SITES

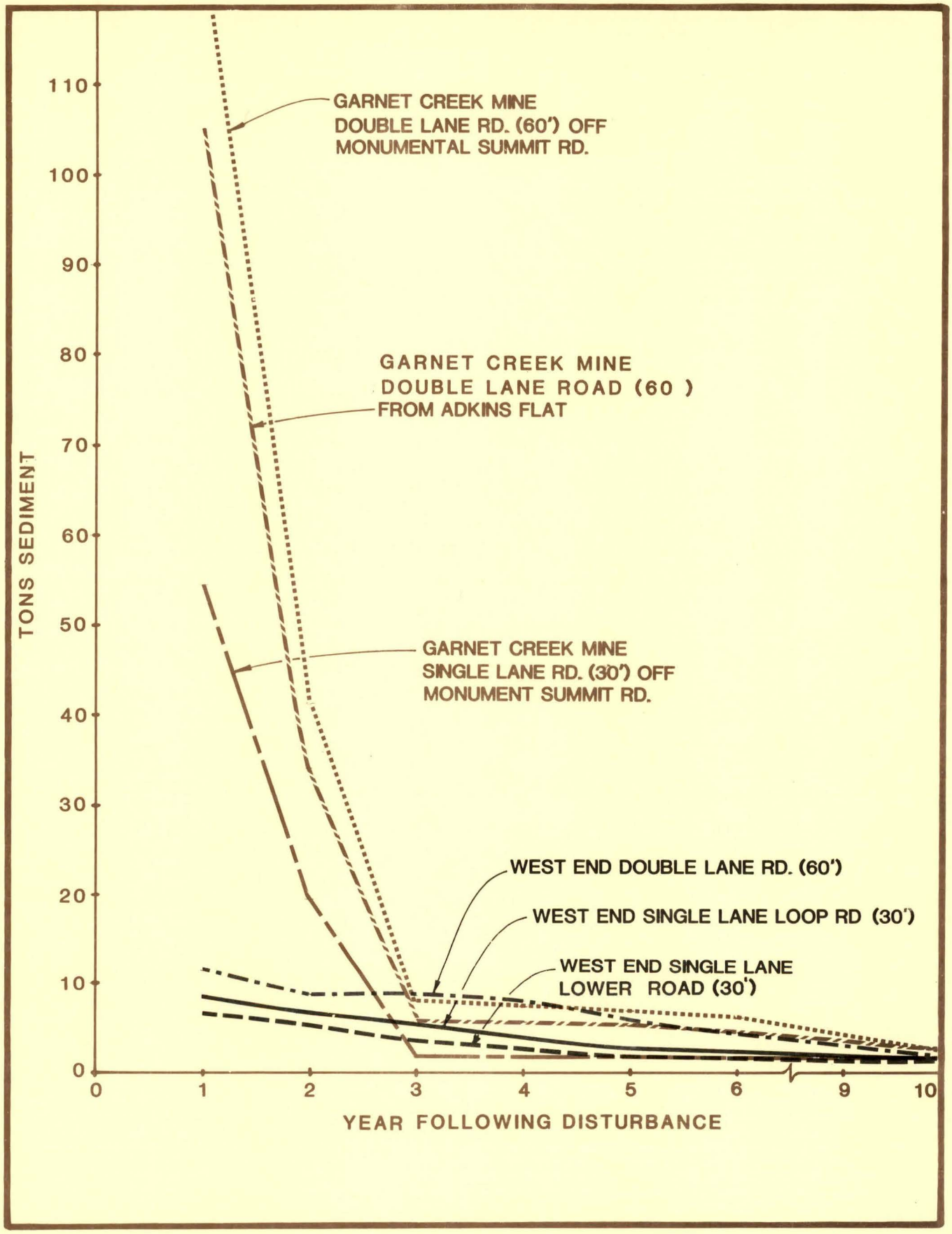

FIGURE 27
ANNUAL SEDIMENT/EROSION INCREASE
AS A RESULT OF ALTERNATIVE HAUL ROADS

The higher rates projected for the Garnet Creek Mine road are a result of the estimate that approximately 25 percent of the road will pass through areas of granitic outcroppings. Rosquist (1980) estimated that in granitics the sediment yield is over 200 times that of durable rock types. These estimates all assume that a very high standard of road construction will be utilized, as described in Chapter 4.

Based upon the magnitude of the increased sediment yields presented in Figures 26 and 27, erosion impacts resulting from any of the mining and road construction activities for any of the alternatives do not appear to be significant. Erosion impacts resulting from minor road improvement work on the access road from Yellow Pine to Stibnite would also be minor, provided adequate management constraints are implemented. There are several areas of road that will need to be widened. Most notable of these are short sections near Salt Creek which total approximately 1.5 miles. It was assumed that the Forest Service requirements for road construction and their review and approval process will adequately insure that this work will be completed with limited effects on local water quality.

Alternative 1 would have the greatest effects on soils and erosion potential, due to the 60-foot width of the haul roads and the larger amount of disturbed area construction would require. Even though the side slopes in the affected area are steep, the thin soil cover and durability of the underlying rock should minimize the overall erosion hazard in comparison to the batholith soils found in other areas of the Boise and Payette Forests (NTL, 1979). The proposed road alignment passes through a short section talus slope which, given the 60-foot width, could effect its long-term stability. The processing site for this alternative is relatively flat, but would require extensive grading and removal of most of the existing vegetation to provide adequate room for ore storage and processing. Soils at the Adkin's Flat processing site have been disturbed by past mining, but are generally stable to moderately stable and well-drained. The ore disposal site, as proposed under this alternative, would require extensive work to stabilize the existing tailing pile from continuing erosion and potential mass failure. This would involve rerouting Meadow Creek and draining the Meadow Creek Pond. Once these modifications have been completed and a reclamation plan is developed for interim and final stabilization of the area, the existing erosion problem associated with the tailing area (estimated at 500 tons annually) could be significantly improved (estimated 70 percent reduction in erosion).

Under Alternative 2, no change from the existing soils or geotechnical conditions would be expected. The erosion impacts of the existing exploration roads would decrease with time, and any soil-related impacts from the pilot plant or other CSM activities would be minor. Unless the Forest Service took independent action to correct the existing erosion problem at the tailing pile, there is no indication that erosion and material losses observed over the last 26 years would decrease. It is probable that the average annual sediment loss from

the tailing area would either remain at the estimated 500 tons a year level, or could substantially increase if the structure were to become more unstable and fail during seismic activity (NTL 1979).

Soils and geological impacts for Alternative 3 would be very similar to Alternative 1, except that the overall erosion impacts of the haul road under this option would be less. The narrower West End Mine (30-ft. wide) loop road system proposed under this alternative is over twice as long as Alternative 1, but the overall surface area disturbed is approximately 20 percent less than the two-way, lower road option. The West End road alignment under the option crosses no identified faults, and would be constructed in what has been described as durable consolidated rock. The proposed Garnet Creek road would have restricted traffic due to the single lane one-way configuration. Except for some localized granitic outcroppings (estimated at 25 percent of the total disturbed area), the soil and underlying geology is similar to the West End area. Both the crushing and stockpiling area (Adkin's Flat) and the processing site (Meadow Creek Landing Field) are relatively flat and have been disturbed by previous activities. Vegetation in the operating areas is sparse. Given the mitigation and management constraints detailed in Chapter 4, the impacts on soil/erosion and underlying geology should be minimal.

The only major differences between Alternative 4 and Alternative 3 are the locations of the storage and processing facilities, and the disposal site for processed ore. Under this alternative, processed ore would be placed in thin lifts within the available narrow valleys of the main canyon and end-dumped down suitable hillsides. This material would then be contoured and reclaimed to as near a natural state as possible. More significant soil and water quality-related impacts would be expected to occur if a number of diverse sites were utilized over the project life of the mine. If all the waste ore is confined to a single disposal location (i.e. Alternative 3), then it is easier and more effective to monitor and manage waste dump stabilization, and reclamation of the site on a continuous basis. If the ore disposal sites are not contained and are generally scattered over several areas (as the option proposes), then the potential for geotechnical failure and increased sediment/ erosion loss via runoff is much greater. Stabilization and final reclamation of the existing tailing pile will be much more difficult under this alternative due to the utilization of the pile for both the leach plant facility and Garnet Creek waste dump. Long-term stockpiling of waste ore would be required to provide sufficient material for stabilization of the pile and long-term regeneration of plan growth.

Alternatives 5 and 3 are similar except that under Alternative 5 all mine waste material would be hauled to the tailing pile for disposal. This option would eliminate the need for any sidehill waste dump, and would reduce the potential for mass failure and increased erosion in West End Canyon. Since the West End waste material is comprised primarily of cohesive rock, the proposed waste dump would not present

major problems from a stability standpoint if properly engineered and constructed (NTL, 1979). It would be necessary to increase the amount of hauling or extend the overall mine life if this alternative were implemented. Based upon recent ore reserve figures presented by CSM, an additional 2.2 million cubic yards of material would have to be transported from the West End Canyon to the existing tailing pile. This would increase the total volume of the ore disposed at the tailing area to over 4 million cubic yards, and would require construction of a dump retainment structure approximately 60 feet high to contain the waste and processed ore within the available 75-acre area (Figure 19). A disposal site this large would be more difficult to design and stabilize, and would increase the overall potential for erosion during the 10-year operational life of the project.

The soils and geotechnical impacts of Alternative 6 would be similar to those of Alternatives 5 and 3. A reduced West End dump would be constructed to contain a portion of the waste material generated from the mine. The remainder of the waste material would be disposed of at either the Meadow Creek site or at another undefined site (possibly Midnight Canyon or a smaller canyon east of West End Canyon). The main advantage of this option is that it would reduce the overall size of the West End disposal site, thus reducing surface disturbance and waste dump failure potential. When the initial dump site was exhausted, it could be reclaimed and the next site would be developed and utilized. Since the slopes within West End Canyon are steep (20 to 30 percent), Alternative 6 would relieve some of the concern connected with building a single large structure (i.e. West End waste dump presented in the preliminary operating plan). However, the alternative could eventually require the construction of several additional dump sites. The alternative would also require development of additional haul roads to serve the dump sites.

Air Resources

As previously discussed in Chapter 2, the proposed mining and processing areas, waste dumps, haul roads, and related facilities are located in a canyon with nearby elevated terrain features. The project site is remote, with no other industrial development in the area. Therefore, only the direct effects of the potential increases in total suspended particulate (TSP) associated with the proposed mining activities are addressed in this evaluation. Secondary effects of the proposed action and alternatives on local air resources were not considered significant, due to the small level of traffic increase between Yellow Pine and Stibnite associated with the mining activities.

Emission calculations that were prepared for the proposed project as an element of the Prevention of Significant Deterioration (PSD) applicability determination, indicate that approximately 240 pounds of TSP per hour, or 273 tons per year, would be generated by the operation (Table 19). The major sources are the crusher (100 t/yr), and haul road traffic (109 t/yr). It is estimated that approximately 400,000 tons of

ore will be mined and transported to the mill for crushing and processing each year. Approximately 525,000 tons of waste will be hauled to the waste dumps. The crusher and haul road traffic account for approximately 87 percent of the total uncontrolled TSP emissions.

The annual controlled TSP emissions were also calculated utilizing EPA-approved control technology and source control efficiency estimates. Based on these calculations, (which are also presented in Table 19), the controlled annual TSP emissions for the proposed project are estimated at 68.58 pounds per hour, or 64.36 tons per year. The methods that will be used to control TSP emissions include the use of dynamic scrubbers for dust suppression at the crusher which will process an estimated 400,000 tons of ore per year, and road watering and spraying at the processing site and dump areas.

TABLE 19
CALCULATED TOTAL SUSPENDED PARTICULATE
EMISSION SUMMARY FOR THE PROPOSED STIBNITE MINING PROJECT

		Uncontrolled		Controlled	
	Item	tons/yr	lbs/hr	tons/yr	lbs/hr
1.	Crusher	100	83.33	5	4.17
2.	Power Plant				
	300 kw (24 hrs)	1.6	0.88		
	600 kw (16 hrs)	2.1	1.77		
3.	Overburden and				
	Ore Removal	19.20	15.97		
4.	Blasting/Drilling	0.6	1.0		
5.	Wind Erosion-Site	27.50	6.28		
6.	Dumping-Mill	0.40	0.09	0.12	0.03
7.	Dumping-Dump	0.80	0.18	0.40	0.09
8.	Haul Road Maintenance	8.30	13.81	4.14	6.91
9.	Hauling Road Traffic				
	Hauling Ore	36.00	30.00	18.00	15.00
	Hauling Waste	18.00	15.00	9.00	17.50
	Hauling Tailing	27.00	22.50	13.50	11.25
	Water Truck	28.40	47.25	14.20	23.63
10.	Diesel and Gasoline				
	Exhaust	2.90	2.35		
	TOTAL	272.78	240.41	64.36	68.58

Annual-average and maximum 24-hour concentrations for TSP were also calculated for the proposed project. These values did not exceed secondary state and federal standards under controlled conditions.

It should be emphasized that any increases in TSP concentrations associated with the proposed project would be localized. This is primarily due to relatively low wind speeds which are characteristic of the area. Maximum predicted TSP concentrations would occur close to the associated activities generating the dust.

It should also be noted that the proposed project involves reclamation of the existing tailing area, utilizing waste material from Garnet Creek and the processed waste ore from the leaching operation. The tailing pile is a major existing source of wind-blown particulates in the study area. While the precise level of TSP reduction is impossible to calculate due to unpredictable meteorological conditions, the expected reduction can be generally categorized as significant.

The "no-project" alternative (Alternative 2) would create no increases in ambient TSP concentrations above those identified in the background monitoring study conducted during September and October, 1979. Major existing TSP sources include vehicular and windblown dust. The results of the monitoring program did not demonstrate any violations in federal or State of Idaho Primary or Secondary Air Quality Standards. However, under the "no-project" alternative, no improvement would be realized in ambient air quality conditions since the option does not involve reclamation of the existing tailing disposal area.

The only significant variation in effects on local air resources which could occur for the four other "action" alternatives would involve the generation of varying amounts of TSP associated with different mileages of haul roads. Haul road distances for the alternative alignments were presented in Table 16. From this information, it can be seen that, except for Alternative 1, all the alternatives are fairly similar in terms of hauling distance. Alternative 5 would require more total vehicle road miles (all waste rock, including that from West End, would be hauled to the existing tailing area), and increased road maintenance and use. This alternative would also be more conducive to TSP generation primarily because of the increased road use and the total miles traveled each operating season. However, since haul roads would be watered to mitigate the generation of TSP and the dump area would be sprayed for fugitive dust control, the effects on local air quality would be very similar for all the action alternatives.

One potential adverse impact of the project, which is similar for all alternatives except the no-action option, is visibility degradation. The seriousness of this would depend on particle size. Past studies have shown that particle sizes generated by mining activities are large (greater than 1mm in diameter) and subject to rapid fallout. Based upon other mining studies and local meteorological conditions, only limited and localized visibility degradation is expected to occur. This potential degradation would also be largely mitigated by watering and other management constraints and mitigation described earlier in Chapter 4. The Environmental Protection Agency (EPA) is presently working on development of a visibility standard. Discussions with EPA personnel, however, indicate that these standards will not be implemented for at least five years. Additional actions by the Forest Service and CSM related to the Stibnite project would be defined at that time.

It can be concluded that, within the accuracy of the preliminary calculations and air emissions summary, the Stibnite mining project alternatives will not cause ambient pollutant levels in excess of federal and state air quality standards provided the management constraints, guidelines and mitigation described in Chapter 4 are applied. These relate primarily to dust abatement on unpaved access roads, construction and excavation activities, and haul roads.

Surface Water Resources

The effects of the proposed mining project on the surface water and quality of the South Fork of the Salmon River drainage are primarily related to increased erosion and sedimentation caused by surface disturbance associated with mining and road construction activities, and potential spills of hazardous chemicals. Estimates of these effects are based on the results of best available research.

Provided that all the mitigation and management constraints (Best Management Practices) identified in Chapter 4 are incorporated in the operating plan, the potential direct and indirect water quality impacts of all the action alternatives would be very similar. Specific areas of water quality concern include sediment production from roads and dump areas, heavy metal contamination, cyanide spills or discharge, and maintenance of flow requirements for fish propagation.

Except for the "no-project" alternative, all of the options would divert the same quantity of water for ore processing. The major potential impact of decreased flow would be a decrease in available aquatic habitat. As presently envisioned, the leaching (gold extraction) process would require a maximum sustained flow of approximately 1.2 cfs, diverted 8 to 10 times (over a 24-hour period) during each operating season for saturation of each ore pile. Analysis of the data prepared by the U.S. Department of Interior - Fish and Wildlife Service, Cooperative Fishery Research Unit, using the Instream Flow (IFG) Incremental Methodology indicates that the most significant effect of these sustained withdrawals would occur in the area between the abandoned mill site and the Yellow Pine Mine Pit ("Glory Hole"). The only area where reduction in usable habitat was calculated to be significant was in the EFSF Salmon River between the old mill site and Sugar Creek during periods of historic low flow. Habitat for juvenile and adult cutthroat could theoretically be reduced by approximately 18 and 33 percent, respectively. This reduction in usable habitat could be largely mitigated by extending withdrawl scheduling during periods of extreme low flow.

Analyses of the other sites for which IFG Methodology data is available did not indicate additional areas of potential significant impact. For example, the main stem of the EFSF of the Salmon below its confluence with Sugar Creek would remain as a suitable habitat for summer Chinook Salmon incubation because the total flow reduction during historic low flow is less than four percent as a result of the proposed 1.2 cfs diversions.

Water quality sampling (JMM 1978) showed that instream concentrations of arsenic and mercury were higher within the Stibnite drainage than those generally associated with other streams in the central Idaho area. This is attributed to the natural mineral composition of the area and, to some extent, earlier mining activities which exposed unoxidized ore to the effects of the environment (e.g. the Yellow Pine Mine Pit). The deposition of saturated unoxidized tailing in the upper reaches of Meadow Creek has also contributed to this problem. The elevated concentration of arsenic found in fish tissue in the area attests to the availability of this element in the food chain. Since none of the alternatives proposed would mine the arsenic/sulfide ores, it is not anticipated that an increase in the existing heavy metal concentration of the drainage would occur. The rerouting of Meadow Creek and the stabilization of the existing tailing pile, as proposed in several of the alternatives (Alternatives 1,3,5 and 6), should limit to some extent the leaching of these metals which may be occuring at the tailing deposit. Stabilization could have a positive long-term effect in reducing arsenic concentrations in the drainage.

While the potential for a cyanide discharge or spill is remote, it will always exist. Transportation of bulk sodium cyanide will be via the main access route from Cascade through Yellow Pine to Stibnite. This route generally follows Johnson Creek from Landmark to Yellow Pine. Hauling of the bulk cyanide will be contracted by the mining company to a commercial trucking firm licensed to handle this type of material. If an accident were to occur and concentrated sodium cyanide was discharged into one of the streams, a fish kill would likely result. The severity of such a catastrophe would depend upon the amount of material released, the stream affected, the time of year, and the point of entry. Since cyanide is an extremely reactive chemical, it does not remain in an active form in the environment for extended periods of time and it does not display cumulative characteristics in biological organisms (McKee and Wolf, 1973). The impact of a spill would be immediate, and would not exhibit any direct long term or residual effects except for the localized reduction in the population of aquatic organisms. According to fishery resource specialists, the "worst case" situation for a cyanide spill in the drainage would occur if the spill took place immediately upstream from a congregation of migrating Chinook. Elimination of even a few adult Chinook in the South Fork Salmon River system could have a long-term effect on the viability of the stock, since it is already in a depleted condition due to overfishing and man-made obstructions to natural migration. Hauling cyanide during high-flow periods would largely mitigate the potential adverse effect of a spill.

A cyanide discharge from the processing facility is unlikely. Solution ponds and leach pads will be tested each year for leakage before they are put into operation in the spring. The system will also be monitored continuously for changes in pH which would indicate potential spills. Drainage facilities and the internal stormwater holding capacity will be sized to meet the projected 100-year storm. Suf-

ficient hypochlorite will be available on site to completely neutralize the cyanide process solution, should it become necessary. Under the Clean Water Act of 1977, the company will also be required to prepare a Spill Prevention Control Countermeasure Plan for the project. Since cyanide reacts very rapidly in the environment, and none of the drainage immediately affected serves as a public water supply, the potential for impacting public health from a spill or discharge is extremely minimal.

The potential for generating sediment and the impact of sedimentation on water quality and aquatic life are major concerns with regard to mining and other nonpoint source activities in Central Idaho. Sediment can be divided into two categories; suspended and bedload. Suspended sediment is that material which is carried in the water and can be gravimetrically measured as suspended solids. Bedload sediment is that material which is hydraulically transported through a stream channel, and may or may not be measured as suspended solids. Bedload sediment is much more difficult to quantify and discretely define, but according to most fishery biologists it plays a more significant role in impacting the quality of the aquatic habitat. Fine bedload sediment (less than 6.35 mm) accumulations have been shown to have a detrimental impact on both insects and fish in central Idaho streams (Bjornn et al, 1977). McCuddin (1977) showed an approximate 25 percent reduction in salmon fry emergence (hatching and early development) when the fine sediment accumulation increased from 30 to 40 percent. The ability to accurately measure and monitor bedload sediment is a question of some controversy, and the various parameters that have been measured to assess bedload impact (percent of fine sediment in core samples, depth of buildup, etc.) are not easily related. Bjornn, et al (1977), states that a 30 percent fine sediment concentration in a stream core sample corresponded to a two-thirds to fully embedded section of a stream bottom on a particular stream segment. However, in Bjornn's example the predominant bottom material was gravel and pebbles, while core sample data from the EFSF of the Salmon River below Stibnite indicates that the bottom substrate is made up of much larger material. A correlation from one location to another is very unreliable for this type of information.

Because of the steep gradient and high stream scouring velocities immediately below the proposed milling and mining operation, it is doubtful that any change in local stream bottom habitat conditions resulting from the operation could be measured in the immediate project area. The effects of any mining-related sediment production downstream in the main channel of the EFSF of the Salmon River would depend on the rate of introduction. Given the type of operation proposed (the limited area of mining, the available geotechnical management practices, relatively thin soil cover and the stability of the underlying rock), little increase in bedload sediment would be expected as a result of the project. Figures 19 and 20 presented earlier provide calculations for the projected erosion and increase in sediment production for the various alternative haul roads and the two mine areas.

The major proposed new haul roads for all the alternatives will not be located immediately adjacent to any streams. Anderson (1954) showed that roads constructed on slopes or ridges away from stream channels have a lower potential for generating sediment (average of one-half) than streamside roads. Side casting of road material on the steeper slopes (50 percent or greater) has the potential to greatly accelerate the erosion rate. In areas where fill cannot be safely placed, full bench construction of roads will be necessary and cut material will need to be end-hauled to either the existing tailing disposal area or a suitable mine waste disposal site for placement and reclamation. An estimated 800,000 cubic yards of cut material would be end-hauled if the CSM preliminary West End Mine road alignment were utilized. The Forest Service specialists have determined that, based on the slopes involved, soil types and the morphology of the area, the road cut materials will gradually be carried down the drainage and result in an accelerated long-term increase of sediment (suspended and bedload) in the Salmon River drainage unless the road cut materials are carefully placed and restabilized. Road construction constraints and management guidelines are described earlier in Chapter 4.

As previously discussed in Chapter 2, the existing tailing area above the old mill site has discharged approximately 10,000 tons of very fine sand and silty material (0.05-6.5 mm) since 1953. This material is highly erodible, as evidenced by the erosion gullies in the pile and observations of blowing fines moving across the surface of the pile. The opinion of both the Forest Service and JMM is that these erosion problems could be improved by stabilizing in the tailing pile. If it is assumed that a uniform erosion rate from the tailing pile has occured over the 27 years of photographic evidence, then approximately 500 tons of sediment have been generated each year. The annual volume of sediment currently generated by the area would be substantially reduced if stabilization measures were introduced as part of CSM's operating plan. If the project is implemented as proposed, it has been estimated that 70-75 percent of the current erosion from the existing tailing pile could be eliminated. Meadow Creek would be rechanneled south of the existing tailing pile and the pond would be drained and stabilized for eventual reclamation at the termination of the project. The net sediment production from the entire mine-impacted area would be less than than that currently produced by the existing tailing area following stabilization of the existing material.

Table 20 presents the calculated first year delivered sediment following stabilization. Alternative 1 (the proposal presented by CSM in the initial "Notice of Intent to Operate") would cause the greatest amount of surface disruption because of the construction of two high-standard, 60-foot-wide roads, for both the West End and Garnet Creek Mine haul roads. While the result of the first year sediment production is relativly low (200 tons), it is greater than any of the single lane, 30-foot-wide alternatives.

TABLE 20
ESTIMATED TOTAL FIRST YEAR CHANGE IN SEDIMENT[1]

Alternative	Estimated Existing Sediment Production (Ton/Year)	Estimated Sediment Production of Alternatives (Ton/Year)	Percent Total Change In Sediment Production Of The Alternatives	
1	2,000	198	9[2]	-8[3]
2	2,000	0	0	0
3	2,000	131	7	-11
4	2,000	131	7	-11
5	2,000	131	7	-11
6	2,000	131	7	-11

1 Mined area disturbance treated as first year road construction
2 Without correcting existing tailing erosion
3 Correcting 70% of calculated loss from existing tailing pile (Project proposed by CSM)
NOTE: Affected drainage estimated at 9000 acres.

The Garnet Creek waste dump area could also be a potentially high source of sediment production and water quality degradation. Safe, on-site disposal of waste from the Garnet Creek deposit will be difficult without creating foundation stability problems due to the steepness of the canyon and the unpredictable nature of the runoff patterns. Any filling of the natural channel of Garnet Creek, regardless of the engineering and construction precautions taken, will increase the probable flooding and mass failure potential and sedimentation problems.

If the waste rock in Garnet Creek were dumped near the mine site, it would also be necessary to locate an alternative source of material to stabilize the existing tailings impoundment. It is projected that stabilizing the existing tailing pile would improve water quality by reducing the sediment/suspended solids in Meadow Creek and ultimately the EFSF Salmon River. Therefore, this alternative was judged to have a higher probability of potential adverse water quality impacts than those involving no waste dump near the mine. .

Alternative 2, "no project," would maintain the existing conditions in the area. No additional roads would be constructed, and the sediment production potential of the existing roads would gradually decline to a near natural baseline level. The amount of suspended solids introduced by the abandoned tailings into the Meadow Creek would continue at a rate similar to that which has occurred in the past. The potential for water quality degradation or any hazardous waste (cyanide, fuel, oil, etc.) spills would be eliminated if further mining development failed to occur, or was delayed for the foreseeable future.

With Alternative 3, the potential impacts on water quality from sedimentation would be less than with Alternative 1. This is primarily due to the reduced amount of surface area disruptions resulting from the construction of the narrower, 30-foot-wide roads. All the waste rock from the Garnet Creek Mine would be removed and hauled to the

existing tailing pile and utilized in constructing a stabilizing berm across the toe of the existing waste ore body.

The water quality impacts of Alternative 4 would be similar to those for Alternative 3 except that the potential for sedimentation would be somewhat higher if the waste ore were disposed of as valley fill and end dumped on the surrounding hillsides. Because of the limited availability of flat valley area, most material would end up in hillside dumps which are difficult to stabilize. The potential for generating a significant increase in sediment is quite high because of the small size of the crushed and graded ore and the steepness of the available dump areas (30-50 percent grades). The unstabilized hillside dump areas could have a long-term impact on water quality, and would also prove more difficult to reclaim than the single existing tailing pile.

Effects on water quality for Alternatives 5 and 6 would be essentially the same as Alternative 3. It may eventually prove necessary to resort to the West End Mine waste dump option proposed in Alternative 6 (a reduced West End Canyon dump with limited valley fill and hillside disposal) if in subsequent years the amount of waste ore proves to be more than can be disposed of at a single site. If this were to occur, the proposed reclamation plan and management constraints would need to be modified. It is difficult to presently predict the precise waste ore production based on the existing geostatistical analyses. If, during the mine life, the price of gold increases substantially above the level used to prepare the Company's economic evaluation, then the cutoff grade of the recoverable gold reserves could be lowered and the waste ore production would increase.

In summary, the impacts of the project alternatives on the surface water of the Stibnite area are primarily a function of the increased potential for generating sediment. While the actual calculated volume of sediment is low in comparison to what would be expected in other areas in the Payette/ Boise National Forests, some short-term acceleration in sediment production is an unavoidable effect of this type of project. Increased sedimentation resulting from road construction and mine operation would continue throughout the life of the project, but could be offset by a reduction in sediment from the existing tailing pile.

Groundwater Resources

The potential for significant groundwater degradation resulting from the implementation of the proposed project (Alternative 1) and the identified action alternatives is minimal. No direct groundwater withdrawals for processing are currently envisioned. An estimated 10,000 gallons per day would be diverted from springs for domestic use at the housing complex. This impact is considered insignificant, and would only occur during the five to six month operational period.

Since only approximately 140-190 total acres of surface area will be disturbed by the project (the actual mine areas involve less than 47 acres), no major impacts on aquifer recharge would be expected. In order to meet State of Idaho Water Quality Standards, the leach pads and holding pond will be designed and maintained as a totally contained, no discharge system. Groundwater contamination from cyanide would be very unlikely even if a small amount of cyanide solution were to infiltrate through the leach pads. As previously discussed in this document, cyanide reacts very rapidly with many naturally occurring inorganic compounds and biological materials in the soil mantle. Any minor spill or discharge of free cyanide would be complexed within the first two or three feet of earth and rock and be rendered inactive.

The results of drill hole sampling at the West End mine site during the summer of 1978 indicated that groundwater only occurred below the 6700 foot level. Under the current mine plan proposed by CSM for mining the West End deposit, the lowest portion of the mine pit excavation was at approximately 6750 feet. Any groundwater collected would have to be removed by either pumping it to a settling pond or utilizing it in water trucks for dust control at the upper mine site and haul roads. The final operating plan will include provisions for maintaining and cleaning of settling ponds, and leaving natural buffers between the mine areas and local surface water systems. If unexpected mine dewatering problems were encountered due to changes in groundwater occurrence, movement or unexpected increases in flow, the mining plan may need to be modified.

Groundwater quality samples taken in the West End Mine area in 1978 (Table 5) indicate that the chemical makeup of the well water is different than that of West End Creek (Table 4). Hardness was almost twice as high at the mine site and arsenic levels averaged nearly ten times higher. If significant volumes of groundwater are intercepted in the latter phases of mining the lower areas, this water would have to be isolated from the West End drainage by controlled spray disposal outside the mine area.

Alternatives 1, 3, 4, and, to a lesser degree, 6 will need to include provisions in the early planning phases of the project to allow for passage of spring flows beneath or through the fill material at the West End Canyon waste dump. Fill material must be selectively placed with larger graded rock comprising the bottom of fills to ensure free passage of water. Potential spring flow problems may also require the installation of an engineered underdrain system to allow passage of the maximum quantity of water anticipated beneath or through the fill. Design criteria for the proposed waste dump facility will be presented in the final Operating Plan.

All of the action alternatives would involve partial or complete draining of Meadow Creek Pond and dewatering of the existing tailing pile to relieve the liquefaction potential which currently exists. This would also help in reducing the potential for leaching of heavy metals and

other toxic substances into the groundwater and surface water systems down gradient from the tailing area.

The no-action option (Alternative 2) would not have any effects on existing groundwater systems in the study area. No mining or cyanide leaching would be conducted under the alternative.

BIOLOGICAL ENVIRONMENT

Plant Communities

Vegetative cover plays an extremely important role in controlling erosion. Vegetation shields the soil surface from the impact of falling rain, slows the velocity of runoff, maintains the soil's capacity to absorb water, and holds particles in place. Paying special attention to maintaining existing vegetative cover on areas of high erosion potential, such as the steep slopes and drainageways involved in the West End and Garnet Creek mine areas, is particularly important in the proposed Stibnite mining project.

Baseline information on plant communities in the study area indicates the primary species which would be progressively removed from the 47 acres that make up the West End and Garnet Creek mine sites are lodgepole pine, white bark pine, and Douglas fir. Dominant understory which would be similarly affected include elk sedge and two species of whortleberry at West End Canyon, and spiny spirea and snowbush at the Garnet Creek site.

Revegetation of the steep West End mine area is expected to be a long-term program, and may involve ripping, surface treatment and grooming, and seeding by hand. Mechanized planting involving the use of a steep-sloped planter may also be utilized. Grooming is expected to reduce topsoil requirements. It is also expected that the efforts will involve transplanting nursery-grown native stocks. Costs for these stocks are estimated at $50 per 1000 plants, plus $0.10 per tree planting costs. This will require that a seed supply from indigenous native stocks, which have adapted to the area, be collected for use in the revegetation program. Recommended grasses for use in replanting in the open areas are smooth brome, intermediate wheat grass, and mountain brome. Shrub species include shiny leaf spiraea, and mountain snowberry. Lodgepole and limber pine transplants collected from higher elevations should also be included in the reclamation program, with grass mixtures involving meadow foxtail and willow planted in the wetter canyon draws.

All of the alternatives, with the exception of Alternatives 2 and 5, involve construction of a waste dump in West End Canyon. The proposed 26-acre West End Canyon waste dump would include alternative drainage facilities to route groundwater beneath or through the fill. This dewatering of drainage areas could cause come changes in the composition of the remaining vegetation in the immediate dump area. Useable

timber at the proposed mine sites and waste dump would be sold and contract logged. Dewatering at the Garnet Creek site may also result in minor changes in vegetation in the area. However, permanent reclamation efforts at Garnet Creek are expected to begin immediately after mining activities have ceased (approximately two years after project initiation) to help control surface erosion. Standard measures developed for the South Fork of the Salmon River (i.e., seeding, straw mulching, etc), which reduce the time excavated areas are left exposed, will be used to control erosion and sedimentation (Monson & Plummer, 1978; Megahan, 1972). These procedures, which will be developed as "best management practices" will be included in the final Operating Plan submitted by CSM to the Forest Service following selection of the preferred alternative.

Alternative 5 would result in the least disturbance to existing vegetation. Under this proposal, 26 acres of heavily wooded area in West End Canyon proposed for a mine waste dump would not be disturbed. All of the waste from the West End Mine would be hauled to the tailing pile for disposal. The leach pads and most of the processing facilities would be located at the Meadow Creek Landing Field. The landing field is without vegetation as a result of the previous use of the area. Due to lack of topsoil on the site, reclamation would require that a large amount of soil be hauled to the location when operations cease. This could also require temporary storage of overburden for reclamation/revegetation activities. Technically, the requirements of the Idaho Surface Mining Act are that planting on affected lands "shall result in vegetation comparable to the vegetation which was growing on the area occupied by the affected lands prior to exploration and surface mining activities." Details of the reclamation program necessary to meet the requirements of the Federal Land Policy Management Act will be described in the Operating Plan to be completed by CSM.

Road corridors will involve disturbances to both relatively steep-sloped areas (25-50 percent) near the West End and Garnet Creek mine areas, and the flatter areas (0-35 percent) near the existing tailing area and Adkin's Flat. Approximately seven miles of new and/or improved haul roads and service access will be required. Road construction will result in short-term unavoidable losses of vegetation from disturbance during clearing, road cutting, and use.

Management constraints and guidelines for road reclamation and revegetation are discussed in Chapter 4 and Appendix E of this document. Road cuts would be treated similar to the mine sites, utilizing a steep-sloped planter and hand seeding where necessary. Fills would be seeded in the fall using combined broadcast seeding and hydromulching methods. Some transplanting of nursery tree stock would be included in the program. Broadcast seeding costs are estimated at approximately $1.00 per pound of seed (30 pounds/ acre application rate), plus the cost of the seed gun operator. Hydromulching costs can be as high as $350 per acre, depending on water availability.

Alternative 1 would involve locating the leach pads and processing facilities in a 20-acre area just north of the Meadow Creek Landing Field at Adkin's Flat. Existing vegetation in the area is limited to native sedges and scattered lodgepole pine. Regeneration potential at the location is considered good.

The existing tailing pile and pond area, which has been proposed for use as a waste disposal area for processed ore from the leach plant and mine waste from Garnet Creek for Alternative 1,3,5 and 6, is essentially void of any vegetation. The proposal presented by CSM (Alternative 1) would involve reclamation of the area utilizing the processed ore and waste materials. Onsite and controlled greenhouse experiments conducted by the Intermountain Forest and Range Experiment Station indicate the tailing area could be effectively revegetated without providing a soil base over the top of the surface if the area is treated (mulching, fertilizing, barriers, etc.) during the period when seedlings are becoming established. Treatment would be required for control of physical movement of surface materials caused by wind and rainfall.

However, preliminary studies indicate that using treated waste ore as a base over the tailing materials and for site preparation (tilling, contour ripping, etc.) is the most feasible approach to reclamation of the tailing pile. Recommendations for treating the tailing pile involve treating the entire area initially to "tie-down" the abrasive action of the fine-grained material. This would also initially entail ripping to a depth of 30 to 40 inches to promote oxygen transfer, and applying of soluble forms of fertilizer during the first three to four years of new growth. Transplanting larger mature stocks would improve revegetation and reclamation. Similar treatment would be required for the other alternatives that propose to utilize the tailing pile as a waste dump.

The proposed housing site locations involve a flat area approximately two miles north of the landing field (lower Midnight Creek), or at one of three nearby alternate sites located in the area of the old recreation hall, Adkin's Flat or the old sawmill. The sites are sparsely vegetated with native sedges and lodgepole pine. The housing complex would be designed to minimize the amount of distrubance to existing vegetation in the area. Site planning would also involve additional landscaping provisions to be developed in the Operating Plan.

The "no-project" alternative (Alternative 2) would not have any direct adverse primary or secondary impacts on existing vegetation in the project area. Much of the project area has been significantly impacted by previous mining activities. Under this option, the existing tailing pile would not be reclaimed. Soil erosion and sedimentation losses to Meadow Creek from the tailing pile would be expected to continue at rates similar to those experienced in recent years, but there would be no losses of vegetation at the mine sites and related facilities.

No known plants listed as candidate species for the Threatened and Endangered Species List or the Sensitive Flora Checklist would be affected by the proposed project or alternatives.

Other potential effects on plant communities in the project area are indirect and are related to: increased potential for fire associated with additional human activity; risk of localized damage to vegetation associated with accidental spills of chlorine, sodium cyanide, and petroleum products used in the operation; and deposition of dust along the haul and access routes which may result in loss of vigor of roadside plants due to reduced light availability. These effects are unavoidable, but are not rated as significant.

Aquatic Habitat and Fish Resources

Many of the organisms making up the aquatic habitat of the EFSF Salmon River are extremely sensitive to changes in their environment. An activity that can affect temperature, available habitat, water quality, and productivity of the food chain will also affect the viability of the native fish population and biota. In analyzing the Stibnite area, two distinct types of fishery resources must be considered: the native trout population, and the anadromous salmonids. While the factors that impact one type will also generally affect the other, a number of subtle differences related to timing and critical or sensitive habitat also exist. For example, if a toxic chemical spill were to occur at the time of a spawning run, the anadromous fish population could be severely reduced for many years, given the already poor salmon returns Idaho has experienced since the development of the Columbia River dam projects. Likewise, if a major localized reduction in the streamflow were to occur during the later summer, the native trout population of the area could be severely impacted. This impact may be only short term if native fish from other drainages could be utilized to reestablish the area, or if a hatchery planting program were implemented.

Several factors that can affect the aquatic habitat have already been discussed. Water quality, stream flow and soil stabilization (sediment production) are closely related to the productivity of the EFSF Salmon River fish populations. These factors are not exclusive of one another and quite often have synergistic effects. An increase in sediment production and a reduction in flow may also affect temperature, which has a direct physical relationship to the availability of dissolved oxygen. It is difficult to separate a discussion of fishery resources and the resultant potential impacts on the aquatic habitat of the various aspects of the mining operation. The inter-relationships are each is critical. For these reasons this discussion frequently refers to information presented earlier under several other resource categories.

Of major importance in the Payette National Forest is the relationship between silt and fine sediment production and its impact on fish habitat. As discussed earlier under the Water Resources section, ex-

tensive research on the causes, impacts and long-term effects of fine bedload sediment has been conducted in the batholith soils of Central Idaho.

Due to the relatively small calculated increase in sediment production generated by any of the alternatives (Table 20) and the estimated 70 to 75 percent potential reduction in sediment associated with stabilization of the existing tailing pile, there will be a net yearly reduction in sediment with all the alternatives except Alternative 2 and, to a lesser extent, Alternative 4. Alternative 2 would not result in any changes in existing environmental conditions. Alternative 4 would utilize the tailing pile for a processing site which may make the area more difficult to stabilize.

No significant deterioration would occur in the condition of existing fish populations on the EFSF Salmon River from increased sediment production as a result of any of the mining alternatives, based upon the calculated reduction in sediment production presented in Table 20. However, it should be noted that: 1) the figures presented are only best estimates, 2) stabilization of the existing tailing pile is critical, 3) sediment production from the existing source is not uniform, and 4) the overall amount of new sediment generated by any of the alternatives is minor in comparison to what would be expected from Batholith soils; there would be the five action alternatives in fact would be expected to result in a net positive benefit to fish if the existing conditions (i.e. erosion at the tailing pile) do exert a detrimental effect on the resources as is presently theorized.

Alternative 1 provides for a waste dump in Garnet Creek Canyon. While Garnet Creek does not have a sustained fishery because of the variability of its flow and the steep nature of the terrain, a waste dump in the Canyon creates a potential hazard in the EFSF Salmon River in the event of a failure. A major waste dump failure could send thousands of tons of waste rock down the Garnet Creek drainage. Since approximately 25 percent of the material is composed of weathered granitics, an uncorrected failure of this type could, over the years, lead to substantial increases in sedimentation.

Alternative 2 (No-Action) will, as discussed, have no substantial effect on the existing aquatic habitat and fish in the drainage. The fishery will remain in essentially the same condition that has prevailed over the past 30 years. If the existing tailing pile were to fail in the event of seismic activity, an undetermined amount of material could be discharged into Meadow Creek and the EFSF Salmon River. If this were to occur and the pond behind the tailing pile were to cut a new channel through the dump, major damage to the existing aquatic habitat and fishery resources would be expected to occur in the area between the tailing pile and the old mine pit. The probability and/or effects of such an occurrance are impossible to predict. However, the study area is located in a Zone 2 seismic region, and substantial seismic activity has been recorded in the past.

Alternatives 3 and 4 would be expected to have similar impacts on the local aquatic biology. The effects are primarily related to the potential failure of the West End waste dump. A preliminary engineering study, based on geotechnical and foundations criteria, concluded that a stable waste dump could be successfully constructed in West End Canyon (NTL, 1979). However, it is impossible to precisely calculate the size and volume of the dump until the final operating plan is completed. The internal waste material is composed primarily of durable rock and would not be appreciably affected by weathering. Since West End Creek does not have an established fishery, the only significant hazards in terms of fishery resources would result from a complete waste dump failure which could reach Sugar Creek, or the leaching of toxic materials from the exposed mine areas. If the toe of the waste dump were located near the lowest elevation of the pit, there would be over 3000 feet of buffer between the waste dump and Sugar Creek. The further down the valley the dump extends, the greater the potential for interference with Sugar Creek and resultant impacts on fisheries in the event of a failure.

Both Alternatives 5 and 6 would reduce the potential impacts associated with West End waste dump failure. Under Alternative 5, all of the wasted material would be removed to the existing tailing pile. Alternative 6 would limit the ultimate size of the West End waste dump. The impacts of utilizing alternative dump site(s) would depend on the volume of material to be disposed of. If properly engineered and constructed, the impacts on fisheries would be minimal.

Wildlife

Major effects on wildlife from implementation of any of the action alternatives would be caused by increased human activity and recreational use, and not by direct displacement from key habitat. The commitment of approximately 190 total acres to mining and processing would not remove a significant amount of land from wildlife use or create any additional wildlife use pressure on adjacent areas. However all the alternatives except the "no action" option would bring additional people into the area. Additional people connected with the mine operation would quite likely increase local fishing and hunting pressures, poaching, and general habitat degradation. In addition, transportation to and from Stibnite and Yellow Pine and vehicle operation near the site would create increased noise and dust that could disturb established wildlife patterns and increase road kills.

Draining and filling of the impoundment behind the existing tailing pile may reduce available water fowl habitat, but migration use of the pond is infrequent and the area is not considered critical habitat for any species.

Contamination of surface water resulting from a spill of toxic chemicals, or an indirect increase in heavy metals concentration, could potentially impact local wildlife populations. While there are no

tailing ponds connected with the project and all the liquid process areas will be fenced, a chemical (i.e., cyanide, chlorine) spill or an increase in any other potentially harmful elements (i.e., arsenic, mercury) that could leach from the wastewater or tailing area could result in some loss of wildlife. Fencing and screening or netting of the solution ponds, while not completely eliminating the potential for rodents, small mammals, and birds from gaining access to the processing areas, will substantially reduce the occurence.

Under Alternative 2 ("No Action") no change in the existing wildlife habitat, species occurence, and numbers would be anticipated.

SOCIO-ECONOMIC (HUMAN) ENVIRONMENT

The evaluation of the socio-economic effects of the proposed Stibnite mining project and alternatives generally centered on the community of Yellow Pine, the proposed "new community" site at Stibnite, and Valley County. Because the mine areas, production schedule, project duration, necessary work force, and management constraints and guidelines for all of the alternatives are identical, the associated effects of implementing these alternatives are generally the same and are treated similarly in this discussion.

Major effects of the project will occur in the areas of population, employment, public utilities and services (primarily schools, transportation, and local water system improvement needs). These effects are qualified and quantified, where possible, in order to provide the reader with sufficient detail to understand which effects are direct, indirect, cummulative, beneficial or adverse. The No-Action Alternative is presented as a baseline against which effects or impacts of implementing the various action alternatives can be compared.

Local Land Use Changes Population and Economics

Direct changes in land use expected to result with implementation of the proposed project and action alternatives (Alternatives 1, 3, 4, 5 and 6) involve land disturbance associated with the stripping and mining of the 44-acre West End and three-acre Garnet Creek mine sites, and additional changes (in varying degrees) to other project-related land areas which will be used for mine waste and tailing disposal, the stockpile area, leach plant construction and operation, and the housing complex. Alternatives 1, 3, 4 and 6, will require essentially the same level of disturbance for construction of a 26-acre waste dump in West End Canyon. Similarly, these options would require a commitment of approximately 20 acres for stockpiling and processing of ore. Under Alternative 3, 5 and 6, the Adkin's Flat location would be used as a stockpile area. The area is relatively undisturbed, as opposed to the Meadow Creek Landing Field and tailing pile which would be used for locating these facilities under Alternative 4. Similarly, those options involving processed ore disposal at the existing tailing pile would result in less land disturbance than Alternatives 4 and 6 which involve varying degrees of valley fill and sidehill disposal.

All of the alternatives except the No-Action option involve some level of reclamation of the existing tailing pile, which currently presents a major environmental concern from the standpoint of erosion and sedimentation in Meadow Creek, and wind blown dust problems. The proposed housing complex location for Alternatives 1, 3 and 5 would require clearing and excavating approximately seven acres of land at Midnight Creek. The saw mill and recreation hall site were significantly altered during previous mining activites. Under all housing options, the facilities would be master planned to meet the Subdivision Regulations and Minimum Standard and Criteria for Mobile Home Subdivisions and Parks, Trailer Courts and Parks. These requirements address platting procedures, design standards, minimum lot sizes, and water and sewer and other public utilities needs, and are intended to minimize the magnitude and duration of environmental effects.

Indirect land use changes involving conversion of land to residential use at Yellow Pine would be minimal, as CSM has indicated that only a small portion of the work force (10-15 persons) would be located at Yellow Pine. These personnel and any families would utilize existing housing and trailer park facilities.

The No-Action Alternative would not have any effects on existing land use patterns in the study area.

By 1983, the proposed action is expected to create approximately 50-60 direct seasonal job opportunities at the mine site over the 10-year operational period. This represents a total increase of approximately three percent in jobs over Valley County's 1975 level (IDWR, 1978). Additionally, an estimated 25-30 service sector jobs will also be created. These positions will be required in order to provide the goods and services for CSM employees and any potential families which might be located at either Yellow Pine or Stibnite.

In 1975, mining only accounted for 0.1 percent of the county's employment base. With the recent expansion of the Golden Gate Mine (tungsten) at Yellow Pine, development of the proposed Stibnite project and other mining operations in the area, the mining sector could comprise as high as five percent of the employment in Valley County by 1985.

In 1978, the average unemployment rate for the county was 11.5 percent. Overall, the proposed project is expected to accelerate diversification of the local economy and help offset recent cutbacks in the wood products industry which account for the high unemployment rate. The project will also indirectly strengthen the county services industry due to the increased demand for goods and services caused by the mine work force.

The estimated annual payroll for the Stibnite project will be approximately $1,026,800. The average annual personal income for mine employees is projected at $17,000 (including mine operators, plant personnel, and administration). The applicant has also indicated that a

major portion of the company's purchase needs will be satisfied by local merchants and businesses.

Four types of taxes would affect the proposed project. These are: 1) County Property Tax: mines and related operating facilities areas are treated as real property; 2) County Net Profits Tax-this tax is essentially a royalty on mine profits; 3) State Mine License Tax-2 percent of the net proceeds less a depletion allowance; and 4) State Income Tax-6.5 percent corporate tax. CSM presently estimates that the proposed project will require a total capital investment of approximately $4 million. Based on this estimate, projected operating costs and recoverable ore reserves, and anticipated mine profits, Valley County and State of Idaho revenues were projected for the operation. Average combined annual tax receipts to the county over the 10-year life of the operation (1983-1992) from the County Property Tax, (based on information provided by CSM, the Valley County Assessor and the Idaho State Tax Commission), are estimated at approximately $470,000. However, it should be emphasized that this figure is presently affected by a freeze on the amount a county can levy based on its highest tax code area, until such time as the 1 Percent Initiative is implemented or repealed. Existing uncertainity over what form of implementation the 1 Percent Initiative will ultimately take makes a long-term analysis impossible at this time. The State of Idaho will also recognize estimated average annual revenues of approximately $680,000. According to State Tax Commission officials, state revenues from the State Mine License Tax and State Income Tax are not affected by the 1 Percent Initiative. All of the revenue projections presented are based on a $600/oz. gold price, inflated 10 percent annually during the period of operation. These estimates are highly dependent on the price of gold, operating costs, etc.

These revenue estimates are particularly important to Valley County in view of the recent decline in the lumber industry and, subsequently Federal Forest Fund revenues, and corresponding effects on school funding. Other concerns expressed by County officials include the potential need for additional law enforcement personnel, and impacts on the current road maintenance program. CSM has discussed with Valley County the potential for prepaying taxes in order to offset potential effects on these services and facilities. House Bill 522, which was passed during the recent session of the Idaho Legislature, provides this opportunity. This situation would involve establishment of an "impact study committee," which would be comprised of the chairman of the county commission, the assessor, and a member of the taxing district at large. This group would determine how the prepayment is appropriated (i.e., purchase of a road grader). Under this arrangement, the company could pay up to 50 percent of the anticipated ad valorem taxes during the term of the impact period. Under existing statutes CSM could also make "gift" payments to offset other expected impacts on necessary services and utilities. The possibility of an override vote by the local citizenry also exists.

It is estimated that approximately 60 percent of the jobs directly related to the project will be seasonal (May through October). CSM has indicated that a major portion of the mining operation will be contracted, with 10-15 company personnel acting in supervisory and technical levels. Overall, the project-related population increase at Yellow Pine is expected to be approximately 35-50 persons, including those workers and families needed to fill related service sector jobs.

An estimated 50 persons will reside at Stibnite during the mining season. Due to the seasonal nature of the operation, relative isolation, and transportation problems getting into both Yellow Pine and Stibnite during the winter season, the existing winter population of Yellow Pine will not be significantly altered.

Housing, Services and Utilities

As previously discussed, under all of the action alternatives the major portion of the work force (approximately 50 persons and any families) would be located at Stibnite. CSM has stated they will plan and construct a permanant mobile home park to meet the necessary housing needs. CSM will also require all of the contract labor force and a limited number of supervisory personnel to reside at the complex during the operational season. This policy would be intended to reduce commuting requirements and to minimize impacts on existing services and utilities at Yellow Pine. Only caretaker/security personnel would be housed at Stibnite during the winter.

Existing housing stock and available mobile home/trailer park space at Yellow Pine would be utilized by CSM personnel to reduce the need for new large scale residential developments. Because the supply of rental housing is limited, housing in the form of motels and existing trailer spaces would meet the majority of these needs. The No-Action Alternative would not place any additional demands on the current housing situation.

CSM would install a central water and sewer system at the alternative mobile home park sites proposed at Stibnite. An adequate water system would be installed to meet both domestic and fire protection requirements. A solid waste collection and disposal system with sufficient capacity to meet projected demands would also be provided by CSM. Garbage would be hauled to the modified landfill at Yellow Pine on a regular basis.

The existing water system at Yellow Pine is near capacity. CSM has stated they will assist in making the necessary improvements in the system to accommodate project-related growth. This will probably require drilling a well, making limited distribution system improvements, and possibly installating a 10,000 gallon holding tank. Costs for these facilities are estimated at approximately $85,000. Ongoing system operation and maintenance would be provided by the Yellow Pine Water District through the annual service charge to users. According

to Central Health District officials, the existing wastewater systems are generally adequate to serve the projected demands for the anticipated work force who will reside in Yellow Pine. Any new system installations will need to comply with Health District regulations for individual waste disposal systems.

The study area, including Stibnite and Yellow Pine, is served by the McCall-Donnelly School District #421. Based on discussions with District officials, the major potential effects on the Stibnite mining project would be the possibility for fluctuating enrollment related to the seasonal operation (i.e., an August buildup in enrollment, followed by an abrupt decline in October when the operation shuts down and personnel move out of the area for the winter). The potential for this problem is demonstrated by the fact that since 1936, the Yellow Pine School has been forced to shut down on six occassions due to lack of required enrollment. The facility serves grades K-8, and could handle up to 30 students if a teacher's aide were made available.

The District has experienced major budget cuts during the past two years due to a decline of approximately $100,000 in (1979-80) in Federal Forest Funds which comprise about 25 percent of the District's budget. While county officials could not provide exact figures on the amount of revenue the Stibnite operation would generate for the School District, officials did indicate that based on the best available information the highest tax code area levy in the District (McCall) would allow a sufficient increase in its levy to offset potential expansion needs. The total county operating budget in 1979 was approximately $2.9 million. The McCall-Donnelly School District operating budget for this period was approximately 52 percent of the total. It should again be noted, however, that the proposed mining activities are not expected to have major effects on the school system, due to the period of operation (May-October), and the nature of the work force which will be comprised primarily of seasonal contract labor and local residents.

Under the No-Action Alternative, a continued decline in Federal Forest Funds is predicted due to projected cutbacks in timber harvest in the Payette, Boise and Salmon National Forests. This situation is expected to have major effects on school system funding and programs.

Power for the operation would be provided by diesel and/or propane generators at Stibnite. These include a 600 kw unit operating 16 hours per day at the processing facility and a 300 kw unit operating 24 hours a day at the housing complex. This system would be supported by an auxillary 600 kw unit to ensure uninterrupted service. Major effects involve the use of approximately 200,000 gallons of diesel fuel annually, increased noise levels (approaching 100 dBA at the site of the generators), and increased air emissions (approximately 2.65 lbs/hr TSP). The potential for utilization of small scale or low-head hydro generating facilities will be explored further by CSM at a later date.

The No-Action Alternative would not affect energy consumption in the study area.

Effects on the local transportation system would mainly involve increased travel over the Yellow Pine to Stibnite Road associated with daily commuting to the mine site by CSM personnel. Average Daily Trips (ADT) would be expected to increase by approximately 30 percent over the 15-mile stretch of road. Overall energy consumption would be reduced by locating the majority of the work force at Stibnite. Over the life of the project, this would represent significant savings in fuel used by the company. Suppliers who will freight supplies to the mine and mill would utilize the Warm Lake/Johnson Creek route for all the alternatives. This route has recently undergone major improvements and is considered preferable to the South Fork and Lick Creek routes. Detailed engineering studies to determine bridge load capacities and improvement needs are presently being completed by CSM. Provisions to safeguard against potential hazardous waste spills will also be addressed in the contingency portion of the Spill Prevention Control Countermeasure Plan (SPCCP) required by the Clean Water Act.

Emergency health care facilities will include a program sponsored by CSM which will require designated personnel to attend and successfully complete emergency medical training. Emergency medical supplies and facilities will be maintained at the project area, with special provisions for a main and auxiliary communications system. The operation will comply with requirements of the Federal Mine Safety Act. Fire protection equipment and trained personnel will be provided by CSM at the project area.

One additional part-time deputy may be required to maintain the current level of law enforcement provided by the county. Current costs for providing a full-time officer in the Yellow Pine/Stibnite area are estimated at $20,000. As previously discussed, the Company has indicated concern over the need to maintain adequate police protection in the area and is willing to assist in funding such a position if determined to be necessary.

Visual Resources and Recreation

All the alternatives, with the exception of the "no-action" option, will impact the visual resources in the project area. Alternative 1, which includes construction of the Garnet Creek waste dump, would probably have the most significant effects on the visual character of the area. The dump site is located adjacent with the mine area, which received the lowest visual adsorption capability (V.A.C.) due primarily to steep slopes and high visibility. A low V.A.C. means the landscape has the lowest absorption capability for visual change, and therefore is the most expensive and difficult landscape in which to accomplish the recommended visual quality objectives (V.Q.O.'s). However, CSM has stated that mining at the Garnet Creek site will be completed within two to three years, with reclamation initiated immediately thereafter.

This would be accomplished by spreading waste material as much as possible conforming to the surrounding valley floor, and establishing a revegetation program which effectively screens the proposed activity. Alternatives 3, 4, 5 and 6 do not involve a waste dump at Garnet Creek. Similarly, Alternative 5 does not include a dump site at West End Canyon. The West End waste dump received an intermediate V.A.C. Although the waste dump involves a relatively large area (approximately 26 acres), the canyon is screened from the major use areas and travel routes. Those alternatives involving a West End waste dump (Alternatives 1, 3 and 5) should direct special attention to prescriptive mitigation involving planting of cutbanks and roadsides for soil stabilization and reducing soil color contrasts.

All of the alternative leach plant sites received intermediate V.A.C.'s due to slope conditions and viewer position (Adkin's Flat, Meadow Creek Landing Field, and existing tailing pile are not highly visible from existing travel routes and use areas). Prescriptions involving intermediate vegetative screening and extensive reclamation will help meet short- and long-term visual quality objectives for these areas.

The areas proposed for ore storage and crushing (Adkin's Flat and Meadow Creek Landing Field) under the various action alternatives received intermediate V.A.C.'s. No major problems in meeting the identified V.Q.O.'s are anticipated at either of the sites provided the prescriptions identified in the full "Visual Analysis, Stibnite Mining Project" report (RCA 1979) are implemented.

Alternatives 1, 3 and 5 would involve locating the housing complex at the Midnight Creek site. Alternatives 4 and 6 would utilize the old saw mill site. Neither of these locations appears to present any major problems with respect to meeting the recommended V.Q.O.'s for the respective areas. Care should be taken at the Midnight Creek site to design the facilities to repeat forms within the existing natural landscape. Vegetative screening at both sites will reduce overall visual impacts.

A number of additional management constraints and guidelines are presented earlier in Chapter 4 to reduce adverse impacts on local visual resources. These include such activities as interpretive sign displays, earth-tone painting schemes, and others. The reader should also give special attention to these management policies which will guide CSM's operation when considering the potential environmental effects of project implementation.

Cultural Resources

Cultural resources are fragile and nonrenewable elements of the physical and human environment. Adverse effects to these resources can occur under the following conditions: destruction or alteration of a site; isolation from, or alteration of, its surrounding environment; and the introduction of physical, visual or audible elements that are not in character with the resource and its setting.

Based upon the results of preliminary studies, no prehistoric archaeological resources would be adversely affected by the various alternatives. Field reconnaissance of the Stibnite project area showed no indication of prehistoric cultural resources in the main areas which would be directly impacted by mining activities. A detailed "Cultural Resources Assessment" which presents the findings of these studies and an extensive historic archaeological survey of the study area is presently being finalized for submittal to the Forest Service and State Historic Preservation Officer (SHPO). Management constraints identified in Chapter 4 (Alternatives Considered) would serve to mitigate any potential effects, should any artifacts be discovered during the construction and operation phases of the project.

The Stibnite/Yellow Pine area is rich in early Idaho mining history associated with the Thunder Mountain Gold Rush of 1902, and the Stibnite and Cinnabar mining operations which occurred between 1930 and 1952. While most of the buildings at Stibnite were either removed or destroyed following collapse of the tungsten and antimony markets in 1952, the Mountain Chief and Olson cabins discussed earlier in Chapter 2 may be eligible for inclusion in the National Register of Historic Places within the context of the proposed Stibnite Historic District. Specific mitigation would be developed for these cabins in the Operating Plan. Additional documentation of the remaining remnants of the Stibnite operation (i.e., bunkhouses, mill, etc.), which are primarily in a state of advanced ruin, and the area within the boundaries shown earlier in Figure 13, would also be completed with drawings and photographs, by the Forest Service and SHPO if the area is nominated to the National Register as a Historic District. In addition, if the district is established, CSM, the Forest Service, the State Historic Preservation Office and the Advisory Council on Historic Preservation will be required to come to agreement in terms of management of mining activities on federal lands within the district.

The No-Action Alternative would not result in any direct impacts on cultural resources in the project area. However, continued long-term destruction of the existing cultural (primarily historic) resources would be expected to continue if management constraints similar to those discussed for the mining proposal are not implemented.

Community Attitudes

As described earlier in Chapter 2 of this report, a public attitudinal survey was widely distributed in the Yellow Pine/Stibnite area in order to gain a better understanding of community attitudes and preferences as related to the proposed project. Major findings of the survey were that residents viewed local environmental conditions as the single most outstanding feature of the area, and limited employment opportunities as the biggest problem or disappointment. A majority of the respondents favored the proposed mining project, but felt adequate environmental safeguards and monitoring programs should be built into the proposal. Respondents also indicated that the local labor force should

be utilized to the maximum degree possible, and that the mining company should pay for any project-related improvements in public utilities or services.

CSM has stated that maximum effort will be made to hire from the local labor force. Management constraints and mitigation to reduce or eliminate potential environmental impacts have also been outlined, and will be further refined in the Operating Plan. While it will be necessary to utilize a contractor to complete the actual mining, no significant problems are expected to occur between long-time residents and contract workers. The majority of the work force would reside at Stibnite. The Town of Yellow Pine is primarily dependent on recreation as the major source of the local economy. Goods and services purchased by hunters, fisherman, campers, snowmobilers and other sportsmen provide the mainstay of income throughout the year. During 1978, between 40 and 50 CSM personnel involved in exploration and pilot plant construction and operation were housed at Yellow Pine. Discussions with local residents and merchants indicate that no problems resulted during this period, and that CSM personnel were universally judged to be "good neighbors." It is anticipated that the portion of the permanent project-related population which will reside in Yellow Pine will be absorbed into the existing community with little effect on traditional social values. Construction/mine workers at the site are also not expected to create any major social problems.

Recreation

Although the potential opportunity for conflicts between mining activities and recreational users exists (i.e., mining activities blocking sportman access, transportation safety), no major effects are expected to occur as a result of the proposed mining project. The primary recreational activities in the area are camping and related automobile sight-seeing. Other less important activities include hunting and fishing.

The operational season (May to early October) does overlap the big game hunting season to the extent that some limited conflicts between mining and hunting access and opportunities may occur, primarily in the immediate project area. Control of local traffic by CSM in the operation impact area would also be expected to result in minimal reductions in hunter visitor days. However, hunting visitor days in the area are normally less than 600 person-days annually. Mining and other human activities would also be expected to discourage the presence of big game in the project area. The proposed activities would disturb only minimal wildlife habitat, and would not affect big game migration routes. Similarly, the fish population which exists in the dammed area behind the tailing pile formed by the blockage of Meadow Creek would be eliminated under Alternatives 1, 3, 4, 5 and 6. However, the tradeoff involving stabilization of the tailing area to reduce a major existing sedimentation source, and stabilization and rerouting of Meadow Creek around the tailing pile (which is thought to be a major source of

existing heavy metal contamination) was generally considered by fishery resource managers interviewed to have an overall positive effect on the EFSF Salmon River fishery.

While traffic between Yellow Pine and Stibnite would be expected to increase by approximately 30 percent because of the project, improvement in the road system would minimize potential public safety problems for sight-seers. In addition, the management guidelines developed for the project also include provisions for minimizing visual impacts which would be experienced by sight-seers and other recreational users, as well as the potential for taking advantage of historical and educational opportunities related to the mining project. Reclamation guidelines were developed to meet stated V.Q.O.'s for the mining activity areas. Interpretive signs and/or information centers have also been discussed by CSM and the Forest Service for describing the area and its history, as well as the proposed mining operation.

The No-Action Alternative (Alternative 2) would have no effects on recreation in the Stibnite Mining District. Traffic volumes on existing roads would continue to be light. Camping, sight-seeing and hunting would probably continue to be the main recreation activities in the area.

Wilderness and Wild and Scenic River Proposals

As previously described in Chapter 2, none of the area proposed for mining and related activities is located in the recently approved "River of No Return Wilderness" area. Similarly, no rivers in the study area are currently being considered for designation as a component of the National Wild and Scenic River System. Therefore, none of the alternatives, including the No-Action option, would effect either of these public interest categories.

Noise

The State of Idaho presently does not enforce any quantitative standards which apply to community noise levels. However, the project area is remote, with no existing residences located in close proximity to the affected areas. Increased noise levels related to construction of the leach plant and facilities, and the mining operation would be expected for all of the action alternatives. Major sources would include blasting, the actual mine excavation work associated with heavy equipment operation, and the crusher and diesel/ propane generators. Blasting would occur on an infrequent basis. Periodic noise levels exceeding 90 dBA will also probably be experienced at the mine site caused by the operation of large drills, loading equipment, and truck noise.

Selection of the alternative housing site locations included potential noise impact considerations. The potential for long-term annoyance of residents at the Midnight Creek location is probably the greatest

between the alternate locations, due to its proximity to the proposed haul road alignments. Residences would be planned and designed at all the sites utilizing U.S. Department of Transportation "Design Noise Level/Land Use Relationship" criteria. Consistent noise exposure at the Midnight Creek location is projected to be steady, low-frequency noise in the 50-60 dBA range. At the sawmill and recreation hall housing sites proposed under Alternatives 4 and 6, lower steady levels would be expected to occur due to distance from the main operational activities.

The above described noise effects will be direct impacts of the mining project. These effects would also be cummulative, because no other major noise sources are expected in the area. These effects are unavoidable if the project is implemented, but would not occur under the No-Action Alternatives.

STIBNITE MINING PROJECT

GOLD MINE AND MILL

FINAL ENVIRONMENTAL

IMPACT STATEMENT

CHAPTER 6

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CHAPTER 6

EVALUATION OF ALTERNATIVES

INTRODUCTION

Utilizing the outputs, costs and information on environmental effects developed in the "Effects of Implementation" chapter, the five action alternatives and the No Action option were evaluated to determine how well each compared against the goals and evaluation criteria presented in Chapter 3 of this report. The major objective of this process was to identify the most significant consequences (adverse and beneficial) of each alternative, if that alternative were implemented.

The No Action option (Alternative 2), which was defined as denial of the proposed project (no mining by CSM), was used as a baseline against which the effects of implementing all other options were weighed. In most cases, as might be expected, this alternative would have no effect on the various evaluation criteria. However, cases do exist where the No Action Alternative could result in adverse effects on local environmental conditions. An example of this situation would be the present erosion and potential for mass failure at the existing tailing pile, which could have major effects on local water quality and fisheries habitat.

The following evaluation, which includes an actual rating (Figure 28) against the evaluation criteria described in Chapter 3, is intended to address priority issues, concerns and opportunities identified in the public involvement program. The evaluation also addresses key concerns raised by involved resource managers during the course of the study, and appropriate goals and objectives included in local planning and land management efforts. A summary matrix presentation (Figure 29) of the major effects of implementation of the six alternatives is also presented in this chapter. The discussion and matrices evaluations focus on identifying: 1) whether or not the alternative meets the respective evaluation criteria; 2) if the effects are adverse or beneficial; and 3) the extent of the effects (major effects receive added emphasis).

The discussion also provides an indication of the level of significance of the respective evaluation criteria. The evaluation assumes that all applicable management constraints and guidelines identified in Chapter 4 will be implemented, and that all federal, state and local laws and regulations will be adhered to. It is also assumed that an approved mine and reclamation plan will provide the framework within which the various alternatives are implemented.

It should be emphasized that, by necessity, the analyses depended a great deal on the judgment exercised by the evaluators, particularly in terms of developing a final overall ranking of the alternatives which is presented in Table 21. In developing the ranking, special atten-

FIGURE 28

SELECTION OF PREFERRED ALTERNATIVE EVALUATION RATING

EVALUATION CRITERIA	ALTERNATIVE 1	2	3	4	5	6	CRITERIA DESIGNATED AS CRITICAL
Air Resources							
1. Meets State Standards	+	+	+	+	+	+	
2. PSD Requirements are Met	+	+	+	+	+	+	
Water Resources							
1. Meets State Standards	+	+	+	+	+	+	X
2. Recognized BMP's for Controlling Mining Would be Applied	+	-	+	+	+	+	X
3. Little Effect on Groundwater Quality	+	+	+	+	+	+	
Soils and Reclamation							
1. Min. Effects on Long Range Soil and Veg. Condition	+	0	+	+	+	+	X
2. Overburden Cent. 90% Safe from Mass Failure	+	0	+	-	+	+	X
3. Erosion w/in State H_2O Quality Stand. (covered under H_2O Resources)							
4. Newly Dist. Areas Effectively Revegetated	+	0	+	+	+	+	
5. Presented Disturbed Areas Stab. & Reveg.	+	-	+	-	+	+	X
6. Fed/State Reclamation Regs. Met at End	+	0	+	+	+	+	X
Fishery							
1. Toxic Sub. in Fish Flesh Maintained at or Below Baseline Levels	+	+	+	+	+	+	
2. Spawning Condit. Maintained or Improved Anadromous Fish	+	0	+	+	+	+	X
3. Instream Flow Needs Met	+	+		+	+	-	X
Wildlife Resources							
1. Proposals Least Impact on W.L. and Veg. Most Accept.	+	+	-	-	+	-	
2. Mitigation for W.L. After Operations Cease	+	+	-	-	+	-	
Energy Resources Allocation							
1. Energy Efficient (petroleum)	+	0	-	-	-	-	
Socio-Economic (Human) Envir.							
1. Proj. Technically Feasible	+	0	+	+	+	+	X
2. Cost-Effective (CSM-FS agree)	+	-	+	+	-	+	
Public Services and Facilities							
1. Proj. Will Not Increase Tax-supported Expenses Above Those Generated by Proj.	+	0	+	+	+	+	X
2. Proj. Will Not Create Infrastructure Burdens	+	0	+	+	+	+	X
3. Proj. Will Have Positive Public Benefits	+	0	+	+	+	+	X
Local Employment							
1. Proj. Will Increase Local Employment	+	0	+	+	+	+	X
2. Majority of Locals Favor Proj.	+	0	+	+	+	+	X
Cultural Resources							
1. Proj. Will Protect Local Cultural Resources	+	0	+	+	+	+	
OVERALL ALTERNATIVE RANKING*	4		3	5	1	2	

Explanation
Meet/Not Meet Evaluation Criteria
+ Meets Evaluation Criteria
- Does Not Meet Evaluation Criteria
0 No Effect on Evaluation Criteria
X Critical Evaluation Criteria
* V.S. Baseline Condition

tion was directed to key evaluation criteria which received special significance ratings.

It should again be pointed out that in evaluating the various alternatives including the No Action option, the Mining Law of 1872 governs the prospecting, locating and claiming of most valuable metallic and related nonmetallic minerals on national forest lands. While it is possible for the Forest Service to recommend specific mitigation for alternatives, the outright banning of mining by the Forest Service is in direct conflict with the Mining Law. This situation further supports the use of the No Action Alternative as a baseline against which the effects of all other alternatives can be weighed.

Of the 25 evaluation criteria listed in Figure 28, 12 were considered to be of special significance, and were subsequently given a heavier weighting in the evaluation process. These criteria represented key questions raised by the public and governmental agencies, and addressed: 1) water quality concerns (primarily sedimentation and heavy metals); 2) erosion potential associated with land disturbance; 3) geotechnical considerations (mass failure); 4) reclamation; 5) effects on fisheries habitat; 6) technical feasibility and cost-effectiveness; 7) effects on public services and utilities; and 8) employment opportunities. These criteria are initially discussed for each alternative, followed by a general description of the effects and other less significant evaluation criteria. Threatened and endangered wildlife and plant species were not considered significant criteria in this evaluation due to the findings of the baseline evaluation and the current or proposed status of endemic plant and wildlife species. In addition, the U.S. Fish and Wildlife Service prepared a Section 7 determination on the grey wolf and concluded the project had "no effect".

EVALUATION OF ALTERNATIVE 1 (PROJECT PROPOSED BY CANADIAN SUPERIOR MINING IN THE "NOTICE OF INTENT TO OPERATE")

Alternative 1 meets all 12 of the key evaluation criteria (Figure 28). While this alternative would require the maximum land commitment, due primarily to the 26-acre West End Canyon and six-acre Garnet Creek dump areas and double lane (60-foot) haul roads, the total area of land disturbance would still only amount to approximately 140 acres. The 60-foot haul roads require approximately twice the volume of new road cut as the other action alternatives. Increased sediment yield from these roads is estimated at approximately 130 tons the first year following disturbance, and by the third year of operation is expected to at less than 20 tons per year for the duration of the project. Particular concern was indicated by Forest Service specialists regarding potential water quality impacts associated with the proposed Garnet Creek mine waste dump. The mine area and mine waste dump locations are characterized by steep slopes and both metamorphosed Belt Series rock and limited granitic intrusions. Erosion potential is rated higher than West End Canyon. Garnet Creek flows through the canyon and carries water throughout the year. However, CSM has indicated that the

FIGURE 29

SUMMARY OF EFFECTS OF IMPLEMENTATION, STIBNITE MINING PROJECT

ENVIRONMENTAL IMPACT CATEGORIES	Alternative 1 (Proposed Project)	Alternative 2 (No-Action)	Alternative 3 (Meadow Creek Landing Field Process. Fac.)	Alternative 4 (Existing Tailing Pile Process. Fac.)	Alternative 5 (All Waste to Existing Tailing Pile)	Alternative 6 (Reduced West End Dump)	Level of Concern
PHYSICAL ENVIRONMENT							
Air Quality	-/M/P	-/I/L	-/M/P	-/M/P	-'/M/P	-'/M/P	M
Surface Water Quality	+/M/L	'-/S'/L'	+/M/L	-/M/L	+/M/L	+/M/L	H
Ground Water Quality	0/I/P	0/I/P	0/I/P	0/I/P	0/I/P	0/I/P	M
Surface Water Hydrology	-/S/P	0/I/L	-/M/P	-/M/P	-/M/P	-/M/P	M
Erosion/Sediment Production	-/M/P	-'/S'/L'	-/M/P	-/M/P	-/M/P	-/M/P	H
Geologic Hazard (i.e., seismic)	+/M/L	-'/S'/L'	+/S/L	-/M/L	+/S/L	+/S/L	H
Site Reclamation	+/M/L	-'/S'/L'	+/S/L	-/M/L	+/S/L	+/S/L	H
BIOLOGICAL ENVIRONMENT							
Vegetation	-'/M/P	0/I/L	-/I/P	-'/M/P	-/I/P	-/I/P	NC
Fisheries/Aquatic Biology	+/M/P	0/M/L	+/M/P	-/M/P	+/M/P	+/M/P	H
Wildlife Resources	-/I/P	0/I/L	-/I/P	-/I/P	-/I/P	-/I/P	M
Threatened & Endangered Species	0/I/P	0/I/L	0/I/P	0/I/P	0/I/P	0/I/P	NC
NATURAL RESOURCES							
Mineral Develop./Dependency	+/S/P	-'/S/L	+/S/P	+/S/P	+/S/P	+/S/P	M
Energy Util./Commitment	-/I/P	0/I/L	-/I/P	-/I/P	-'/I/P	-/I/P	M
SOCIO-ECONOMIC (HUMAN) ENVIRONMENT							
Land Use Commitment	-'/I/P	0/I/L	-/I/P	-'/I/P	-/I/P	-/I/P	NC
Population (Induced Growth)	-/I/P	0/I/L	-/I/P	-/I/P	-/I/P	-/I/P	M
Housing, Services, Utilities	+/M/P	-/I/L	+/M/P	+/M/P	+/M/P	+/M/P	H
Employment Opportunities	+/S/P	-'/S'/L	+/S/P	+/S/P	+/S/P	+/S/P	H
Community Attitudes	+/S/P	-/S/L	+/S/P	+/S/P	+/S/P	-/I/P	M
Recreation	-/I/P	0/I/L	-/I/P	-/I/P	-/I/P	-/I/P	M
Visual/Noise	-'/I/P	0/I/L	-/I/P	-/I/P	-/I/P	-/I/P	M
Cultural	0/I/P	0/I/L	0/I/P	0/I/P	0/I/P	0/I/P	M

EXPLANATION

Effect/Significance/Duration

Effect: + Postive; - Negative; 0 No Change

Significance: S - Significant; M - Moderate; I - Insignificant

Duration: L - Long-Term (12 yrs. to beyond project life); P - Project Life (3-12 yrs.); C - Construction (1-2 yrs.)

' - Added Emphasis

Level of Concern: H - High; M - Moderate; NC - Not Critical

State Guidelines for Mine and Mill Waste Disposal and other applicable regulations will be implemented to minimize potential water quality impacts. The proposal to drain and stabilize the tailing pile and reroute Meadow Creek would reduce existing sediment yield from the drainage by approximately 500 tons annually . This would theoretically result in a net reduction in sediment production in the area. This alternative would have the most significant impact from a visual resources standpoint, due to the increased cuts and fills required for the two-lane road. The alternative would result in a substantial increase in county and state tax revenues, and would also provide substantial local employment opportunities and result in a number of other positive public benefits including improvement of the town of Yellow Pine's water system and stabilization and reclamation of the existing tailing pile which appears to be a major existing water quality problem. The proposal could have slight negative effects on instream flow needs in the EFSF Salmon River and Sugar Creek during periodic short-term withdrawals required to saturate and/or supplement the water supply for the leaching operation. These effects would occur during low flow periods and could also be largely mitigated by extending the period of diversion to reduce the rate of withdrawal, and altering withdrawl scheduling during these periods. Although the alternative would increase TSP concentrations by an estimated 64 tons/year, the project would meet State of Idaho Air Quality Standards. The project would have little or no effect on groundwater quality. Estimated 1981 construction costs for Alternative 1 are approximately $3.9 million (Table 21).

EVALUATION OF ALTERNATIVE 2 (NO ACTION)

The No Action Alternative would not allow CSM to develop the proposed mining and processing operation at Stibnite. Under this option, even the existing pilot scale level (500 tons/year) would be prohibited. No new commitment of land, beyond the area developed for the pilot plant and existing exploration roads, would be required. Similarly, no increase in existing sediment production levels in the drainage would be expected, provided potential mass failure problems associated with the tailing pile discussed earlier in Chapter 2 do not occur. The alternative would have essentially no change on the existing vegetation, and on fisher and wildlife resources, as shown in Figure 29. A major negative impact would occur under the category of "Mineral Development/Dependency." As previously discussed in Chapter 2, the United States presently imports approximately 60 percent of the gold and 42 percent of the silver consumed in the country. Identified gold ore reserves involved in the Stibnite project are estimated at approximately 3.4 million tons. The decision would also establish a precedent regarding any future mining in the project area, and very likely discourage exploration on all forest lands throughout the western United States. This could conceivably result in an eventual decline in U.S. mining and increased import dependency. Significant adverse effects would also be realized under the categories of "Community Services and Utilities," and "Employment Opportunities." The proposed project and

action alternatives would result in significant local and county-wide benefits in the form of needed utilities improvements, and increased employment opportunities and additional tax proceeds to Valley County through the property and net profits tax on mining. In general, the No Action Alternative would have no effect on the evaluation criteria developed for the project (Figure 28). However, the alternative would not meet the "Cost-Effective" and "Public Attitudes" criteria. CSM has invested over $2.3 million since 1974 on geologic mapping, sampling, diamond drilling, rotary drilling, metallurgical testing, and related engineering and environmental studies. This represents a significant expenditure and corporate commitment, which could not be recovered if the No Action Alternative is implemented. The existing tailing pile would not be stabilized and reclaimed under this option. It should be noted that the Idaho Department of Health and Welfare - Division of Environment (IDHW-DOE) has studied several stream segments in the state adversely affected by past mining activities (most notably the South Fork Coeur d'Alene River), and has developed a series of alternatives for addressing these types of potential water quality problems. These types of problems will receive added attention in future IDHW-DOE planning studies and programs.

EVALUATION OF ALTERNATIVE 3 (MEADOW CREEK LANDING FIELD PROCESSING FACILITIES LOCATION ALTERNATIVE)

Alternative 3 meets all 12 of the key evaluation criteria (Figure 28). The alternative would not involve construction of a mine waste dump in Garnet Creek Canyon. Mine waste would be hauled to the existing tailing pile and used to construct a support berm across the face of the pile. The Garnet Creek deposit would be mined and reclaimed during the first two years of the project, minimizing potential erosion/sedimentation-related water quality impacts from the drainage. The alternative would also involve a single-lane (30-ft. wide) loop road utilizing the existing lower corridor and a new upper alignment through Midnight Creek, and a single-lane haul road from the old Monumental Summit Road to the Garnet Creek deposit. Annual estimated sediment yields (during the first three years) resulting from road construction would be approximately 46 percent less (approximately 100 tons) than for Alternative 1 which involves the double-lane (60-ft. wide) alignments. The alternative would not completely meet three of the secondary evaluation criteria which address instream flow needs, wildlife habitat and energy utilization. While the associated effects on these criteria were rated as adverse or negative, the effects were assigned moderate to insignificant ratings in the "Summary of Effects of Implementation" (Figure 28), and would only occur for the duration of the project. Overall, the alternative would be expected to result in a net improvement in local water quality due to reduced erosion/sedimentation from the tailing pile following drainage of Meadow Creek pond, stabilization of the pile, and re-routing of the stream around the tailing area. As with all the action alternatives, significant public benefits would be recognized in the form of needed utility improvements in the area, supplemental county and state tax revenues, local employment opportuni-

ties, and the purchase of local goods and services (estimated benefits are shown in Table 21). While the project would meet the air resources criteria, the alternative would result in negative impacts on local air quality. These effects are rated as moderate, and would occur for the duration of the project (Figure 29). Alternative 3 received a high rating in terms of visual and recreational resources impacts due to the potential for interpretive display of the processing operation at the landing field, and the improved potential for screening the housing complex at the Midnight Creek location. Alternative 3 also received the best overall rating in terms of the environmental effects evaluation, ranking slightly higher than Alternative 6 which involves more overall areal disturbance related to utilization of valley fill for disposal (Figure 28). The alternative is also the least expensive to construct at an estimated cost of $3.2 million.

EVALUATION OF ALTERNATIVE 4 (LOCATION ALL PROCESSING FACILITIES AT THE EXISTING TAILING PILE)

Alternative 4 would involve locating the processing facilities (leach plant) at the existing tailing pile. The alternative would meet only eight of the 12 key evaluation criteria (Figure 28). Problems associated with the potential for stabilizing the pile prior to construction of the leach plant, inadequate area for disposal of waste rock, and generally unfavorable geotechnical conditions at the site combine to make this option the least attractive of the action alternatives (Figure 29). The Geotechnical Evaluations Canadian Superior Mining, Ltd. Project on the Payette National Forest report (NTL, 1979), and preceeding chapters of this report describe these problems in considerable detail. Because this alternative would require stabilization of the pile prior to construction of the leaching plant, additional problems in the proposed scheduling of the operation would also be created. Other negative effects of this alternative include additional loss of wildlife habitat related to valley bottom and side hill mine waste and tailing disposal, and continued water quality (erosion/ sedimentation) problems from the tailing pile. Effects on local water quality would be negative, with an estimated 500 tons/year of fine sediment from the tailing pile continuing to occur over the long term. The alternative would also be the most costly to build due to existing geotechnical considerations. Construction costs for the option are estimated at $14.3 million. First year operation and maintenance costs are the same as those projected for Alternatives 1 and 3 ($3.21 million). Overall, this option received the lowest rating of the five action alternatives.

EVALUATION OF ALTERNATIVE 5 (ALL MINE AND PROCESS WASTE MATERIAL DISPOSED OF AT THE EXISTING TAILING PILE)

Under this alternative, no waste dumps would be constructed at either of the mine sites. Approximately 2.2 million cubic yards of mine waste material would be hauled to the existing tailing pile for disposal. The tailing pile would also be utilized for disposal of process waste. The alternative meets 11 of the 12 key evaluation criteria. However,

TABLE 21
ALTERNATIVE PROJECT COSTS/BENEFIT ANALYSIS

	Capital Construction Cost[1]	First-Year O&M[1]	Potential Annual Local Tax Revenues[2]	Annual Public Cost[3] (1st Year)	Estimated Public Benefit[4]
Alternative 1	$3,900,000	$3,200,000	$470,000 Presently being Revised by Accessor's Office	$30,000	$800,000
Alternative 2	0	0	0	0	0
Alternative 3	3,200,000	3,200,000	470,000	30,000	800,000
Alterntive 4	14,280,000	3,200,000	470,000	30,000	800,000
Alternative 5	3,900,000	3,622,000	470,000	30,000	800,000
Alternative 6	3,900,000	3,420,000	470,000	30,000	800,000

1 Source: CSM, 1980

2 Tax Revenue estimates include County Property Tax and County Net Profits Tax averaged over the 10-year mine life. These estimates will be affected by the final implementation plan developed for the 1% Initiative.

3 Includes estimated costs for administration of monitoring program. Forest Service to provide overall supervision (includes travel, road maintainance, fire patrol, timber management).

4 Includes goods and services purchased locally from mine, salaries, capital improvements for roads, water system, assessments. Direct individual annual salaries were estimated at $17,000 annually per employee (CSM, 1980).

due to the additional annual operation and maintenance costs related to increased hauling requirements for mine waste disposal at the existing tailing pile, the project would be the least favorable from the standpoint of CSM (Table 21). Overall impacts on air quality would be the worst for this alternative. This situation is again related to increased hauling requirements and resultant increases in TSP concentrations. Alternative 5 would have a positive long-term effect on surface water quality associated with stabilization and reclamation of the tailing pile. The project would also result in the least areal disturbance and reduction in plant communities and wildlife habitat due to the fact that no waste dumps would be required. While implementation of this alternative would require draining of the pond behind the tailing pile and would result in loss of the existing fishery in the pond, discussions with Forest Service and Idaho Department of Fish and Game resource managers indicate that the benefits gained by stabilizing the tailing pile in terms of erosion and sedimentation control and potential reductions in heavy metal buildup in fish flesh outweigh the losses which would occur. The potential for long-term rehabilitation of fish habitat and fish populations in the upper Meadow Creek and EFSF would also be enhanced by implementing this alternative. Alternative 5 would have positive long-term effects in terms of site reclamation. The alternative would have major positive effects on all of the socio-economic criteria including infrastructure requirements and costs, public benefits and employment benefits. The old sawmill site was judged to be the most desirable of those proposed for this alternative from a cultural resources impact standpoint. Alternative 5 also meets the criterion which addresses public attitudes. A large majority of the local residents expressed support of the mining project when surveyed by JMM, provided adequate environmental controls and safeguards and monitoring requirements are implemented with the project. The project would cost approximately $3.9 million to construct. The alternative would require the largest energy commitment due to increased hauling requirements which are approximately 2.5 times the total number of trips required for the proposed alternative. Therefore, a determination was made that the project would not meet the energy efficient evaluation criteria (Figure 28).

EVALUATION OF ALTERNATIVE 6 (REDUCED WEST END CANYON WASTE DUMP WITH LIMITED VALLEY FILL)

Alternative 6 would involve reducing the size of the West End Canyon waste dump, and utilizing limited valley fill and sidehill disposal for a portion of the total 2.2 million cubic yards of waste rock from the mine site. The remaining waste rock would be utilized in construction of the support berm across the face of the tailing pile, and spread over the pile as necessary to "hold down" the highly erosive fine-grained sand material. The alternative meets all 12 of the key evaluation criteria. The reduced West End waste dump, as presently planned, would be placed above the spring and designed to hold an estimated 750,000 to 1.2 million cubic yards of material. Because of the reduced size, it was generally conceded that reclamation problems would be

minimized. The potential for failure of the West End Canyon waste dump would also be reduced because of the size of the dump. As previously described, construction of a stable fill in the waste dump area is not expected to be a difficult problem due to the shape of the canyon and the durable nature of the rock material which would be used as a foundation for the dump. Alternative 6 did not meet the evaluation criteria for and effects on plant communities and wildlife habitat. The alternative would result in some limited unavoidable habitat loss during the stripping and mining operations. Management constraints and guidelines identified in Chapter 4 (Alternatives Considered) would reduce these impacts. A Reclamation Plan would also be developed as an element of the final mine plan to meet applicable federal and state requirements. Overall, the alternative ranked as the second most desirable (Figure 28). The cost analysis presented in Table 21 indicates that the capital cost for constructing the alternative would be approximately $3.9 million. Other costs, including annual operation and maintenance, public benefits, public costs and estimated annual local return (salaries, tax benefits, goods and services), are also provided in Table 21.

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CHAPTER 7

IDENTIFICATION OF THE FOREST SERVICE SELECTED ALTERNATIVE

BACKGROUND ON DECISION-MAKING PROCESS

It is the policy of the Forest Service to indicate the agency's preferred alternative in the DEIS. This preferred alternative, which was selected from the options presented in the body of the EIS document, represents what the Forest Supervisor and the agency's resource specialists feel is the best apparent alternative based upon the analysis of potential environmental effects performed utilizing the evaluation criteria presented in Chapter 3. Upon issuance of the Final Environmental Impact Statement (EIS), the preferred alternative, along with any changes or modifications, becomes the agency's selected alternative. This procedure allows for maximum public input in the decision-making process.

The method utilized to arrive at the preferred alternative required the continous close involvement between the Contractor and the Forest Service ID Team specialists. Each step in the preparation of the draft document incorporated the review and comments of these specialists. Questions in data interpretation and final conclusions were thoroughly discussed with individual resource specialists and the Project Coordinator and Forest Supervisor, and the information base was continually refined. By the time it was necessary to present the Forest Service selected alternative, each member of the project team and the Supervisor had ample opportunity to become intimately aware of the project as proposed by CSM, and various public and agency input and opinions regarding the feasible project alternatives.

During the course of the preparation of the DEIS, CSM also continued to refine and analyze the proposal presented in the initial "Notice of Intent to Operate" in order to develop a more environmentally sound, economically feasible option. For example, a detailed geostatistical and economic analysis resulted in the modification of the preliminary mine plan and the scaling-down of the proposal as it was originally presented. While these reduced mining levels are reflected in the text, they may be subject to further minor refinements as a result of actual operating experience and fluctuations in the international metal market.

The decision-making team involved in identifying the selected alternative included the Forest Supervisor, the Project Coordinator, the Forest Planner, and Forest Service ID Team resource specialists in the areas of water quality, hydrology, fish, wildlife, social science, visual resources, soils, and cultural resources. Each of the alternatives were weighed against the evaluation criteria presented in Chapter 3, as well as potential effects of the various options on the

individual resource areas. All alternatives were considered to include the implementation of management and mitigation criteria discussed in Chapter 4. The alternatives were also weighed against the No Action Alternative (Alternative 2) which was considered to represent existing or baseline environmental conditions.

The Forest Service evaluation team made two significant modifications in the proposed alternative as part of their decision-making process in initially identifying the preferred alternative. The waste dump component of Alternative 5 was revised to include as feasible, West End Mine waste disposal at either the existing tailing pile, or internally within the mine site. Under this refined proposal, no new waste disposal areas would be established. A second variation in Alternative 5 involved recommendations for concentrating the housing of all employees in Yellow Pine, rather than splitting the staff between the Stibnite area and Yellow Pine. However, following considerable discussion and debate it was decided that housing of the work force should be split between Yellow Pine and Stibnite to better facilitate reducing the overall public services and utilities and other social impacts on Yellow Pine. The mining company has expressed a willingness to work with the town of Yellow Pine in helping to meet the objectives of minimizing project-related services and utilities needs and maintaining the established life-styles.

During the evaluation session it was determined that all the action alternatives generally met the constraints of the evaluation criteria. A ranking system was utilized to weigh the probable effects of the options and to derive the apparent "best" alternative. Group concensus, as summarized on Table 21, was to select Alternative 5 as the preferred alternative to be presented in the DEIS. The most attractive feature of this alternative is that it would eliminate the establishment of a waste dump in the West End Canyon. Waste rock from this area would be hauled to the existing tailing pile for disposal, or disposed of internally where possible.

The uncertainty of whether internal disposal is technically feasible or economically acceptable from the company's standpoint due to provisions of the CSM lease agreements and the difficulties in scheduling was also pointed out in the DEIS. It was discussed that if all waste material was required to be removed to the existing tailing pile, the higher costs for transportation and related energy requirements would likely affect the overall acceptability of the option. A brief synopsis of the major issues that brought about the selection of the preferred alternative are presented below by major resource category.

MAJOR CONSIDERATIONS IN IDENTIFYING THE SELECTED ALTERNATIVE

Soil and Geophysical Resources

Those alternatives which include stabilization of the existing tailing pile were considered to be more acceptable than those which did not.

Alternative 1, which calls for two-lane haul roads (60-ft. wide) was viewed less favorably than the other alternatives due to increased erosion and disturbance. It was also shown that alternatives involving the one-lane loop road system produced approximately half the volume of waste material of the two-lane non-loop road system. Special emphasis relative to stabilization was directed to the mine waste dumps due to the potential for increased erosion or the more serious potential for mass failure. In this respect Alternative 5 was viewed by the Forest Service as the most favorable option, since no new waste dumps would be created and the least amount of waste material would be involved in road construction. This alternative also provides for stabilization of the existing tailing pile.

Air Quality

This environmental factor was not considered to be of major significance. The basic consideration was to identify which alternative would result in the smallest net gain of total suspended particulates (TSP). In this respect, those alternatives which minimize hauling and associated TSP levels and vehicle emmissions were given a slight edge. Overall, Alternative 5, while given the highest rating for a majority of the impact categories, was viewed the least favorable from an air quality standpoint since it has the potential for producing the most vehicular emmissions and dust due to the increased amount of hauling. This alternative would maximize the potential for increased air pollution.

Noise

Noise generation also was not considered to be a significant environmental factor. The only variable identified between alternatives was the location of housing facilities in relationship to haul roads, and the amount of hauling. Thus, Alternative 5, which requires increased hauling, was considered slightly less desirable in terms of this environmental factor. Alternatives which provided for screening of the housing facilities from major access and haul roads received higher ratings.

Surface Water Resources

Water use requirements are the same for all the action alternatives. Water quality considerations are similar to those for soils, and relate to the magnitude of the disturbance caused by road construction and waste disposal. The danger of surface water pollution resulting from possible spills of hazardous materials used in ore processing increased with the proximity to the watercourse. Overall, Alternative 5 was judged as being the most desirable in terms of protecting surface water quality from potentially harmful effects because it does not require construction of additional waste disposal (dump) sites. Alternative 4, which involved locating the leach plant on the existing tailing pile, received the lowest rating due to geotechnical/foundations problems associated with constructing the plant on the unstable pile.

Groundwater Resources

There is some increased risk potential to groundwater quality resulting from the release of hazardous materials used in processing and waste disposal. Those alternatives which would locate the processing facilities on areas of relatively low soil permeability (i.e., the airfield site) were therefore judged to be slightly more desirable. However, this resource category was not felt to be of major significance in determining the most acceptable alternative.

Wildlife

The basic consideration relative to wildlife resources was to produce minimal areal distrubance, thereby reducing the potential for adverse effects on wildlife. Alternatives favorable to the soil and the geophysical resource base (previously discussed) were considered equally beneficial to wildlife for many of the same reasons. On this basis, Alternative 1 was viewed as having the greatest potential impacts, and hence was judged to be the lease desireable option. Alternative 5 was considered the "best" alternative since the disturbed area was minimized (no new waste dumps would be established at the West End Mine area). The overall significance of the various alternatives on local wildlife resources in the area was judged to be insignificant due to the relatively small area affected (less than 190 total acres including roads).

Fish Resources

Water withdrawals necessary to operate the processing facilities could have a slight negative impact for all of the action alternatives. These effects can be mitigated by scheduling withdrawals over an extended period of time (i.e. 48 hours), thus reducing the total withdrawl during any given period. Since sedimentation is expected to decrease with reclamation of the existing tailing pile, alternatives that provided for increased reclamation opportunities were favored. For this reason, Alternative 2 (No Action) and Alternative 4 which would involve construction of the leaching facilities on the tailing pile were given lower ratings. In general the considerations relative to fish were similar to those for soils, surface water and wildlife, and involved minimizing the total size of the disturbed area. Therefore, Alternative 5 was selected as the most desirable, since the areas of new disturbance would be limited to construction of haul roads and the actual mine areas.

Plant Communities

As with soils and wildlife, the prime consideration in differentiating between alternatives was the magnitude of the disturbance. The size of the project area is relatively small (approximately 140 total acres) in any case, and therefore does not represent a major potential impact on plant communities. Alternative 5 was viewed as the most desirable because it would minimize the area to be revegetated, and also provide for reclamation of the existing tailing pile.

Community Attitudes

Local community attitudes favor the project (a 75:25, pro:con split). The major issue regarding the proposed mining project appears to be simply one of encouraging development or discouraging it. There is no apparent concern with differences between project alternatives. Most attention is centered around the possiblity of change in life-style resulting from an increased population base. Local community attitudes do not favor concentrating the majority of the project's work force in Yellow Pine. Concern over effects on local public services and utilities was also expressed.

Energy Resources

While energy resource conservation was not determined to be a significant issue when the evaluation criteria were initially prepared, the Forest Supervisor indicated that this criterion should be an important consideration in selecting the best apparent alternative. This decision was based on increased concern over the need to conserve energy. Those alternatives which would consume the least energy should rank as the most desirable for implementation. Of the five action alternatives, Alternative 5 would consume the largest amounts of fossil fuel due to increased hauling requirements, and therefore was considered to be the least desirable from the standpoint of energy utilization. Alternative 6, which involves a reduced West End waste dump, would require one-half as much fossil fuel.

Mineral Resources

All of the action alternatives were considered similar in relation to mineral resource development because all would involve mining and processing of approximately 400,000 tons of ore annually during the planned 10-year operating period. The No Action Alternative (Alternative 2) received a lower rating due to the fact that no mining would occur if the option were implemented. Implementation of the No Action option would be in conflict with the Mining Law of 1872. This action by the Forest Service would also be expected to discourage exploration on all National Forest lands throughout the western United States, with an eventual decline in U.S. mining and increased import dependency.

Cultural Resources

This resource category was not viewed as a significant environmental consideration. Those alternatives which would concentrate housing at Yellow Pine or the "old sawmill" area were viewed the most favorably. The most desirable location for over-winter stockpiling was determined to be the Stibnite Meadow Creek landing field, in conjunction with the related processing facilities.

Population And Economics

Project implementation of any of the action alternatives would provide a major revenue source and stimulate the local economy. Housing the major portion of the mine employees in Yellow Pine would result in a population surge which most likely would not be viewed favorably by the community. It is anticipated that tax revenues would more than offset any increase in needed public services. The company has also expressed a commitment to pay its "fair share" with respect to increased burden on public services and utilities. Job opportunities, both direct and indirect, would result with all action alternatives. The No Action Alternative would inhibit future mineral exploration and development and act as a damper on related job opportunities for the local community. A large exploration investment by CSM would not be recouped. A decision to implement the No-Action option would also probably discourage similar activities on other unpatented lands not involved in the proposed Stibnite Mining Project.

Recreation

All of the action alternatives would result in minor potential for adverse effects on local recreation opportunities. Some recreation and sight-seeing use will be displaced by the mining and processing activities. However, there are other nearby areas available to accommodate these activities. On-site housing for mine employees is generally not considered desirable in terms of public recreation opportunities. On-site housing provided at the Midnight Creek site is considered the most desirable option from the standpoint of available recreation potential. Use of the existing tailing pile for waste disposal, and subsequent drainage of the Meadow Creek pond, would destroy an existing unique recreation opportunity. However, this is not a "natural" resource and reclamation activities would be aimed at establishing an area "in tune" with the natural ecosystem. All action alternatives would provide new recreation opportunities in terms of recreation/education experiences. Those alternatives with the potential for providing better interpretation of modern mining activities were judged to be more desirable. Location of the processing facilities on the airfield would be the most advantageous from this standpoint. Overall, Alternative 5 was judged to have the least effects on existing recreational opportunities as a result of minimum areal disturbance while providing the best interpretative potential.

Visual Resources

Construction of two-lane haul roads, as proposed in Alternative 1, would not be desirable from a visual resources standpoint. Screening of on-site housing is considered imperative, and would be best achieved at the Midnight Creek site. However, locating the work camp at the Midnight Creek site was also determined to be the least desirable from the standpoint of protecting historical/cultural resources. Location of processing faciltites on the airfield was considered as the most

acceptable option, since the interpretative potential is maximized. Alternative 5 best meets visual quality objectives because it would minimize new areas of disturbance.

Housing And Utilities

Implementation of any of the action alternatives would require that a portion the mine work force be housed in Yellow Pine. This would result in direct economic gains to the community. Necessary capital improvements to the community's utilities would be supported by CSM (e.g., water system improvements). An improved communications system and as necessary, other tax-supported improvements (e.g. improved road maintenance from Yellow Pine to Stibnite) could be anticipated. Thus, all action alternatives provide opportunities for some degree of community development through company investment associated with the project. Centralizing the living facilities in Yellow Pine would require the most extensive public facilities and utilities improvements, but could conceivably provide worthwhile recreation improvements after the life of the project. However, based on the results of the attitudinal survey, this concept may not be viewed favorably by local residents.

After extensively reviewing the proposed project and its alternatives, and analyzing and evaluating several years of data and the results of pilot testing and research, the Forest Service ID Team recommended to the Forest Supervisor that Alternative 5 be selected as the agency's preferred alternative for presentation in the DEIS. The Forest Supervisor concurred with this recommendation, and after review of the information and discussions with his staff, approved the selection of Alternative 5 as the preferred alternative for this phase of the NEPA process as defined by FSM 1950 with the stipulation that the selected alternative must be energy efficient. He further stipulated that some level of energy efficiency analysis should be prepared for the energy consumption requirements of the various alternatives prior to final selection of the Forest Service selected alternative. He indicated that given the similarity of the alternatives, those requiring less energy for road construction, process operation and hauling would be preferable to those requiring greater energy consumption.

FOREST SERVICE SELECTED ALTERNATIVE

Obviously, an acceptable alternative could create significant effects on the local (Stibnite area) and regional (EFSF Salmon River drainage) environments. However, in terms of comparison against one another, two of the six major alternatives stood out as better candidates following completion of the DEIS and a detailed review and analysis of the responses to the preferred alternative by the Forest Service Project Coordinator, ID Team resource specialists, Forest Supervisor and their Contractor. Alternatives 5 and 6, which involved hauling all the mine and process waste to the tailing pile for disposal, and a reduced West End Canyon waste dump with limited valley fill, respectively, were

judged to have essentially the same environmental effects. The main differences between these two alternatives are the reduced areal disturbance associated with Alternative 5 which would not involve construction of a waste dump (approximately 26 acres of land for the project proposed by CSM, and ten acres for the reduced West End Canyon dump outlined for Alternative 6), and increased impacts on local air quality related to additional hauling and energy requirements with associated increases in particulates and vehicular emissions. Based on the analysis performed for the DEIS, Alternative 5 would require approximately twice the total number of trips and fuel as Alternative 6. The additional hauling would also result in an associated increase in TSP concentrations. A comparative analysis of operating costs prepared by CSM also showed the cost for hauling all the West End Mine waste material to the tailing pile as approximately $2,160,000 more than a reduced West End waste dump over the life of the project.

In addition, comments to the DEIS provided by the U.S. Environmental Protection Agency and U.S. Department of Interior, while supporting Alternative 5 as the preferred alternative, questioned its selection in terms of overall energy requirements and air quality considerations described earlier in the Chapter (see Appendix F, Letters A and J). On the basis of these comments, and additional information provided by CSM concerning final reduced dump waste volumes, and total areal disturbance and preliminary design considerations, it was determined by the Forest Supervisor that a modified verison of Alternative 5 involving a reduced West End waste dump should be presented as the Forest Service selected alternative in the FEIS. The decision included a stipulation that the capacity of the waste dump not exceed 1.2 million cubic yards over the duration of the project. An areal limitation of ten acres was also assigned for the waste dump. Other provision included:

1. Detailed plans and specifications for the facility must be completed a licensed engineer and submitted to the Forest Service for reveiw and approval prior to any construction activities commencing.

2. The dump site should be cleared of all trees, vegetation, and any large accumulations of organic materials such as dead trees prior to construction.

3. During construction the dump slopes may be allowed to form at the angle of repose, 1.3 horizontal to 1 vertical. After completion of the dump, all embankment slopes must be flattened to 2 horizontal to 1 vertical.

4. The dump should be constructed by end-dumping above elevation 7100, creating a french drain beneath the waste dump and existing ground surface. The intent of end-dump construction is to provide, by natural sorting of materials, a very open permeable layer for drainage in the canyon bottom. Specific areas where dumping may be started will be delineated once operational plans have been finalized.

5. Grading and placement of the embankment during construction should be planned to avoid any ponding of water on the fill.

6. Water, ice, or snow should not be trapped within or beneath the embankment during construction.

7. A hydrologic study of the area should be made to provide a basis for design of a perimeter ditch system to pass the flow of West End Creek around the dump site, and to collect surface runoff from both the dump and surrounding hillsides.

8. A soils engineer should observe the initial earthwork and dumping phases of the project to ensure that conditions encountered are consistent with those used in the analysis and design. Periodic observation of the waste-fill operation should be performed to evaluate the performance of the slope and adjust construction techniques if necessary.

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CHAPTER 8

CONSULTATION WITH OTHERS

The Environmental Impact Statement for the Stibnite Mining Project was prepared for the U.S. Department of Agriculture, Forest Service, Payette National Forest by James M. Montgomery, Consulting Engineers, Inc. The Payette National Forest, acting as the lead agency, conducted an extensive public and interagency consultation and coordination program throughout the development of the EIS document.

The Information and Involvement (I&I) program (Appendix D) was initiated with the establishment of an Interdisciplinary (ID) Team composed of specialists from the Forest Service. The team provided technical communication and coordination with the Forest Service's consultant throughout the project. The ID Team also reviewed consultant outputs, was involved in work sessions designed to address key project issues and resolve conflicts, and provided support information and review of the working Draft and Final EIS documents.

The following discussion and list summarizes specific activities and contacts that have been made part of this coordination program. Early in the study effort, three public information meetings were held in Yellow Pine, McCall and Boise, Idaho, to facilitate the "scoping process". A public opinion survey was distributed by CSM to the residents of the Yellow Pine area. Coordination and consultation also involved meetings with other federal and state agencies, local government groups, public interest groups, and individuals.

On October 30, 1980, a field trip of the project study area was conducted under the supervision of the Forest Service. The trip included a tour of the proposed mine sites, waste disposal area, the pilot plant operation and the general area of Stibnite that could be affected by the proposed project. Individuals and groups that responded to the Forest Service following the three informational issues and concerns meetings were invited to attend this field trip. Thrity-one people accompanied the Forest Service on the trip. All of the various aspects of the proposed project were explained, and questions were answered by members of the study team. The names of individuals in attendance are listed below:

Name	Representing
Dave Little	Cattle Permittee
William R. Meiners	Idaho Wildlife Federation
Russ Heughins	Idaho Wildlife Federation
Jim Higgins	Aviation Adjuster
Melody Juarez	Star News
Ed Kent	Hydrometer, Inc.
Ervin Ballou	Idaho Dept. of Water Resources
Glen Youngblood	Boise Cascade Corporation

Name	Representing
Robin S. McRae	Thunder Mountain Gold, Inc.
Mary Warner	
Dave McClintock	Valley County Sheriff
Adolf Heinrich	Valley County Commissioner
Jerri Montgomery	
Ray Smith	
Nelle Tobias	
Barbara J. Davis	
Rick Richins	James M. Montgomery, Consulting Engineers, Inc.
Buck Stark	
Jim Keating	Idaho Dept. of Fish & Game
Farrell D. Jones	
Jim Adkins	
Howard Schmitt	
Pat Allen	
Tom Markland	Idaho Dept. of Lands
Larry M. Jones	Idaho Dept. of Lands
Lafe & Emma Cox	
Donald Bork	Canadian Superior Mining (U.S.) Ltd.
Skip Gould	Canadian Superior Mining (U.S.) Ltd.
Earl Dodds	USFS, Big Creek Ranger District
Earl Kimball	USFS, Krassel Ranger District
Hank Shank	USFS

In addition, the following agencies and/or organizations were contacted during the course of the study and contributed to the preparation of this EIS:

GOVERNMENT AGENCIES CONTACTED

Federal Agencies

- U.S. Department of Army, Corps of Engineers
- U.S. Department of Agriculture, Forest Service, Region 4 Office
- U.S. Environmental Protection Agency Region X, Seattle, Washington
- U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station
- U.S. Department of Agriculture, Forest Service, Payette and Boise National Forests
- U.S. Deparment of Commerce, National Marine Fishery Service
- U.S. Department of Commerce, National Oceanic and Atmospheric Administration
- U.S. Department of Interior, Bureau of Indian Affairs
- U.S. Department of Interior, Fish and Wildlife Service

State of Idaho

- Bureau of Economic Resources and Community Affairs
- Cooperative Fishery Research Unit (University of Idaho)
- Department of Employment
- Department of Fish and Game
- Department of Health and Welfare, Division of Environment (Bureau of Water Quality, Bureau of Air Quality, Solid Waste Management)
- Department of Lands
- Department of Water Resources
- Historic Preservation Office
- State Archaeologist

Local Government

- Valley County Commission
- Valley County Clerk
- McCall-Donnelly School District 421
- Clerk, City of Cascade
- Valley County Sheriff's Department
- Central District Health Department
- Yellow Pine Water District
- Ida-Ore Regional Planning and Development Association

Other Governmental Organizations

- California Department of Fish and Game
- Oregon Cooperative Fish Resources Unit

Private Groups and Individuals

In addition to the public opinion survey discussed earlier, other private groups and individuals who have participated in the consultation and coordination process for the EIS are listed below.

- Kellogg Tribune
- Idaho Conservation League
- Idaho Daily Statesman
- Idaho Mining Association
- Idaho Wildlife Federation
- Local Residents of the Yellow Pine/Big Creek Area
- Star News
- Valley County Hospital

NOTIFICATION OF AVAILABILITY OF DRAFT EIS

The Draft EIS was released to government agencies, private organizations, and interested individuals on January 28, 1981. The official deadline for submission of comments on the Draft was March 30, 1981.

Notification of the avaibility of the Draft EIS for public reveiw and comment was made in newpapers, and on radio and television as follows:

Newspapers

Star News McCall, Idaho	Adams County Leader Council, Idaho	The Council Record Council, Idaho
News Reporter Cambridge, Idaho	Weiser Signal American Weiser, Idaho	Idaho County Free Press Grangeville, Idaho
Messenger Index Emmett, Idaho	Argus Observer Ontario, Oregon	Independent Enterprise Payette, Idaho
Idaho Free Press Nampa, Idaho	Idaho Statesman Boise, Idaho	

Radio

KMCL McCall, Idaho	KWEI Weiser, Idaho

Television

KBOI Boise, Idaho	KTVB Boise, Idaho	KIVI Nampa, Idaho

Approximately 500 copies of the DEIS were distributed to federal, state and local agencies, private organizations and individuals during the public review period from January 28 to March 30, 1981. Respondents included federal, state and local government, private organizations and individuals. A total of 30 comments were received. A list of the comments and responses is presented later in Appendix F.

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APPENDICES

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APPENDIX A

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The following individuals had a major role in the development of the studies, evaluation, technical memorandum and background data which resulted eventually to the preparation of the Draft Environmental Impact Statement on the Stibnite Mining Project. The academic background and recent experience of team members with major project responsibility or those involved in the actual writing of significant sections of the DEIS document are presented in detail.

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Clem Pope	Review and Editing

CANADIAN SUPERIOR MINING (U.S) LTD

Donald Bork
B.S. Mining Engineering, Montana College of Mine Science and Technology

APPENDIX B

DESCRIPTION OF THE PROPOSED ACTION
STIBNITE MINING PROJECT
(CONCEPTUAL OPERATING PLAN)

CANADIAN SUPERIOR MINING (U.S.) LTD.

P.O. BOX 385

SPOKANE, WASHINGTON 99210

SECTIONS 1, 2, 11, 12, 14, 15 AND 22 T18N, R9E

AND SECTIONS 35 AND 26 T19N, R9E

EAST FORK OF THE SOUTH FORK OF THE SALMON RIVER

STBNITE AREA

BIG CREEK RANGER DISTRICT

PAYETTE AND BOISE NATIONAL FORESTS

VALLEY COUNTY, IDAHO

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SUMMARY

Canadian Superior Mining (U.S.) Ltd. has spent over $2.3 million since 1974 in the Stibnite area, Valley County (Figure 1), Idaho on geologic mapping, sampling, diamond drilling, rotary drilling, metallurgical testing, and environmental studies. This work has indicated the presence of commercial ore deposits.

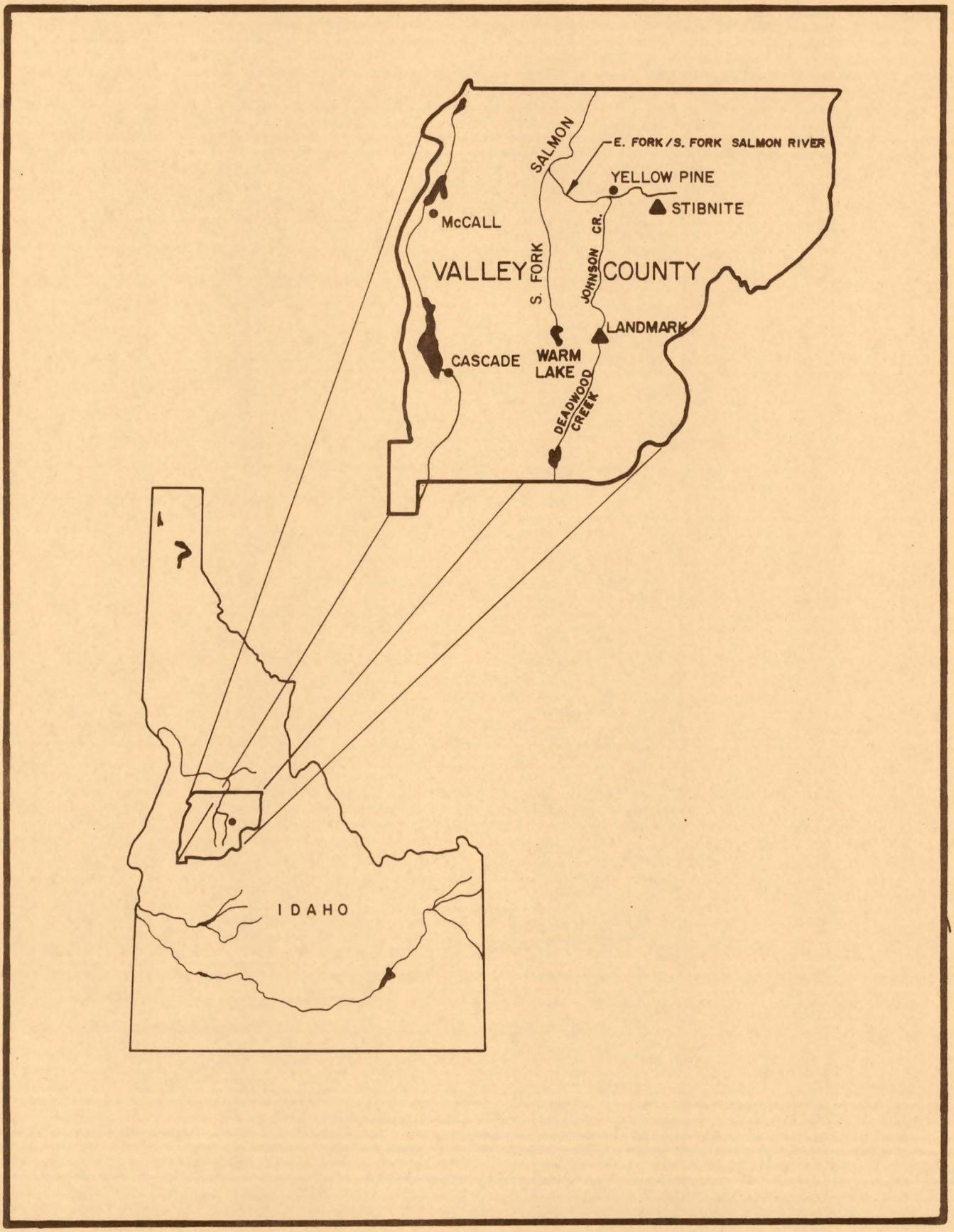
The West End and Garnet Creek ore deposits have sufficient proven ore to supply Canadian Superior's proposed mining and milling facilities with gold-bearing ore for approximately ten years. Using conventional surface mining techniques, the mine will produce approximately 3,000 tons of ore and 4,000 tons of waste daily. The project will operate for approximately 150 days each year, during late spring, summer and early fall.

A heap leaching process will be utilized for the recovery of the metal values. In this method the ore is piled upon impervious pads and a dilute solution of sodium cyanide is percolated through the pile. The metal-bearing solution that flows out of the heaped ore is then collected in impervious ponds and pumped through a metal recovery plant. After passing through the plant, the solution is chemically adjusted and recycled back to the heap. The process is a totally enclosed system with no discharge of process solution to the environment. Before the disposing of the processed ore, the residual cyanide solution will be processed with water and chlorine solution to remove cyanide.

Construction of mining and plant facilities is scheduled to start in the spring of 1981. This construction will be completed by the fall of 1981 and include: roads, plant buildings, pads and facilities, and housing needed to commence commercial production in the spring of 1982.

The operation will provide employment for approximately sixty people during the regular production season. The current plan is to employ the residents of Yellow Pine and other communities of Valley County, Idaho to the greatest extent possible. Canadian Superior will provide housing for the majority of its non-resident work force at Stibnite, causing a minimum impact on the community of Yellow Pine.

Following termination of the project, all buildings and concrete structures constructed by Canadian Superior Mining will be removed or buried. Reclamation techniques will be used to restore the affected areas to a condition that is as near original conditions as practicable, or to standards agreed upon in the approved reclamation plan.



STIBNITE MINING PROJECT LOCATION MAP

FIGURE 1

AREAS TO BE DISTURBED

The areas impacted by the Canadian Superior Mining proposal are shown on Figure 2. Two surface ore deposits will be mined by Canadian Superior Mining in the Stibnite area. The West End Mine will encompass approximately 44 acres in the N ½ of Section 2, T18N, R9E, BPM, Valley County, Idaho. The mine will be situated on the south slope of the West End Creek Canyon. The natural slope of the canyon wall in this area is up to 50%. Canadian Superior Mining plans to remove 3.4 million tons of gold bearing ore and 4.3 million tons of waste from the West End deposit using conventional open pit mining methods. The Garnet Creek mine will encompass approximately 3 acres in the SE ¼ of Section 11 in the same township. This mine will be situated near the bottom of Garnet Creek Canyon. The nautral slopes in this area are also up to approximately 50%. Canadian Superior Mining plans to remove 200,000 tons of gold bearing ore and 300,000 tons of waste using conventional open pit mining methods (see Figure 2).

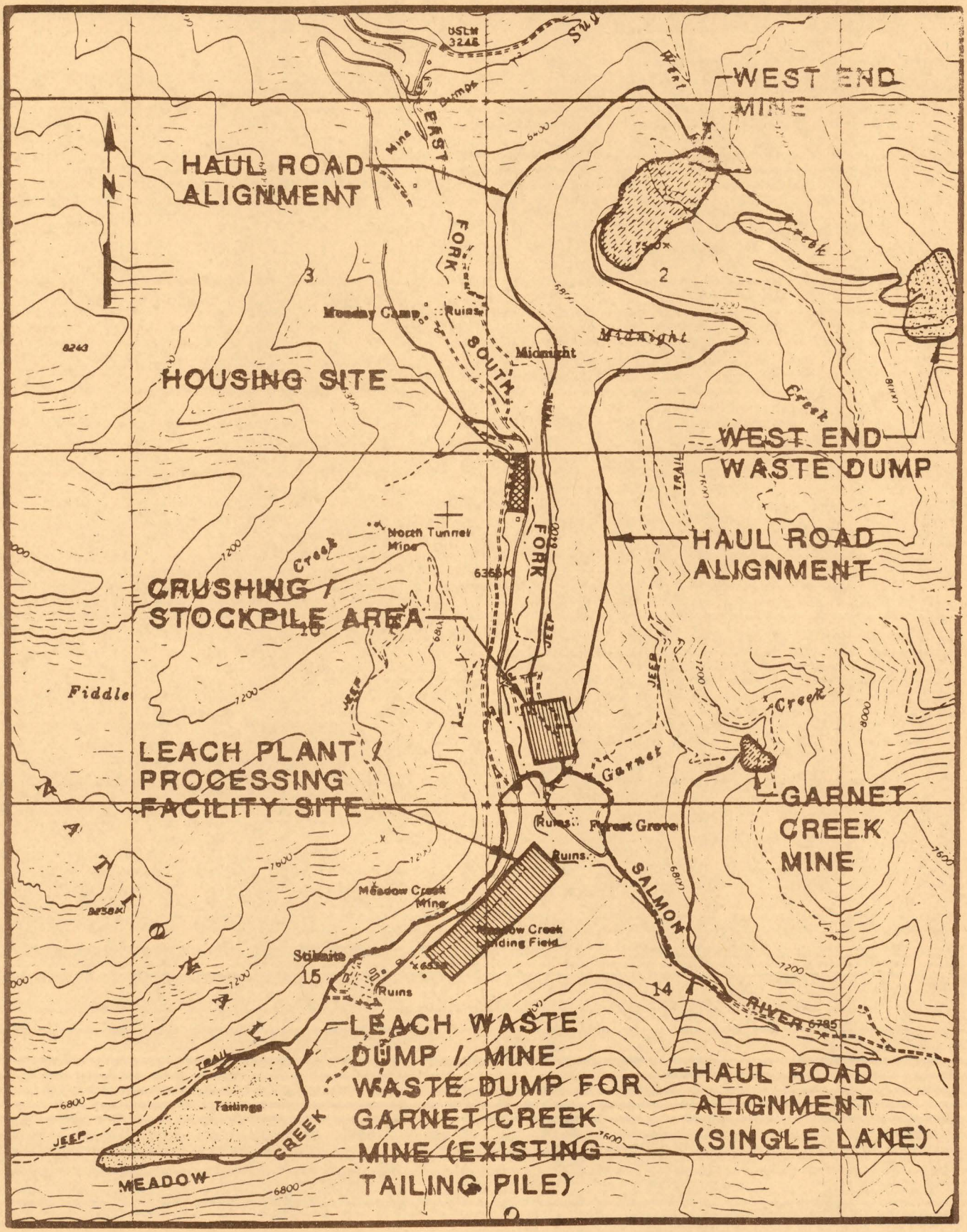
A mine waste dump of approximately 10 acres will be established in Section 2 in the dry stream bed of West End Canyon. This area will be used to dispose of up to 1.2 million cubic yards of waste rock from the West End Mine. All additional waste rock and processed ore will be disposed of at the existing tailing pile (discussed later).

Processing and administration facilities will be constructed in the NW ¼ of Section 14 and NE ¼ of Section 15, of the previously mentioned township. These facilities will occupy approximately 20 acres. The area is situated on and below the present Meadow Creek landing strip. The facilities will process between 2,000 tons and 3,000 tons of ore each day using heap leaching techniques.

Crushing and stockpiling facilities will occupy some 15 acres at Adkins Flat which is located in the SW ¼ of Section 11, of the aforementioned township and range, Valley County, Idaho. The shop and truck pool will cover some 10 acres adjacent to the crushing and stockpiling facilities. The processed ore will be disposed of on the existing Stibnite tailing pile. The proposed disposal area is approximately 80-90 acres in size and is located in the SW ¼ Section 15 of the above township and range. On site housing for 40-50 personnel will be located at the ruins of the old Stibnite sawmill on 5 acres in the NW ¼ of Section 11, township and range as above. Additional permanent staff housing will be provided off-site at Yellow Pine.

Nearly 25,000 feet of road will be required to connect the various surface installations with the mines (see Figure 2).

Garnet Creek will be serviced by a one way single-lane road starting at the stockpile area. This road will follow the existing East Fork of the South Fork/Monumental Summit route for one mile and then continue north off the existing road for 6,000 feet to the Garnet Creek Mine. The stockpile and the plant sites will be connected by 3,500 feet of



PROJECT FACILITIES LOCATION MAP

FIGURE 2

two-lane road. The processing plant and the processed ore disposal site will be connected by 4,500 feet of two-lane road.

MINING OPERATIONS

A general contractor will be employed to conduct the actual mining and crushing of ore. Mining will entail traditional blasting and hauling of ore and waste. The proposed equipment is listed below in Table 1 (equipment in a given size range varies in actual size depending upon the manufacturer).

TABLE 1

	Capacity/Model	Number	Horsepower
Front End Loader	6 - 7 Cu. Yard	3	325
Blast Hole Drill	3" to 5" Holes Track Mounted	3	250
Off Highway Trucks	35 - 50 Tons Rear Dump	8	600
Road Grader	14 G Type	1	180
Water Truck	2,000 - 3,000 Gal.	1	500
Maintenance Truck	5 Ton	1	175
Bulldozer - Tracked	D-8 Type	2	250

The mining cycle will be initiated by drilling a vertical blast hole grid along the edge of each bench. The closely spaced shallow blast holes will be loaded with an ammonium nitrate-fuel oil mixture (ANFO) and detonated. Blasting will break the rock into fragments ranging from the size of pea gravel up to 24 inches in diameter. It is estimated that 0.5 pounds of ANFO will be consumed per ton of ore. Average explosive consumption per year will be about 250 tons of ANFO or the equivalent.

During the blast hole drilling operation, samples will be collected from the drill cuttings. These samples will be taken to the laboratory and analyzed for gold content. Using this information, mine personnel will mark the blast area into ore and waste sections.

The blasted rock will be loaded by front end loaders into off-highway trucks. During loading, the operator will segregate ore and waste. In the West End pit, the ore trucks will traverse the interconnecting road and ramp system and deliver the waste to the waste dump while the ore will be hauled over the lower loop road to the processing facility. After dumping at the crushing site, the ore trucks will return to the mine via the upper loop road. Waste trucks will return to the mine via the interconnecting haul road system in the pit.

In the Garnet Creek pit, 2 or 3 off-highway mine trucks will convoy between the mine and the crushing site and waste disposal area.

PIT DESIGN

The pit will be mined using conventional open pit techniques with 20-foot-high benches and an overall pit slope of 45° (Figure 3). The bench faces will be cut at 65° to 75° slopes. Below each bench face a 10 to 15 foot catch bench will be maintained for safety and future access.

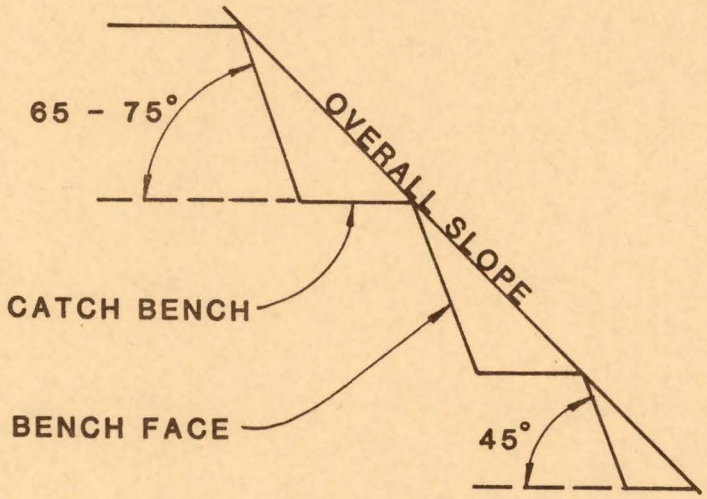


FIGURE 3

Pit floors will have water collection sumps at the lowest elevation to collect ground water seepage and precipitation which may fall in the pit area. Water entering these sumps will be transferred by pump to water trucks and used for haul road dust control.

Surface runoff patterns will be studied while the mining operation is in progress. Mine pit water diversion ditches will be constructed as required, including siltation berms, settling ponds and other runoff control measures.

HAUL ROADS

To accommodate the off-highway mine trucks, the Stibnite project will utilize two widths of roads (see Figure 2). The West End and the Garnet Creek mine roads will both be single-lane. The crushing area,

the leach pad area, and the disposal area, will be connected by a double-lane system. The grades on the above roads will be approximately 8%. The mine area and waste dump will include a system of internal double-lane ramps and roads of less than 10% grade. The road base material will be constructed of crushed waste cut from the roadway and processed waste ore, where feasible. Drainage ditches will also be provided. Final surfacing of the roads will utilize additional processed ore material as it becomes available. All major roads will be built to Forest Service specifications to insure minimal erosion effects.

Road construction (30' single; 60' double-lane) will be accomplished by means of cuts and fills. To reduce the possibility of stream pollution from sedimentation, full cuts will be utilized in areas where the natural side slopes are over 60° or where the fill would enter a natural stream channel. The cut material will be end-dumped at a designated disposal site.

To prevent trucks from traveling too close to the edge of elevated roadways, a safety berm 3 feet high will be constructed along these edges. On double-lane roads, trucks will travel in the left hand lane, allowing better visibility of the road edge. Safe speed limits will be posted for all sections of the roads with these limits being strictly enforced. Other traffic signs will be posted where they are appropriate.

PROCESSING FACILITIES

The off-highway mine trucks entering the crushing area will dump their load of ore on the stockpile or into the crusher system, depending on the production needs at that time. The crushing unit will produce minus 1 inch material at the rate of 200 tons per hour. This unit will be made up of a jaw crusher (36 inches by 48 inches-(200 horsepower) with a four foot cone crusher (150 horsepower). These two crushers will be interconnected with conveyor belts. Vibrating screens and grizzlies will be employed to maximize the efficiency of the crushers. To reduce dust emissions, water mist sprays will be employed throughout the crushing system. Wastewater will be settled and recycled.

After the ore has been crushed it will be moved by truck to one of five impervious asphalt-covered leaching pads. The integrity of the pads will be maintained using a plastic subliner. At the leach pad in addition to trucks, loaders and dozers will be used to stack the ore into heaps 10 to 15 feet high.

After the ore has been stacked into heaps, a sprinkler system using PVC pipe will be constructed over the heap (Figure 4). A dilute barren solution of sodium cyanide (0.01% to 0.1% sodium cyanide) will be pumped through the sprinkler system and allowed to percolate through the ore, dissolving the gold and silver in solution. After passing the solution through the heap, the now "pregnant" (continuing gold in

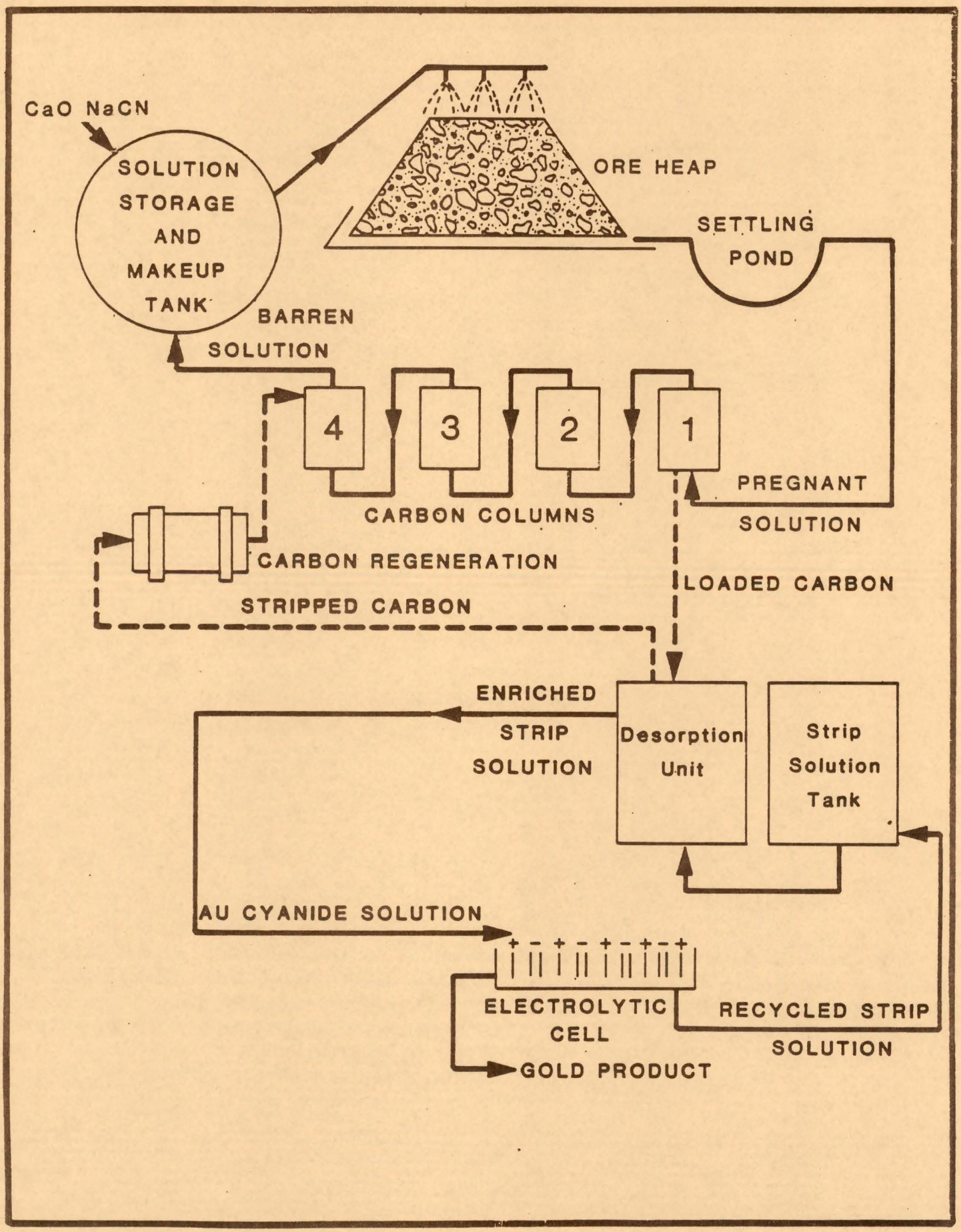


FIGURE 4
CYANIDE LEACHING PROCESS

solution) solution will be collected on the pad and directed into a pipe to a one million gallon pregnant solution pond. The pregnant solution is then pumped from this pond to the plant at a rate of approximately 300 gallons per minute (gpm), where it is passed through a series of five tanks containing approximately 2,000 pounds of activated carbon each.

At this point in the process the gold is absorbed by the granulated carbon, rendering the solution "barren." Following passage through the granulated carbon, the now barren solution will be pumped to a one million gallon barren solution pond where the pH and cyanide content are monitored and reagents (sodium cyanide and caustic soda) added as required to bring the solution back up to normal leaching strength.

From the barren pond the solution is pumped into the sprinkler system and recycled. This operation will be continuous until all the economically feasible gold values are leached out of the ore. Pilot tests conducted at the site show that the process will be completed in approximately one to two weeks.

After the gold values have been leached from the heaps, they are allowed to drain into the pregnant solution pond. The operation also includes a fresh water pond which provides makeup water as necessary. While in the pregnant pond, the pH of the water is adjusted to between 10 and 11. After the heap has drained the highly alkaline water is pumped to the top of the heap and allowed to percolate through the pile, diluting the remaining cyanide. The solution is drained into the pregnant pond, and makeup water lost through evaporation is added. After the above step, a solution of alkaline chlorine is sprayed on top of the heap and the drainage diverted into the neutralization pond and recycled to the heap. The alkaline chlorine will oxidize the cyanide to carbon dioxide (CO2) and nitrogen (N2). When tests show that the cyanide content is below drinking water standards, the processed ore will then be loaded into trucks and moved to the disposal site where it will be spread in thin layers to allow for further oxidation of cyanide.

After the carbon in the #1 tank (Figure 4) has been loaded with gold it will be removed from the leaching circuit. The carbon will then be ready for the gold-stripping circuit. In this circuit gold is removed from the carbon by passing a heated solution of water (90°C), caustic soda, sodium cyanide and alcohol through the carbon. Gold is then plated out of this solution onto a stainless steel wool cathode. When the steel wool is loaded with gold, it is removed and palced in a small sulfuric acid bath to dissolve the steel. The gold sludge will then be fluxed with various silica sands in a small crucible (approximately two cubic feet). The gold will then be poured into impure bars and sent to a refinery for further processing and refining.

After the gold has been removed from the carbon, the carbon will be reactivated by passing it through a carbon regeneration tube heated to 1,100°C. The regenerated carbon is then transferred to the #5 carbon

tank. The carbon in #5 tank will move to #4 tank and so on, until the carbon from #1 tank is removed to the stripping circuit.

REAGENT MIXING

Mixing tanks will be utilized to mix each of three main chemicals used in the Stibnite process (sodium cyanide, caustic soda, and alkaline chlorine) separately. After the sodium cyanide and caustic soda have been mixed, they will be stored in their respective tanks in concentrated solution. The concentrated solutions will then be pumped to the ponds through a piping system as production requires. An alkaline chlorine solution will be added to the neutralization pond continuously during neutralization of the heaps.

REAGENT STORING AND HANDLING

Estimated yearly consumption of chemicals for the operation is shown in Table 2. A warehouse will be constructed where the process chemicals can be stored in a safe dry environment. Sodium cyanide will be purchased in briquette form and shipped in sealed 220-pound drums. Granular caustic soda will be similarly handled in 400-pound drums. The chlorine for the alkaline chlorine will either be purchased as calcium hypochlorite or bottled chlorine gas (2000 pound cylinders). The chemical will be kept in their shipping containers until they are used. Chemicals will be shipped to the Stibnite project in 25-ton lots.

TABLE 2

ESTIMATED YEARLY CONSUMPTION
OF CHEMICAL REAGENT FOR THE STIBNITE PROJECT

Chemical	Tons	Truck Loads (25 tons)
Sodium Cyanide	100	4 Trucks
Caustic Soda	200	8 Trucks
Chlorine		
Calcium Hypochlorite or	200	8 Trucks
Chlorine Gas	100	4 Trucks
Silica Sand	1	_____
Gypsum	10	½ Truck
Hydrochloric Acid	1	_____

To insure against accidents on the road, these chemicals will be escorted by a pilot car between Cascade and Stibnite. If a chemical spill does occur while the chemicals are in transit, abatement procedures will be carried out by personnel trained for this purpose. A written chemical spill procedures Spill Prevention and Control Plan will contain approved spill containment procedures and a list of the federal, state and county agencies that need to be notified if a spill occurs. This list will include the phone number of the person(s) to be notified and will be kept at the site.

PERSONNEL SAFETY

In addition to the normal federally-mandated training for a mining operation, the approved MSHA training program will include instruction of the safe use and handling of process reagents. To augment the training program, protective clothing and equipment will be provided by Canadian Superior Mining to the personnel handling chemicals, safety showers and eye wash equipment will be installed in the plant area, and cyanide antidote kits will be located through the plant. Special efforts will also be made to ensure that a main communication system and an emergency backup unit are also maintained in good condition at the site.

CHEMICALS AT THE PLANT SITE

The leach pad will be constructed to be imprmeable to the leaching solution. The pad construction will include a PVC base liner protected by six inches of fine gravel or tailing covered by 12 inches of subgrade, and three to four inches of a dense apshalt concrete as a working surface. An asphalt concrete seal coat will be applied to the surface of the pad. Before the cyanide leaching is started each year, the pads will be water tested for leaks.

Ponds and ditches will be constructed of either asphalt or a synthetic rubber liner. The pad will be sloped so that the leaching solution is directed to the appropriate pond through a pipe and ditch system. Each pad will be bermed and protected from storm runoff. The individual pond holding capacities will provide further protection from the threat of a storm flood. The plant and storage areas will be constructed so runoff will drain into the solution ponds. A berm will be constructed below the plant and pond area to capture any solution runoff. Design criteria for those facilities are presently being finalized utilizing historic flow information and an approved methodology developed by the U.S. Geological Survey. The methodology considers frequency analysis, capacity or design flow, and risk analysis.

GROUNDWATER MONITORING

A system of 12 wells will be located around the perimeter of the plant and pad. The wells will be monitored monthly to insure the ground water quality in the area. pH measurements will be taken continuously

on a daily basis in order to detect potential cyanide leakage from the pads.

WILDLIFE PROTECTION

To exclude the wildlife from the operation area a 10 foot high woven wire fence will be constructed around the pads and plant. The cyanide solution pond(s) will be netted as necessary to prevent access to birds and other wildlife.

WORK SEASON AND FORCE

Past weather data from the stibnite area indicates that the favorable season for a heap leaching operation will be from approximately mid-May to mid-October. This would provide an average operating season of approximately 150 working days starting May 15. To obtain the needed production required to support a mine operation, the Stibnite project will operate on full scale, 7 days a week. The mine and crushing facilities will operate two 10 hour shifts per day, 7 days per week; and the plant will operate three 8 hour shifts per day, 7 days per week.

The work force will include approximately 60 personnel. A breakdown is provided in Table 3.

TABLE 3

STIBNITE ESTIMATED YEARLY WORK FORCE

Truck Operator	21
Loader Operator	6
Dozer Operator	4
Powder Men	3
Crusher Operator	6
Mechanics	1
Plant Operator	4
Plant Helper	4
Plant Mill Right	1
Assayer	1
Samplers	2
Laboratory Helper	2
Supervisor	3
Surveyor	1
Secretary	1
Total	60

WINTER SHUT DOWN

Upon completion of each operating season, all heaped ore will be neutralized. The pads will be left with a thin layer of neutralized ore covering to protect them from winter frost. The solutions in all ponds will be neutralized and disposed of after lowering the pH of the solutions with hydrochloric acid or gypsum. The neutralized solutions will be sprayed on the waste ore at the disposal site.

SNOW REMOVAL

As the operation will be shut down throughout the winter months, no formal snow removal will be required.

PROCESSED ORE DISPOSAL SITE

The processed ore will be disposed of on top of the existing tailing pile. Prior to site utilization a berm will be constructed at the downstream edge of the old tails. This berm will have a keyway constructed on the valley floor and sides. The depth of the keyway will be determined by the depth of solid subsoil. Material will then be laid down in ten-foot lifts and compacted. Over the proposed 10-year operation, a full design height of some 50 feet may be attained. The berm will be built on a 1 to 4 slope. The width at the top of the berm bank will be less than 20 feet. The emplaced berm material will be checked for competency by a qualified soils engineer.

To reduce the moisture content of the existing tailing, Meadow Creek will be diverted around the tailing pile, and the small pond will be allowed to drain and evaporate. The diversion will be along the south side of the tailing. The old diversion channel will be rehabilitated and improved to handle 100-year flood.

Upon completion of the berm the processed ore will be trucked to the disposal site and spread in one-foot lifts. Following completion of mining at Stibnite, the entire disposal area will be revegetated with native species. By disposing of the processed ore in this manner several pre-existing environmental problems are alleviated:

1. The possibility of mass-wasting.
2. Annual spring runoff sedimentation and high arsenic.
3. Existing wind-blown dust problems.
4. Visual pollution.

WEST END WASTE DUMP

The waste dump for the West End mine will be constructed in the dry bed of Upper West End Creek Canyon. The structure will be constructed by end dumping, with the larger boulders rolling to the bottom of the canyon thus allowing for adequate sub-surface drainage of the waste dumps. Upon completion, the face of the dump will be terraced at

irregular intervals for visual acceptability. In order to assure free passage of subsurface drainage and overall dump stability, no revegetation has been recommended on the finished dump. Instead, the face of the dump will be reclaimed using natural talus material which characterizes the area. Ephemeral surface water and over-land drainage will be routed around the dump.

SUPPORT FACILITIES

OFFICE

Canadian Superior will maintain an office at Stibnite. The mine office will be responsible for keeping payroll records, production records, and safety and other necessary records for the operation of the mine and processing facilities.

LABORATORY

The Stibnite laboratory will utilize two methods of assay for gold and silver. These include atomic absorption (A.A.) and fire assay. The laboratory will have the facilities to handle approximately 250 A.A. and 30 fire assay samples per day. In addition to assay work, the laboratory will be equiped to test for cyanide, chlorine, and alkanity.

ELECTRICAL POWER

Electrical power at the Stibnite project site will be provided by diesel-electric generators. Power for the processing facility will be supplied by generator at 400 amps, 440 volt, 3 phase. One generator will be in service at a time with a second generator available for backup. Automatic switching and start-up will be provided to prevent power outages in the event of a generator malfunction.

Power for the crushing plant will be supplied by a generator at 500 amps, 440 volts, 3 phase. This generator will be serviced during crushing plant shut downs.

The housing facilities will be serviced by a 400 amp 400 volt, 3 phase diesel electric generator. Periodic short-term shut down is anticipated for servicing.

FUEL STORAGE

The fuel consumption for the Stibnite Mining Project is estimated at approximately 3,500 gallons of diesel fuel per day. Canadian Superior Mining will store 50,000 gallons of diesel fuel at the Stibnite operation. Approximately 28,000 gallons will be stored in underground tanks at the mine shop area for operation of mine equipment. Each of the three generator sites will have diesel fuel in above ground fuel tanks, with a total capacity of 7,000 gallons. Appropriate berms will be

constructed around these tanks to catch any spills according to EPA requlations. The fuel will be shipped into Stibnite by tank trucks in 7,000 gallon lots. A Spill Prevention Control Countermeasure Plan is currently being finalized for the operation.

Propane may also be utilized for the following activities:

1. The fire assay furnance.
2. The heating of the carbon stripping solution
3. The regeneration of carbon.
4. The fluxing of the ore.
5. Heating the processing plant.

The housing complex will also use propane for heating and cooking purposes. Propane consumption is estimated at 100 gallons per week. Some 2,000 gallons will be stored at the housing site, and an additional 5,000 gallons will be stored at the plant site. Propane will transported to Stibnite by tank truck.

HOUSING FACILITIES

Because of Yellow Pine's limited ability to house additional people, Canadian Superior Mining will provide the infrastructure for approximately 25 house trailer units at Stibnite. In addition, the company will provide facilities for single personnel. Meals will be prepared and served in a mess hall constructed by the Company for personnel requiring the service. Besides the facilities at Stibnite, Canadian Superior Mining will acquire property in the Yellow Pine area where they plan to provide approximately 5 to 10 living units for employees and any dependents. All housing will meet Valley County building codes. The living facilities at Stibnite will be removed upon completion of the mining operation.

OPERATIONAL BUILDINGS

To facilitate the removal of buildings upon the completion of mining, the Stibnite project will utilize four small buildings in lieu of housing the entire plant operation in one large building. These buildings will be approximately 64 feet by 36 feet. The plant building and shop building will have 20-foot eave heights. To lessen the impact on the environment, these buildings will be painted in earth tones.

ACCESS ROADS

Public roads to and from Stibnite will not be changed from their existing locations. In order to accommodate the large equipment needed at Stibnite, four sharp corners around rocky points on the Stibnite-Yellow Pine road will be improved. The improvement of these corners are the only alterations that Canadian Superior Mining will perform on the access roads to Stibnite. Large mining equipment moving into Stibnite will ford the streams if their weight exceeds the load limits

of any particular bridge. CSM will assist the County in road maintenance if the County road crews are unable to maintain the schedule CSM requires.

EXPLOSIVES

Dynamite and other explosive agents will be stored and handled in accordance to MSHA regulations. Personnel handling explosives will be trained in their safe handling and use.

WATER

The water requirements for the Stibinite processing plant are anticipated to be approximately 120,000 gallons per day. This water will be supplied to the project from Meadow Creek. The water will be collected in a creek-bottom sump and then pumped out of the sump at a rate of approximately 150 gallons per minute. A three inch pipe line will be used to transfer the water to the plant. Water rights and a water division permit has been obtained from the State of Idaho for the use of this water.

A water well will be drilled to supply the housing facilities with water. All federal, state, and county permits required for the operation of a water well will be obtained before construction and operation of the well.

Drinking water will be treated so as to comply with the Federal Safe Drinking Water Act and standards enforced by the Idaho State Department of Health and Welfare.

The water sprays at the crushing plant will be supplied from a storage tank periodically filled by the water truck. Wash water will be settled and recycled.

WASTEWATER

Domestic wastewater will be handled at the Stibnite site by a septic tank/leach field system. The design of the system will be approved by the Central District Health Department office engineer before installation. There will be no applicable amount of industrial waste to be disposed of.

APPENDIX C

SUPERIOR MINING COMPANY
STIBNITE PROJECT - EAST FORK-SOUTH FORK DRAINAGE
SUMMARY PLAN AND PROPOSED SAMPLING SCHEDULE

Water Quality (3 Stations - Upper Meadow Creek; confluence EFSF Salmon River with Sugar Creek; West End Creek at confluence with Sugar Creek)

Level 1 - Sampled twice (high & low hydrologic event)

Parameters

pH	CN
Flow	Hardness (Ca & Mg)
Temp	SO_4
D.O.	AS
Turbidity	Cd
Total Suspended Solids	Cu
Conductivity	Fe
NO_2	Pb
NO_3	Mn
Total N	Ni
Total PO_4	AL
Ortho PO_4	Zn
Distillates (grease & oil)	Hg
Total and Fecal coliform	Sb

Level 2 - Bi-monthly (4x max.)

pH	Conductivity
Temp	Total N
Flow	Total PO_4
D.O.	Total coliform
Turbidity	CN
Total Suspended Solids	SO_4

Level 3 - One time mid-late summer

a. Aquatic invertebrates and fish survey (coordination with Idaho Fish and Game, Forest Service)
b. Stream bed core samples for measuring potential increases in bed load sediment
c. Fish flesh for arsenic and mercury only

Level 4 - Groundwater sampling

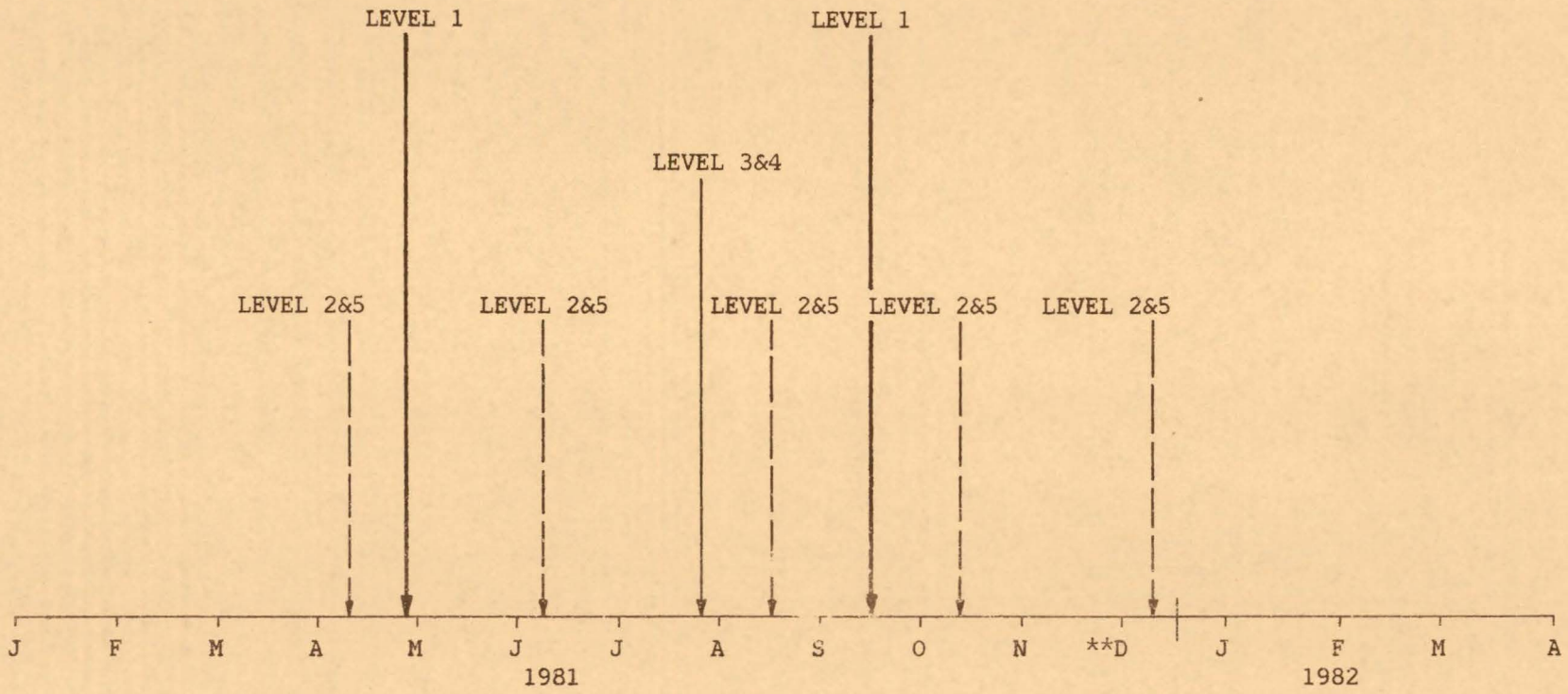
Twelve test wells down gradient from the plant site and ore disposal area will be sampled on a monthly basis for cyanide con-

tamination, and once in late fall for metal levels. A background sampling program will be initiated as soon as the wells can be constructed and the conditions are allowed to stabilize.

Level 5 - Air Quality

Total particulate will be sampled on a monthly basis. Partical size distribution measurements will also be measured once each season.

SAMPLING SCHEDULE



**Field Condition Permitting

NOTE: One Sample Variable

APPENDIX D

STIBNITE I & I PLAN
Payette National Forest - June 1979

I. SITUATION

The Canadian Superior Mining (U.S.), Ltd., has been conducting exploratory and testing operations at Stibnite since 1974. They now wish to proceed into a program of production mining.

In brief, their project will involve the following steps:

1. Mining 2,500 to 3,000 tons of ore and 9,000 tons of waste per day.

2. Trucking material and piling on impervious asphalt pads.

3. Sprinkling piles with dilute sodium cyanide solution (less then 1 pound NaCN per ton of solution).

4. Circulating pregnant solution through tanks which contain activated charcoal. Activated charcoal strips gold from pregnant solution.

5. Returning solution to pile for continued leaching.

6. Washing pile free of cyanide with fresh water. This solution is also passed through activated charcoal. The cyanide in solution and the piles are neutralized by proven technological processes.

7. Hauling waste from the processing operation to the disposal site on top of existing mill tailings from previous operations.

Some concern is expected because of the use of cyanide in proximity to the South Fork of the Salmon River. There is also concern that mining may add sediment to the stream. Concerns can be expected from both local citizens and from organized environmental groups. Past problems involving impacts of resource activities on the important anadromous fishery within the South Fork drainage will heighten this concern.

Other concerns involve the transportation of hazardous materials and the reclamation of both the waste materials and the open bench mine sites.

II. OBJECTIVES

The I & I plan is designed to meet the following objectives:

1. Inform the public and the media about the proposed mining and leaching operation and its safeguards. This plan should prevent misinformation from reaching the public and the media.

2. Keep both Canadian Superior Mining and its consultant informed about our I & I efforts.

3. Provide for other agency awareness and involvement.

4. Honor the mining company's request for confidentiality in keeping with the mining regulations and Forest Service policy.

5. Meet the requirements for public involvement as defined in the CEQ regulations and Chapter 1950 of the Forest Service Manual. To assure that planning and the decision making process is open and available for public review.

III. ACTION PLAN

A. Develop the following key lists:
   1. Individuals
   2. Political
   3. State and federal agencies
   4. Organizations
   5. Industry
   6. Media

Responsibility - Dufour and Dodds

Date - Complete by 6/30/79.

B. Involve the public in the development and review of the environmental impact statement. Involvement steps include:

   1. Notify other federal and state agencies through A - 95 process. Arrange for their future involvement if desired.

   2. Identification of Issues and Concerns. Conduct a public meeting in McCall and, if necessary, in Boise.

   Responsibility -

      a. Develop an information package about known issues and concerns for mailing to those on the key lists - Dodds.

      b. Make public notification about issues and concerns meeting by letter to key lists - Dufour.

      c. Issue news release to media - Dufour.

      d. Conduct public meeting(s) - Dufour & Dodds.

      e. Provide opportunity for further involvement.

   Dates - To be established.

3. Development of Selection Criteria. Work with selected state and federal agencies on a one-to-one basis.

Responsibility - Core team.

Date - To be established.

4. Formulation of Alternatives. Work with selected groups such as the Department of Fish and Game, Idaho Conservation League, etc., on a one-to-one basis.

Responsibility - Core team.

Date - To be established.

5. Evaluation of Alternatives. Work with selected groups, as in Item #3 above, on a one-to-one basis.

Responsibility - Core team.

Date - To be established.

6. Review of the Preferred Alternative. Public and agency review of the preferred alternative is made through the draft environmental impact statement.

Responsibility -

a. Public notification of request for public comment on draft EIS - Dufour.

b. Draft EIS (distribution) - Kimball.

c. Public information meeting(s) about the draft EIS, if requested - Dodds & Dufour.

d. News release to media.

Date - To be established.

7. Review of Selected Alternative (Decision). Public and agency review of the decision is made through the final environmental impact statement.

Responsibility -

a. Public notification of decision and availability of final EIS - Dufour.

b. Final EIS (distribution) - Kimball.

c. Public notification of implementation - Dufour.

d. News release to media.

Date - To be established.

APPENDIX E

CONCEPTUAL RECLAMATION PLAN
STIBNITE MINING PROJECT
GOLD MINE AND MILL

INTRODUCTION

This Conceptual Reclamation Plan is a condensed version of the "Stibnite Mining Project Gold Mine and Mill Reclamation Plan" which was prepared by James M. Montgomery, Consulting Engineers, Inc., for Canadian Superior Mining (U.S.) Ltd. (CSM) in conjunction with the full Environmental Impact Statement (EIS) for the proposed project. The contents of the Reclamation Plan present measures that CSM will take to safeguard the environment during mining activities and to reclaim the affected areas when mining operations cease. The Reclamation Plan was submitted to the State of Idaho Department of Lands for compliance with Title 47, Chapter 15, Idaho Code - the Idaho Surface Mining Act. The Idaho Department of Lands has primary responsibility for ensuring that overall mining and reclamation activities comply with the Idaho Surface Mining Act. Other State and Federal agencies, such as the Idaho Department of Water Resources, Idaho Department of Health and Welfare, Forest Service, U.S. Environmental Protection Agency, and U.S. Army Corps of Engineers also have jurisdiction over specific aspects of the mining operations. CSM has contacted these agencies and is presently obtaining approval for activities over which the respective agencies maintain control to ensure that the proposed mining operation will comply with all applicable codes, rules, regulations and laws. The Conceptual Plan presents basic goals and strategies for implementing the Forest Service selected alternative.

GENERAL STRATEGY

Short-Term Procedures

Reclamation measures will be applied to affected areas to minimize short-term adverse impacts and maximize long-term stability. Erosion and siltation from disturbed areas is generally greatest during the first two years after development. Short-term measures that CSM will utilize to control initial erosion and minimize siltation are listed below.

- Diversion Dikes
- Slope Serration
- Slope Stepping
- Slope Scarification
- Straw Bale Sediment Barriers
- Sediment Retention Basins
- Siltation Berm

Diversion dikes will be constructed at the top of slopes to divert runoff from the slopes and into stable areas. These dikes will be particularly effective in controlling siltation from the mine sites between the time that the sites are prepared and the actual mining begins. Slope serration is useful for providing favorable sites for vegetation to become established. Serration is accomplished using a dozer with a special blade that contains a series of ten-inch-square grooves. The blade is positioned at the same angle as the slope and scarifies the slope along the contours. Slope stepping is especially useful for establishing favorable sites for revegetation measures and for stabilizing large, overly steep slopes in competent material. This method of slope stabilization will be the primary reclamation measure for the mine sites. Slope scarification will be used on slopes having a large proportion of fines, and will help prepare the slopes for seeding. This shallow process is usually done with a hand rake or farm rake. Straw bale sediment barriers are temporary berms, diversions or other barriers that are constructed of baled straw and utilized to retain sediment on the site by retarding and filtering runoff. The bales are laid in a shallow trench and staked securely to prevent movement. A sand and gravel outlet is usually provided as a spillway at the low point in the barrier. A sediment retention basin is a small, temporary basin used to capture sediments carried in storm waters. These basins will be used where natural sedimentation areas have been destroyed or are inadequate to accommodate increased runoff from newly disturbed areas. A siltation berm is a temporary, impermeable berm for use on construction sites to retain runoff waters on site and to allow the retained water to infiltrate behind the impoundment. Siltation berms will be composed of sound, stable material and will be constructed to assure maximum stability and integrity of the structure.

Long-Term Measures

Long-term measures will be directed toward returning the affected areas to a condition that is compatible with the surroundings and reversing several adverse conditions in areas affected by previous mining operations. The principle reclamation measure will be revegetation of affected areas with either a mixture of perennial grasses or lodgepole pine, depending upon the area to be reclaimed. The revegetation techniques that CSM will utilize are listed below.

- Site Preparation
- Seeding
- Mulching
- Transplanting
- Fertilizing

Because the soils in the Stibnite area are generally capable of supporting plant growth, site preparation will focus on grading the sites to provide proper drainage, to blend with the adjacent undisturbed areas, and to prepare the soils for seeding or transplanting. Crusted and compacted soils will be ripped to loosen the soil matrix and pro-

vide crevices in which seeds can lodge and germinate. CSM will broadcast seed either perennial grasses or lodgepole pine over the sites after they have been prepared. The seeds will be selected from strains that are specifically adapted to the precipitation, temperature, elevation and latitude of the Stibnite area. Mulching of the seeded areas will be required to minimize erosion from soils with an excessive amount of fines. Since most of the soils in and around Stibnite are competent and resistant to erosive forces, mulching will not usually be required and will be applied on a case-by-case basis. Most revegetation will be accomplished through broadcast seeding, but some transplanting will be done to establish borders or screens at specific locations during the mining operation and to provide visual variety to the reclaimed sites when mining ceases. The plant types that will be utilized have been selected to preclude the need for a long-term fertilization program. A research study was conducted by the Forest Service Intermountain Forest and Range Experiment Station at Stibnite during the 1979 and 1980 field seasons to assist CSM in determining revegetation, stock selection, planting requirements and treatment needs. CSM will apply fertilizer to each site during the second year after revegetation measures have been applied to insure that the measures achieve optimum results.

RECLAMATION OF MINES

Both mine sites are similar in appearance and differ mainly in the amount of land that will be affected by mining activity. The Garnet Creek Mine encompasses approximately 3 acres while the West End Mine will be developed on 44 acres. Both sites are timbered with intermittent patches of exposed, weathered rock and clumps of brush. During the first year of development the sites will be clear-cut and the timber will be marketed. The areas will then be scarified to remove any topsoil and overburden. Virtually no topsoil exists at the mine sites and what little does exist will be very difficult to remove intact. As a result, topsoil will be segregated and limited stockpiling will occur for use at the mine sites. Overburden will be disposed of at either of two dump sites and ore will be transported to the crusher for processing.

The rock underlying the mine sites appears to be very competent and should be stable and resistant to erosive forces without being revegetated. The mines will be developed so that runoff from the surrounding drainages will either be diverted around the mine sites or will flow into pits excavated during the course of the mining activities. The pits will act as sediment traps in which silt carried in the runoff will be settled out before it can reach the natural water courses.

As the mines are developed, the finished slopes will be terraced to provide sites for vegetation to become established. The terraces will be ripped, broadcast seeded with lodgepole pine and fertilized according to the techniques presented previously. The final grading of the mines will result in the construction of a series of pits that will

act as natural sediment traps during periods of high runoff. The temporary sediment traps will be removed after the mines have been excavated to finish grade and mining operations cease.

RECLAMATION OF HAUL ROADS

Construction of the haul roads will occur during the first year of activity in the area. Waste material from haul road construction will be utilized to construct a retaining berm at the toe of the existing tailing pile. Because the rate of erosion from haul roads is typically greatest during the first two years after the roads have been constructed, the uphill and downhill side slopes of the newly-constructed roads will be broadcast seeded with perennial grasses in the fall of the first year. The side slopes should not require any special preparation prior to seeding, but may need to be mulched in areas where the soils contain excessive fines. The actual need for mulching will be determined in the field. These measures will minimize the amount of erosion that will occur during the mining operation. In addition, the locations of the haul roads have been selected to provide as much of a buffer zone as possible between the roads and surface waters. The buffer zones will serve to intercept any silt that may be carried in runoff from the roads and further minimize the impact of the haul roads on local water quality.

A fifteen-foot-square, reinforced-concrete, box culvert will be constructed as part of the haul road construction, and will serve as a bridge across the EFSF Salmon River. The bridge will be used by trucks carrying ore to the processing facilities and process waste to the dump. The culvert will be cast-in-place on dry land and the River will be diverted through the culvert after the culvert is built, which will necessitate the construction of a new River channel. The lining for the new channel and the fill for the old channel will be coarse, granular waste material obtained from haul road construction. This material, with an appropriate percentage of fines, will provide a relatively erosion-free channel and a good, sound roadway base.

When mining operations cease, those haul roads that the Forest Service does not wish to retain will be reclaimed. The unwanted haul roads will be ripped to loosen the compacted soils, cross-ditched at strategic locations to intercept runoff and divert it off the roads, broadcast seeded with the perennial grasses to stabilize the soil and lessen the long-term visual impact, and blocked with earth or rock berms to eliminate vehicular access. Some of the road surfaces may require seeding with lodgepole pine or need to be provided with transplanted woody plant seedlings to achieve the desired visual quality objectives.

RECLAMATION OF DISPOSAL SITES

Two sites will be utilized to dispose of mining and process waste; the existing tailing pile, and the West End dump. The existing tailing pile contains tailings that were deposited by slurry pipeline during

the early Stibnite mining operations. The West End dump will be developed at a new, undisturbed site.

EXISTING TAILING PILE

Part of the reclamation activities carried out by CSM involve grading and stabilizing the existing tailing pile to reduce significantly the volume of sediment that will be discharged to Meadow Creek and, ultimately, to the Salmon River. During the first year of activities, a retaining berm will be built below the toe of the tailing pile to intercept sediment in the event that liquefaction and subsequent slumping of the tailing material occur. Waste rock from haul road construction will be utilized to construct the berm. To minimize the liquefaction potential, Meadow Creek will be rerouted into an existing diversion channel that was constructed during the original mining activity. The channel will be cleaned and a series of energy dissipators or drop structures (gabions) will be constructed to reduce water velocity and channel erosion and allow for fish passage.

This will eliminate the major water source that is presently saturating and eroding the portions of the tailing pile. This condition also contributes to sedimentation in the drainage, and is thought to be a major sources of heavy metals which appear to be leaching from the pile into the aquatic ecosystem. The pond that has formed at the upstream end of the tailing pile will be dewatered, with the water either being discharged to Meadow Creek or utilized in water trucks for dust control. The water remaining in the tailing pile will gradually seep out once the sources of recharge have been eliminated, and the tailing pile will become increasingly more stable as the water seeps out.

The mining and process waste will be placed and graded so that runoff will flow over the site and collect in a channel on the southeast edge of the site. Rip-rap will be placed in the channel to resist erosion, and a small spillway will be constructed in the berm to allow the runoff to drain from the channel. Once mining activities cease and the last load of mining and process waste has been dumped, the site will be graded, ripped to loosen any crusted and compacted soils, and broadcast seeded in the fall with perennial grasses. Some spring transplanting of woody plants may be required for screening.

WEST END DUMP

The West End Canyon dump will be developed as a partial valley fill at a site that is at approximately the same elevation as the West End Mine. During the first year of activity, the site will be clear cut and scarified to provide a sound foundation for the waste material. Construction of a stable fill should not be a problem for the following reasons:

- The competent bedrock will provide good foundation support for the fill.

- Most of the waste material will be fresh, durable, angular rock that will exhibit good frictional and interlocking properties.

- The steep-sided, vee-shaped dump site will create a wedge-shaped fill which will result in "edge effects" of interlocking or wedging against the sides of the canyon.

A major design consideration in the development of the West End dump is the ability of the fill to accommodate runoff and maintain its integrity. Because the waste material will be durable, angular rock, the end dump method will be utilized for placement of the fill. This method will result in the segregation of the fill material during placement, with the coarser material migrating to the bottom. As a result, an open graded rock mass will occur in the bottom of the fill and will allow water to pass freely through the fill. Diversion ditches will also be constructed to divert runoff around the site and onto undisturbed areas. The site will be graded and the top of the fill will be broadcast seeded with lodgepole pine after mining activities cease. As the mine and dump sites are prepared and developed, talus will be collected and stockpiled. This material will be end-dumped down the finished face of the fill to blend the site into the surrounding landscape and provide additional stability to the face of the fill.

RECLAMATION OF PROCESSING FACILITIES SITES

The processing facilities include the ore crusher and stockpile, the leach pads, the extraction facilities and pregnant (cyanide/gold) and washwater ponds. These facilities will be built on the existing landing field and adjacent areas. CSM will remove the structures and any foundations at the landing field and adjacent processing areas, rip the crusted and compacted areas, and broadcast seed the affected areas with the aforementioned mixture of perennial grasses at the specified application rate. Some transplanting of woody plants may be necessary to screen the affected areas from the view of passers-by, as well. As presently envisioned the landing field facilities are expected to be reclaimed and returned to service within three years after the Stibnite Mining Project activities cease.

Approximately 1000 feet of the EFSF Salmon River on the southeast side of the landing field will be rerouted to improve drainage in the vicinity of the processing facilities. The channel will be straightened using berms constructed from waste material obtained from haul road construction. This material will be coarse, granular rock that will provide a relatively erosion-free channel and a sound base on which structures can be built and heavy equipment can be operated.

RECLAMATION OF HOUSING FACILITIES SITE

The housing facilities will be needed by personnel who will operate the processing facilities when the anticipated mining activities commence. Housing facilities at the site will include pre-fabricated bunkhouses and a mobile home trailer park. If the housing facilities are not put back into service within three years following project shutdown, CSM will either reclaim the area or turn the facilities over to the Forest Service for development as a campground. If CSM reclaims the site, all of the structures and foundations will be removed, the site will be regraded, all crusted and compacted soils will be ripped, and the area will be broadcast seeded with the aforementioned mixture of perennial grasses. If the Forest Service chooses to convert the site to a campground, the only probable modifications that will be required are converting the recreation hall to a lavatory/shower facility and installing a generator to supply power.

APPENDIX F

(DRAFT EIS COMMENTS AND RESPONSES)

This section contains letters of comments from individuals and groups to the Stibnite Draft EIS. Those letters which commented directly on the Draft EIS have been reproduced in this document. Where a response is required of the Forest Service to the letter, a response page follows that letter.

The following table is a listing of the comment letters received, the general tone of the letter toward the project in terms of supportive, critical or informative, and a general categorical listing of the major contents of the comments. Comment categories are shown in a general attempt to indicate those aspects of the proposed action about which the commentors were most interested and concerned.

Response to written comments were provided only when the comment was in the form of a question or a specific assertion or responsible criticisms. Comments of a general informative nature were noted and used to modify the draft is possible.

The Forest Service wishes to express its appreciation to all commenting agencies, groups and individuals for the time and effort spent in reviewing the Draft EIS. All comments were presented to the Forest Supervisor and were considered by him in the Forest Service decision-making process.

COMMENT RECEIVED ON DRAFT EIS

	FROM	GENERAL TONE	WILD AND SCENIC RIVER	WILDLIFE	RECREATION	MINING & PROCESSING	ENERGY	FISHERIES/FISH	WATER SUPPLY	WATER QUALITY	MITIGATION	POPULATION PROJECTION, GROWTH/PUBLIC SERVICES	MINERAL RESOURCES	HISTORIC/CULTURAL RESOURCES	LAND USE, PLANNING	ECONOMIC GROWTH	CONSTRUCTION IMPACT	ALTERNATIVES	FLOODPLAIN DEVELOPMENT	HAZARDOUS MATERIALS	RECLAMATION	AIR QUALITY	HEALTH & SANITATION
	FEDERAL AGENCIES																						
A	United States Dept. of the Interior Office of the Secretary	Informative		X			X	X	X	X			X	X				X					
B	U.S. Dept of Agriculture, Rural Electrification Administration	No Comment.																					
C	U.S. Dept of Agriculture Science and Education Administration	No Comment																					
D	Federal Energy Regulatory Commission	No Comment																					
E	U.S. Dept. of Agriculture Office of Secretary (OEO)	No Comment																					
F	U.S. Dept. of Agriculture Soil Conservation Service	Informative																			X		
G	Dept. of Health and Human Services Public Health Service	Informative								X		X					X						X
H	U.S. Dept. of Housing and Urban Development	Informative			X			X	X	X		X	X				X		X	X			X
I	United States Senator Steve Symms	Supportive																					
J	U.S. Environmental Protection Agency	Informative				X	X			X	X									X	X	X	

COMMENT RECEIVED ON DRAFT EIS

	FROM	GENERAL TONE	WILD AND SCENIC RIVER	WILDLIFE	RECREATION	MINING & PROCESSING	ENERGY	FISHERIES/FISH	WATER SUPPLY	WATER QUALITY	MITIGATION	POPULATION PROJECTION, GROWTH/PUBLIC SERVICES	MINERAL RESOURCES	HISTORIC/CULTURAL RESOURCES	LAND USE, PLANNING	ECONOMIC GROWTH	CONSTRUCTION IMPACT	ALTERNATIVES	FLOODPLAIN DEVELOPMENT	HAZARDOUS MATERIALS	RECLAMATION	AIR QUALITY	HEALTH & SANITATION
	STATE AGENCIES																						
K.	State of Idaho Historical Society	No Comment																					
L.	State of Idaho Dept. of Water Resources	No Comment																					
M	State of Idaho Dept. of Fish and Game	Supportive																					
N	State of Idaho Dept. of Health and Welfare Division of Environ.	Informative							X													X	
O	State of Idaho House of Representatives Jim S. Higgins	Supportive					X						X										
P	State of Idaho Division of Economical and Community Affairs	No Comment																					
		Protest																					
		Supportive																					
		Critical																					
		Informative & Concerned																					

COMMENT RECEIVED ON DRAFT EIS

	FROM	GENERAL TONE	WILD AND SCENIC RIVER	WILDLIFE	RECREATION	MINING & PROCESSING	ENERGY	FISHERIES/FISH	WATER SUPPLY	WATER QUALITY	MITIGATION	POPULATION PROJECTION, GROWTH/PUBLIC SERVICES	MINERAL RESOURCES	HISTORIC/CULTURAL RESOURCES	LAND USE, PLANNING	ECONOMIC GROWTH	CONSTRUCTION IMPACT	ALTERNATIVES	FLOODPLAIN DEVELOPMENT	HAZARDOUS MATERIALS	RECLAMATION	AIR QUALITY	HEALTH & SANITATION
	PRIVATE INDIVIDUALS AND FIRMS																						
Q	Derrold Slavin	Protest																					
R	Faye Stark	Supportive																					
S	Jerry S. Dixon	Critical	X			X		X				X	X			X				X			
T	Dorian Boyd	Informative & Concerned				X				X													
U	Don Millen	Supportive																					
V	Jerri Montgomery	Supportive																					
W	Buck Stark	Supportive																					
X	Sharon Murray	Supportive																					
Y	Ethel Thorniley	Supportive				X																	
Z	Alan Terrill - MacGregor Triangle Company	Supportive														X							

COMMENT RECEIVED ON DRAFT EIS

	FROM	GENERAL TONE	WILD AND SCENIC RIVER	WILDLIFE	RECREATION	MINING & PROCESSING	ENERGY	FISHERIES/FISH	WATER SUPPLY	WATER QUALITY	MITIGATION	POPULATION PROJECTION, GROWTH/PUBLIC SERVICES	MINERAL RESOURCES	HISTORIC/CULTURAL RESOURCES	LAND USE, PLANNING	ECONOMIC GROWTH	CONSTRUCTION IMPACT	ALTERNATIVES	FLOODPLAIN DEVELOPMENT	HAZARDOUS MATERIALS	RECLAMATION	AIR QUALITY	HEALTH & SANITATION
	PRIVATE INDIVIDUALS AND FIRMS																						
AA	Wallace Cory	Supportive														X							
BB	William Crowley Wm. Crowley & Associates, Inc.	Critical											X			X							
CC	Donald W. Bork Canadian Superior Mining	Informative				X	X			X	X	X		X	X	X					X	X	
DD	Nelle Tobias	Concerned																					

COMMENT RECEIVED ON DRAFT EIS

	FROM	GENERAL TONE	WILD AND SCENIC RIVER	WILDLIFE	RECREATION	MINING & PROCESSING	ENERGY	FISHERIES/FISH	WATER SUPPLY	WATER QUALITY	MITIGATION	POPULATION PROJECTION, GROWTH/PUBLIC SERVICES	MINERAL RESOURCES	HISTORIC/CULTURAL RESOURCES	LAND USE, PLANNING	ECONOMIC GROWTH	CONSTRUCTION IMPACT	ALTERNATIVES	FLOODPLAIN DEVELOPMENT	HAZARDOUS MATERIALS	RECLAMATION	AIR QUALITY	HEALTH & SANITATION
	COMMENTS RECEIVED SO LATE FOLLOWING THE CLOSE OF THE FORMAL COMMENTRY PERIOD THAT THEY COULD																						
	NOT BE INCLUDED IN THE RESPONSE SECTION																						
EE	Congress of the United States Larry E. Craig (House of Rep.)	Supportive																					
FF	Dept. of Interior U.S. Fish & Wildlife Service	Complimentary																					
GG	Advisory Council on Historic Preservation																						
HH	Ron Watters	Questions																					

APR 1 1981

United States Department of the Interior

OFFICE OF THE SECRETARY
PACIFIC NORTHWEST REGION
500 N.E. Multnomah Street, Suite 1692, Portland, Oregon 97232

March 27, 1981

ER 81/175

Mr. Kenneth D. Weyers
Forest Supervisor
Payette National Forest
McCall, Idaho 83638

Dear Mr. Weyers:

The Department of the Interior has reviewed the draft environmental statement for the Stibnite Mining Project, gold mine and mill, in Payette National Forest, Valley County, Idaho, and we have the following comments.

GENERAL COMMENTS

Mineral Resources

This draft is generally excellent in regard to mineral resources but fails to address adequately the important issue of possible future recovery of deeper sulfide ores. The proposed two small open-pit mines would remove only the near-surface oxide ores while the underlying sulfide ores of the same and other metallic mineral systems of the Stibnite mining district would not be recovered. Very likely, the most important resources in the Stibnite district are the sulfide ores of antimony, gold, silver, and perhaps tungsten that will remain after these two small open-pit mines are completed.

Proper conservation of natural resources (such as antimony, gold, silver, and tungsten) demands that each of the currently viable alternatives be weighed against possible future recovery of these metals. If possible, present choice of facilities sites or waste-dump sites should not be permitted to interfere with prospects for future mining of the sulfide zones. This operation should be planned and developed in such manner as to enhance the economic viability and environmental suitability of future mining, milling, and metals recovery. Tentative planning should be given to probable future mine sites, ore types, concentrating methods, mill sites, waste-dump sites, etc. For example, future concentrating methods may require the disposal of vast volumes of finely ground milltails rather than the relatively coarse, crushed rock tailings expected from the proposed operation. Where can finely ground material be placed; will any of the current alternatives interfere with the placement; and, can any

A-1

F-7

RESPONSE TO COMMENTS BY UNITED STATES
DEPARTMENT OF THE INTERIOR

A-1 The mining company has no plans at present to utilize any milling or processing methods other than heap leaching of coarse crushed (minus one inch) ore. No evaluation of other disposal sites for slurry or fines were investigated under this proposal. Studies show that the processed ore does not contain leachable toxic chemicals or metals, and could be utilized as a base material for haul roads.

When a mining company or an individual submits an operating plan for a proposed mining operation on unencumbered lands administered by the U.S. Forest Service, the District in which the plan was submitted prepares an environmental analysis on the proposed operation as submitted. The EA will only cover the proposed operation and will not cover future operations which are unknown. The National Environmental Policy Act (and CFR 252 regs.) requires the Forest Service to do so. In an EIS, we can only address those operations that are proposed and not those that are unknown.

of the current alternatives enhance the viability or reduce environmental costs of a future metals recovery operation? Possibly, the choice of the preferred alternative will be exactly the same after these questions have been researched; however, intelligent choice requires careful consideration of all available data that may help answer these questions about future utilization of mineral resources in the area.

Energy Resources

It is stated frequently that energy efficiency, particularly use of petroleum products, was one of the important factors in evaluation of alternatives (e.g., p. 64, item VII A). However, the summary of alternative evaluation ratings presented in fugure 6-1 (following p. 146) shows that preferred Alternative No. 5 is evaluated as negative from the standpoint of energy efficiency, while the only alternative evaluated as positive from the standpoints of every criterion is Alternative No. 1. The comparative energy efficiency is summarized by the following statement: "Of the five action alternatives, Alternative 5 would consume the largest amounts of fossil fuel due to increased hauling requirements, and therefore was considered to be the least desirable from the standpoint of energy utilization" (p. 158, par. 2). The only quantitative information on the relative energy efficiency of alternatives is the statement that transport would require 2.5 times the number of trips for Alternative 5 as compared with Alternative 1 (p. 152, par. 1). In view of this, a quantitative analysis of the energy implications of selecting Alternative 5 should be provided in the final environmental statement.

A-2

Ground-water Resources

The statement demonstrates careful consideration of ground-water resources, ground-water impacts, and ground-water impact mitigation or prevention. However, the ground-water impact evaluation during pilot leach-pad operation should be more thoroughly addressed. In particular, the description of the test should include the following: the distance between the test leach pad and the monitoring well, the approximate or typical depth to water in the test area, the depth and type of construction and completion of the monitoring well, a well log showing the lithology and stratification of the materials penetrated and the nature of the rock or sediments at the bottom of the well, and the physical composition of the base of the test pad. It should be stated whether the monitoring well fully penetrated unconsolidated materials. Inclusion of information on the porosity and permeability of the materials between the pad and the water table would strengthen the assessment.

A-3

Fish and Wildlife Resources

The draft statement adequately addresses potential impacts of the proposed action on fish and wildlife resources. The mine site is located in a drainage that has been heavily impacted by sediment in the past from forest road construction, forest development, and storms. The sedimentation severely degraded spawning and rearing habitat of chinook salmon and steelhead trout, which resulted in extremely reduced runs of those anadromous salmonids to the South Fork of the Salmon River. Efforts to

A-2 Energy utilization and efficiency between the various alternatives presented, is basically a function of the hauling distance and number of trips necessary to move overburden, ore and waste rock to their ultimate disposal site(s). The only significant difference between the alternatives involves the use of a West End waste dump. It was estimated that at current hauling efficiencies (utilizing 50 ton haul trucks) it would require 355,500 gallons of fuel to haul all the waste rock down to the proposed existing tailing pile disposal site and 170,000 gallons of fuel to haul to a West End waste dump. This represents a difference of approximately 50% over the life of the project. While Alternative 5 had the lowest rating in terms of energy utilization this was only one of many evaluation criteria.

A-3 There appears to be a misunderstanding on the part of this reader as to what information the pilot test pad well was intended to provide. The well was a shallow (approximately 20 feet) 4 inch PVC cased drill hole approximataly 150 feet down gradiant from the processing area. No well log was kept and no lithology or stratification information collected. The well penetrated the groundwater immediately below the pad which was constructed on well-drained permeable material. Any significant leakage from the pad or processing area should eventually find its way into this shallow ground water system. The well was installed simply to monitor for the possibility of a large leak of cyanide solution from the pad or collection ponds. pH levels were also monitored on a continual basis to detect potential leakage at the leach plant.

rehabilitate those runs could be negated by any forest development producing significant sediment in the drainages. Our concern for anadromous fish runs in the Upper Columbia River drainage is exemplified by the fact that our Fish and Wildlife Service ranked these degraded runs as the highest national resource problem.

The potential for significant sediment production from an individual development such as this mining proposal may be low, but the potential exists for significant cumulative sediment production from all forms of forest development activities in the drainage (e.g., timber sales and road construction in the Warren Unit of the Payette National Forest and the Southfork and Landmark Units of the Boise National Forest). Therefore, we concur that Alternative 5 will have minimum impact on fish and wildlife resources relative to all the other alternatives.

Cultural Resources

A-4 Both Yellow Pine and Stibnite have existing structures that qualify them as potential historic districts for inclusion on the National Register of Historic Places. The effects of these structures by an increased demand for housing as a result of the proposal have not been adequately addressed. These effects and results of consultation with Idaho's Historic Preservation Officer and the Advisory Council on Historic Preservation, per 36 CFR 800, should be included in the final EIS along with mitigation measures. The SHPO for Idaho is Dr. Merle W. Wells, Historic Preservation Officer, Idaho State Historic Society, 610 North Julia Davis Drive, Boise, Idaho, 83706.

SPECIFIC COMMENTS

Page 4, paragraph 2. The word "fish" should be substituted for the word "fishery" in the last sentence. The term fishery should pertain to the taking of fish for human use.

A-5 Page 4, Public Issues. The sixth issue addresses potential impacts on resident and anadromous "fisheries." The issue should address potential impacts on the fish and their habitat as well. Throughout the DEIS the use of the word fishery should be closely scrutinized to determine its appropriateness.

A-6 Page 17, paragraph 2. In the 4th and 5th sentences the stream discharges given are instantaneous, not monthly; the word "monthly" (4 times) should be deleted. Also, the period over which the maxima and minima were recorded was 15 years, not 13 as stated in the 4th sentence; however, the average discharge given in the 5th sentence is for the 13-year-period 1928-41.

A-7 Page 27, table 2-9. The lists of benthic macroinvertebrates and periphyton from an August 1978 survey lack sufficient detail for any meaningful evaluation. Insect orders and algae divisions are not sufficient base-line information for use in comparing community/population structures/complexity after implementation of the proposed action. Classification, even at the family level, is insufficient. Genus- and species-

A-4 See Letter K and response.

A-5 Noted in text of FEIS.

A-6 Only 13 years of complete usable data were available for the 15 years the gauge was maintained.

A-7 A more detailed classification is available in the Stibnite Mining Project EIS support document: Biological Evaluation of the Proposed Canadian Superior, Ltd. Mining Project at Stibnite, Idaho, (DRI, 1980). This report is on file at the Big Creek Ranger District office at McCall, Idaho. The information was summarized in the DEIS for brevity, in compliance with current NEPA regulations.

level information will be necessary for the algae and benthos in order for the comparison monitoring program to produce usable results.

A8 Page 28, Fishery. See comment above for page 4, paragraph 2.

A9 Page 32, Minimum Flow Considerations, and figure 2-7. We strongly discourage the use of the term "Minimum" when applied to instream flows in regard to aquatic organisms. Please substitute the word "maintenance" to describe flows. Minimum flows to sustain aquatic organisms operate on the individual organism level, not the population or community level. Maintenance flows refer to needs of a population to maintain itself in all life stages. The caption for figure 2-7 is incorrect relative to the Fish and Wildlife Service's Instream Flow Group Incremental Methodology.

Pages 37-39, Wildlife. We concur with the comments from Idaho Department of Fish and Game.

Page 40, next to last paragraph. Subsequent drill exploration after Cooper's study was probably by the Bradley Company; some was under a Defense Minerals Exploration Agency (DMEA) contract monitored by the U.S. Bureau of Mines and the U.S. Geological Survey. The only significant "Government" drilling of which we are aware was that done by the U.S. Bureau of Mines during the early 1940's, when the major tungsten deposit was found.

In the last paragraph, is the estimate of 1,140,000 tons of gold reserves for the Homestake in addition to a comparable tonage identified by the Bradley Company in the 1950's at the Clark Tunnel-Homestake area?

Ore reserves are correctly defined as material that can be mined and otherwise utilized at a profit. Therefore, section C, Mineral Resource Values, should be rephrased to conform to accepted terminology. Also, the authors should address potential mineral resources which are not yet outlined in detail by drilling or other exploration. The total is measured, indicated, inferred, and hypothetical resources of such a tenor as to be of economic interest for the longer-term future (10-60 years) is in excess of 30 million tons for this area. For example, the 252,000 tons at Garnet Creek is apparently limited to oxide ores that are economically minable. The geochemical work by the U.S. Bureau of Mines and previous DMEA drilling by Bradley Company north-northeast of the recreation hall infer far greater tonnages of gold-silver-antimony-bearing sulfide resources in this general area.

A-10 Page 69, Waste Dump Areas. A fourth major problem, related to hydraulic pressure buildup, is the long-term potential for mass failure of the waste dumps with resultant damage to fish habitat.

A-11 Page 89, last paragraph. We recommend consideration of using this method in combination with reusable pads. Also, we suggest evaluating it as a series of 3- to 5-foot-thick layers, with a sprinkling of dilute cyanide solution on each layer, and gradually rising to a truncated pyramid.

A-8 Noted in text of FEIS.

A-9 Noted in text of FEIS.

A-10 This concern is adequately covered by interpretation under the three potential problems presented and in the Evaluation of Alternatives (Chapter 6) of the EIS document.

A-11 The mining company has evaluated mining and processing methods for both the West End and Garnet Creek ores for the last four years. A number of private professional consultants as well as company personnel have been involved in determining the most environmentally acceptable, operationally cost-effective and efficient methods for recovering mineral values from the available ores. The one time heap leach method is not a realistic technique for use in the Stibnite area because of local topography and climatic conditions.

A-12 Page 92, Treatment by Chlorination. Any probable residual chlorine concentration in the wastewater should be discussed and control measures should be suggested in the evaluation of this alternative.

Page 93, Options Eliminated. See our comment for page 89.

A-13 Page 93, next to last paragraph. Stockpiling on the pad should be reconsidered. The technology is probably available to test the pad permeability without removing ore.

A-14 Page 95, next to last paragraph, next to last sentence. As written, the statement is incorrect; sulfide ore can be processed, but probably not profitably.

A-15 Page 102, Alternative 3. It is uncertain whether the leach plant will interfere with operation of the airfield. Access to Stibnite is poor, at best. For personnel access, critical machinery parts delivery, and especially for personnel safety, the future aircraft access to the airfield should not be compromised.

Pages 102 and 103, Alternatives 4, 5, and 6. See our comment for page 102, Alternative 3.

Page 105, Fish and Wildlife, 3rd guideline. This feasibility study should also consider any possible future mining and not choose artificial spawning sites that would later conflict with mining.

Page 105, Fish and Wildlife. See comment above for page 4, paragraph 2.

A-16 Page 106, Reclamation and Revegetation, 4th guideline. It appears that Canadian Superior Mining (CSM) will reclaim all old mine sites, many of which are owned and controlled by other private companies. These activities should be planned so that they will not interfere with any potential future recovery of the mineral natural resource.

A-17 Page 109, Reclamation and Revegetation. Final decision on "ripping hard surfaces" should be postponed until proposed mining is nearly complete, because new or additional mining operations may be in the planning stages at that time. Nothing should be done that would obviously interfere with future recovery of the mineral natural resources.

Page 109, Processing Facilities, 4th sentence. Structure removal and revegetating should proceed only after evaluation of their possible use for future mineral activities. We suggest addition such as "...all man-made structures will be removed from the area, unless other mineral operations are being planned which could use the same facilities within the near future (3 to 5 years maximum after termination of this operation). The company remains responsible for removing structures and reclaiming area if other mineral operations are not forthcoming in this period."

Page 110, Support Facilities Mitigation. See our comment for page 109, Processing Facilities.

A-12 Due to its cost the use of chlorine will be carefully controlled. Wash water will be dechlorinated to acceptable level prior to spray irrigation at the end of each operating season.

A-13 Stockpiling a portion of the mined ore on the pads will likely be considered after the first full season of operation and testing of the pads following exposure to winter conditions. Some advantages may result from weighting the asphalt paving if frost heaving appears to be a problem.

A-14 Economical full scale processing of high arsenic sulfide ores is not at present possible. While a certain amount of the gold values may be in the free pyrite portion and could be separated by flotation, the company has no plans at present of mining sulfide ores.

A-15 The airfield as stated in the DEIS is not a recognized FAA landing field and currently receives a minimum level of use. The airfield under the current proposal will be abandoned and the area used for ore processing. It is the only flat area in the vicinity large enough to accommodate the project.

A-16 Only the new areas disturbed by CSM and the existing tailing pile will be relaimed. This is required under the State of Idaho mining laws.

A-17 The State of Idaho mining regulations currently requires that a mine or milling site be returned to near natural conditions following the termination of mining activities. The detailed Reclamation Plan will describe the proposed rehabilitation steps and schedule. Key aspects of the Plan are presented in Appendix E (Conceptual Reclamation Plan) of the FEIS. This Plan is presently being reviewed by the State of Idaho Department of Lands.

A-18 Page 111, last sentence. This request is unrealistic unless sediment dumped in EFSF of Salmon River is greater after mining starts. Estimated reduction of sediment from tailings pond is at least 70 percent of 500 tons per annum (TPA), while estimate of sediments from both mines is 50 to 55 TPA and that from widest, longest roads is about 120 to 130 TPA. If 30-foot-wide loop road to West End Mine and 30-foot single lane road to Garnet Creek Mine are used with Alternative 1, as we previously suggested, the total would be about 105 to 115 TPA the first years, for a net reduction of about 240 TPA. The average net reduction will increase thereafter.

Page 123, paragraph 2. We would like to see more emphasis on the statement that if a year-class of anadromous steelhead trout or chinook salmon were to experience a severe mortality from a spill of concentrated sodium cyanide, the effects on those species populations could be long term.

Page 125. We agree that road-cut materials must be carefully placed to avoid increased sediment in the Salmon River drainage. We urge the Forest Service to employ Best Management Practices and to conduct intensive management of road construction contract to limit sediment production.

A-19 Following page 146, figure 6-1. Add "Mineral Resources" after "Water Resources." The statement under Evaluation Criteria should be "non-interference or enhancement of future recovery of mineral natural resources." Also, under "Socio-Economic (Human) Envir.," add the criteria statement "Personnel Access and Access to Emergency Medical Facilities."

A-20 Pages 147 and 148. Following evaluation of Alternative 1, add an evaluation using a 30-foot loop road to West End deposit and 30-foot single-land road from Monumental Summit road to Garnet Creek deposit.

A-21 Page 158. Add a section on "Mineral Resources" just before or after "Energy Resources."

Page 158, last sentence. A "no-action" decision would also discourage exploration on all national forest lands throughout the Western United States, with an eventual decline in U.S. mining and increased import dependency.

Thank you for the opportunity to comment.

Sincerely,

Charles S. Polityka
Regional Environmental Officer

A-18 This comment is unclear with regard to the referenced paragraph on page 111. Therefore, no response was prepared.

A-19 Mineral resources was not one of the selected evaluation criteria. The scoping process included a detailed analysis to determine what were to be included as significant evaluation criteria. Mineral resources were not determined to be significant by the involved "publics," resource managers or Forest Service Contractor.

A-20 Several of the alternatives included a single-lane loop road for the West End disposal and a single-lane Monumental Summit Road to Garnet Creek. See pages 101-104 for these alternative descriptions.

A-21 A section on "Mineral Resources" has been added. See text of FEIS.

B

United States Department of Agriculture | Rural Electrification Administration | Washington D.C. 20250

FEB 13 1981

SUBJECT: DEIS Stibnite Mining Project

TO: Mr. Kenneth D. Weyers
Forest Supervisor
Payette National Forest
McCall, Idaho 83638

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the Stibnite Mining Project located in the Payette National Forest. Since the power requirements for the project will be met by installing diesel generators at the site and will not involve commitments from electric power cooperatives, the Rural Electrification Administration has no substantive comments concerning the DEIS.

It is suggested that any transmission lines built to serve the project comply to the maximum extent practicable with the USDA/USDI guidelines for transmission lines to mitigate environmental impacts.

Charles T. Crowley

CHARLES T. CROWLEY
Chief, Environmental Services Branch
Environmental and Energy
Requirements Division

PAYETTE N. F.
BIG CREEK R. D.

FEB 19 '81

RECEIVED

OFR			
W. S. L.			
FCO			
CLERK			

F-13

C

United States Department of Agriculture | Science and Education Administration | Office of the Administrator Extension | Washington, D.C. 20250

PAYETTE N. F.
BIG CREEK R. D.

FEB 17 '81

RECEIVED

DFR			
W. BIOL			
FCO			
CLERK			

February 10, 1981

Mr. Kenneth D. Weyers
Forest Supervisor
U. S. Department of Agriculture
Forest Service
Payette National Forest
McCall, Idaho 83638

Dear Mr. Weyers:

Thank you for sending the Draft Environmental Impact Statement (DEIS) for the proposed Stibnite mining operation.

If a review is in order by the Cooperative Extension Service, I believe it should be done locally.

By copy of this letter, we are transmitting the DEIS to Dr. Fred E. Kohl, Acting Director of the Extension Service at the University of Idaho for comment, if he deems it necessary.

Sincerely,

Mary N Greenwood

MARY NELL GREENWOOD
Administrator

cc:
Dr. Fred E. Kohl w/enclosure

F-14

D

PAYETTE N. F.
BIG CREEK R. D.

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON 20426

IN REPLY REFER TO:

FEB 23

RECEIVED

February 12, 1981

Mr. Kenneth D. Weyers
Forest Supervisor
U. S. Department of Agriculture
Forest Service - Fayette National
Forest
McCall, Idaho 83638

Dear Mr. Weyers:

I am replying to your request of January 1981 to the Federal Energy Regulatory Commission for comments on the Draft Environmental Impact Statement on the Stibnite Mining Project - Gold Mine and Mill. This Draft EIS has been reviewed by appropriate FERC staff components upon whose evaluation this response is based.

This staff concentrates its review of other agencies' environmental impact statements basically on those areas of the electric power, natural gas, and oil pipeline industries for which the Commission has jurisdiction by law, or where staff has special expertise in evaluating environmental impacts involved with the proposed action. It does not appear that there would be any significant impacts in these areas of concern nor serious conflicts with this agency's responsibilities should this action be undertaken.

Thank you for the opportunity to review this statement.

Sincerely,

Jack M. Heinemann
Advisor on Environmental Quality

F-15

E

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

OFFICE OF EQUAL OPPORTUNITY

IN REPLY REFER TO: 8140-FS

SUBJECT: Draft Environmental Impact Statement, Stibnite Mining Project, Payette National Forest, Idaho

TO: Kenneth D. Weyers
Forest Supervisor

THRU: Dave Williams
Associate Deputy Chief
for Administration
Forest Service

We have reviewed the Draft Statement. There appear to be no civil rights impacts involved although it goes without saying that any employment and housing generated by the project must be available on a nondiscriminatory basis.

Thank you for the opportunity to review your Statement.

PAYETTE N. F.
BIG CREEK R. D.
MAR -3

JAMES FRAZIER
Director

RECEIVED

DFR			
W. BIOL			
FOD			
CLERK			

F-16

MAR 2 4 1981

United States Department of Agriculture

Soil Conservation Service

Room 345
304 North 8th Street
Boise, Idaho 83702

March 23, 1981

Kenneth D. Weyers
USDA, Forest Service
Payette National Forest
McCall, Idaho 83638

Dear Mr. Weyers:

The following comment is made in regards to the Draft Environmental Impact Statement, Stibnite Project Gold Mine and Mill, Valley County, Idaho:

F-1 The reclamation and revegetation sections do not cover grading and shaping of areas prior to revegetating.

F-2 It is stated that adapted native species will be used. In many cases, seed stock will not be available. Natives will probably not be adapted to the disturbed soil sites, especially those severely scalped or the tailing areas which are leached with acid. These areas will be hard to vegetate. Other plants than native need to be considered for these areas if natives will not perform in a reasonable length of time.

Thank you for the opportunity to review the DEIS.

Sincerely,

Amos I. Garrison, Jr.
State Conservationist

PAYETTE N. F.
BIG CREEK R. D.

RECEIVED

The Soil Conservation Service is an agency of the Department of Agriculture

SCS-AS-1
10-79

F-17

RESPONSE TO COMMENTS BY UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

F-1 A detailed description of reclamation activities is presented in the Stibnite Mining Project Reclamation Plan which has been submitted to the Idaho Department of Land and the U.S. Forest Service. The summary of these activities is presented in Appendix E, Conception Reclamation Plan of the FEIS.

F-2 A detailed discussion of revegetation is presented in the Stibnite Mining Project Reclamation Plan. Test plots were established by Forest Service Intermountain Forest and Range Experiment Station, Boise Branch to determine viable species for use in the Stibnite area. Native seed collection and greenhouse planting of native bush and other understory species was initiated in the summer of 1980 under the direction of the Forest Service.

G

MAR 2 7 1981

(404) 262-6649

March 24, 1981

Mr. Kenneth D. Weyers
Forest Supervisor
U.S. Department of Agriculture
Payette National Forest
McCall, Idaho 83638

Dear Mr. Weyers:

We have reviewed the Draft Environmental Impact Statement (EIS) for the proposed Stibnite mining operation, 14 miles southeast of Yellow Pine, Idaho. We are responding on behalf of the Public Health Service.

After our review of the document, we have some specific questions which we feel should be answered in the Final EIS. These questions relate to Chapter 5, Effects of Implementation.

G-1 It is stated in the document that a 30 ft. haul road is being considered instead of the usual 60 ft. road. From an environmental standpoint, this is presented as being the most desirable to prevent land disruption and siltation. However, we would like to know what is the safety margin of a 30 ft. and a 60 ft. haul road, especially since large equipment and people will be expected to pass repeatedly during operation?

G-2 There is mention of naturally occurring arsenic levels in the proposed mining area with some being much higher than others. Will the disruption from the mining project cause concentrated higher levels of arsenic in the water shed run-off? Also, are any point source discharges planned from holding ponds or any other areas of the operation?

G-3 Will the West End Canyon Waste Dump be constructed so natural flow through can occur? If so, will this water be monitored?

G-4 We feel a more definite commitment should be given to the proposed housing for the people who will be employed by the mine. It appears from this document that only minimum requirements will be met at best. Also, there is no mention of emergency and health services that will be available. The commitment for EMT is a plus for this facility but where will injured persons be taken for secondary care? Is there any facility nearby that can handle the transported victims?

G-5 We noted the power for the housing units would be supplied from diesel and propane generators and that the noise levels would be around 100 dBA. How close will these generators be to the dwellings? What is the expected noise level in the trailers?

F-18

RESPONSES TO COMMENTS BY THE DEPARTMENT OF HEALTH AND HUMAN SERVICES PUBLIC HEALTH SERVICE

G-1 All roads will be built to MSHA standards and include outside berms and adequate traffic control measures. In addition, all road plans and specifications for the project will be reviewed by the Forest Service engineer to insure that Payette National Forest road design requirements are met. A copy of the road plans will be available for review at the Big Creek Ranger District office McCall, Idaho.

G-2 As presently envisioned only the oxide ores (those in which the arsenic concentrations have been leached) will be mined. The present pit design is not expected to intersect the sulfide concentration to any significant extent. Stabilization of the existing tailing pile along with the rerouting of Meadow Creek should reduce the overall arsenic levels in EFSF of the Salmon River, as discussed on pages 122-123 of the EIS document.

G-3 The preliminary design of West End Canyon Waste Dump as proposed by the foundation engineer (Report of Subsurface Soils Investigation West End Canyon Waste Dump Site Stibnite, Idaho - December 23, 1980 NTL) would be constructed by end dumping and would not impede the passage of surface flow. West End Creek would be monitored as described in Appendix C.

G-4 A detailed housing site plan is currently being prepared for submission to the Valley County Commissions. Hospital facilities at Cascade and McCall are described on page 52 of the EIS document. Emergency medical air service is also by Arnold's Flying Service (Cascade) to Cascade, McCall or Boise, if necessary.

G-5 As shown on the site plans for the trailer housing development, the generators will be approximately 100 feet from the nearest trailer. The unit will be housed in an audio-insulated building. The generator will also be installed with a critical silencer. The noise levels at this point should be less than 45 dBA.

G-6 Also absent from the document was a commitment for recreational facilities that would be available to the workers and their families.

Thank you for the opportunity of reviewing this draft statement. We would appreciate receiving a copy of the Final EIS when it is issued.

Sincerely yours,

Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Center for Environmental Health

G-6 As presently envisioned the dining hall will include a recreation room with facilities for movies, video-taped T.V., a pool table and other indoor recreation opportunities. In addition, the Stibnite area offers unique outdoor recreational activities including fishing, hiking, sight-seeing, camping, etc.

H

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
REGIONAL OFFICE
ARCADE PLAZA BUILDING, 1321 SECOND AVENUE
SEATTLE, WASHINGTON 98101

MAR 2 6 1981

March 23, 1981

REGION X

IN REPLY REFER TO:
10C

Mr. Kenneth D. Weyers
Forest Supervisor
U.S. Department of Agriculture
Forest Service
Payette National Forest
McCall, Idaho 83638

Dear Mr. Weyers:

Re: Draft Environmental Impact Statement
Stibnite Mining Project
Payette National Forest
Valley County, Idaho

We have reviewed the statement submitted with your January, 1981 letter.

Our concerns are principally on how the mining operations could impact existing and new housing. Our Portland Area Office has jurisidiction over HUD projects in Idaho and Oregon and their detailed review comments are attached for your consideration.

We believe the proposed activities will increase employment opportunities for the low and moderate income and will strengthen the fiscal condition of communities in the area, thus we support the proposed activities. However, as indicated in our Portland review we suggest adequate monitoring be provided to minimize potential hazards.

Thank you for the opportunity to comment.

Sincerely,

Gordon W. Johnston
Regional Administrator

Attachment

cc: Nile Paull, PAO HUD
Cliff Safranski, PAO HUD
Reno Kramer, Boise Service Office, HUD

Memorandum

U.S. DEPARTMENT OF
HOUSING AND URBAN DEVELOPMENT

TO : Robert C. Scalia, Regional Director, CPD, SRO, 10C DATE:03/17/81
Attention: Ry Tanino

FROM : Clifford T. Safranski, Portland Area Office, 10.2SS

SUBJECT: DEIS - Stibnite Mining Project, Payette National Forest, Idaho

In accordance with your February 2, 1981 request I have reviewed the above subject DEIS.

The remotness of the area, climate and projected 10 year life of the mining operation impose limitations on normal housing considerations.

However, some of the natural and man-made hazards are essential to consider when selecting the site and services for housing.

Generally, the review comments that follow attempt to ensure that a level of awarness of those concerns is emphasized.

Housing Concerns

Page 11 Earthquakes up to a 6 reading have been measured in the Seismic Zone II area. The current UBC (uniform Building Code) and HUD/FHA 79g requirements suggest that soil tests should be conducted and appropriate engineering performed for housing sites.

Page 19 Site selection and drainage are particularly important due to the high arsenic concentrations in surface water particularly during May and June runoff period.

Page 30 H-1 | Table 2-5 could be improved if a column providing acceptable standards was added to it.

High arsenic levels in groundwater supplies as well as high calcium and magnesium hardness and ionic constituents were revealed in sample wells. In addition, water quality data for the well located below the leaching pad indicated localized degradation in the system resulting from construction activities.

H-2 | These conditions seem to indicate the need to exercise monitoring of water quality to determine if treatment is needed for safe drinking water.

Page 22 H-3 | Table 2-7 could be improved by adding a column which lists acceptable standards.

PREVIOUS EDITION IS OBSOLETE

HUD-96 (7-79)

F-21

RESPONSE TO COMMENTS BY THE DEPARTMENT
OF HOUSING AND URBAN DEVELOPMENT

H-1 State of Idaho water quality standards are defined by the ultimate use for which the water are to-be-protected. The EFSF Salmon River has been designated for protection as a domestic water supply, agricultural water supply, cold water biota, salmonid spawning, primary contact recreation, secondary contact recreation, and as a Special Resource Water. Meadow Creek and Sugar Creek have similar designated uses. The reader is referred to the State of Idaho and the U.S. EPA Publications for further discussion of various standards that may apply to different classified uses.

H-2 The company does not anticipate utilizing any of the sites tested for culinary water. Any domestic water source selected will be thoroughly tested and approved by the Idaho Department of Health and Welfare and Central District Health office prior to its use.

H-3 See response to H-1.

2

Page 23 Housing siting and drainage again seem to be critical concerns particularly if the flood episode severly washed out many parts of the road between Yellow Pine and Stibnite.

Page 34 & Page 37 H-4 Concentrations of heavy metals in fish and the increased potential for heavy metal bio-accumulation associated with mining activities suggests the need to monitor fish particularly when those fish will be consumed as food.

Page 35 & Page 36 Table 2-12 reflects high background levels of arsenic and mercury.

H-5 A column showing acceptable standards would help in understanding Table 2-12.

Page 41 H-6 The feasibility of present and future by-product recovery of antimony and tungsten would be a helpful discussion.

If the feasibility is imminent, storage of the waste for later processing would be more important.

Page 46 H-7 Table 2-14 seems to be confusing since the subtotals don't appear to add.

Page 48 H-8 The Yellow Pine water system does not provide for treating the water supply. It would seem helpful to plan for the contingency of water degradation.

Page 49 & Pages 138-139 H-9 The anticipated fluctuating enrollment in the school system and the previous closure of the Yellow Pine school for almost 20 years suggests that educational opportunities are tenuous. The exploration of alternatives including transporting by snow-crawler, change in the teaching year calendar and use of audio-visual programs would seem helpful.

Page 50 & Page 106 "Stibnite has been designated as a potentially dangerous abandoned chemical disposal site by the U. S. Environmental Protection Agency."

"Remove all hazardous or special wastes (oil and petroleum products) to an authorized sanitary landfill or approved hazardous waste disposal site."

H-10 Has EPA specifically located the chemical disposal site designated as potentially hazardous? If so, is it located where it would not adversly affect housing? Is the removal of all hazardous or special wastes proposed for the existing as well as the anticipated wastes?

H-4 See Appendix C for proposed Stibnite Monitoring Plan.

H-5 See discussion on page 35, paragraph 4. No acceptable levels have generally been established for either arsenic or lead for fish flesh and tissue.

H-6 The company has made no plans for the recovery of either antimony or tungsten. Therefore, no geological/metallurgical information is available on this topic. The process proposed is selective for gold and silver and would not impact the recovery of any antimony or tungsten at a future date if those minerals were found to exist in the waste rock or processed ore.

H-7 The table has been corrected in the FEIS.

H-8 CSM has proposed assisting the Town of Yellow Pine in making improvements to its water system including additional storage facilities and a chlorination system.

H-9 As discussed in Chapter 2 and on pages 138 and 139 of the EIS document, the Yellow Pine Elementary School has experienced fluctuating enrollments over the years to the point that operation was closed for six years between the period 1961-1980 due to lack of sufficient enrollment. However, the proposed mining operation is limited by local climatic conditions, and would occur only during the period of mid-May to mid-October. This period does not overlap with the school year. Also, according to present plans the mining protion of the operation would be contracted to a private company on a seasonal tonnage-mined basis. It is expected that most of the mining including stockpiling would be completed prior to September 1 each season. Therefore, effects on the Yellow Pine Elementary School would be expected to be minimal, and the alternatives identified by the reviewer do not appear to be necessary or feasible. The McCall-Donnelly School District #421 has been consulted on a regular basis throughout the preparation of the EIS document. The district has expressed support of the project, and will benefit from the increased State and County revenues generated by the proposal.

H-10 On November 19, 1980 EPA amended 40 CFR Part 261 of the Hazardous Waste Regulations under the Resource Conservation and Recovery Act (RCRA) to temporarily exclude from regulation, the solid waste resulting from exploration, mining, milling, smelting and refining of ores and minerals. This exclusion does not apply to suc wastes as spent solvents, pesticide wastes, and chemical products which may be associated with mining and processing operations. CSM has filed the initial Notification, and Application for a Hazardous waste Permit as directed by RCRA. The company will also be preparing a comprehensive hazardous waste management plan once the hazardous waste standards for operating a facility where hazardous waste is treated, stored, or disposed of are finalized by EPA.

3

Page 51 Seasonal roads closed during winter by snow, effected by flood episodes and requiring extensive grading and maintenance in the summer suggest the need for very flexible fire fighting and emergency services equipment.

Page 72 & Figure 4-9 One housing site is proposed at Midnight Creek near Monday Camp and another is near North Tunnel Mine at the Sawmill site.

The proximity to hazardous waste, to explosive or potentially hazardous material, to degradated water supply, to excessive noise, to flood water hazards and to isolation due to impassable roads all need to be considered seriously in addition to normal construction concerns when selecting housing sites.

Page 127 & Page 128 Although "... no major impacts on aquifer recharge would be expected", "if significant volumes of groudwater are intercepted in the later phase of mining the lower areas....this water would have to be isolated....by....injection into the aquifer at a site below the mine." "Groundwater samples taken in the West End Mine area....arsenic levels average nearly ten times higher."

H-11 If water with significally high levels of arsenic are to be re-injected into the aquifer it seems important to treat the water prior to re-injection.

Environmental Clearance Officer

Regarding housing site locations, careful consideration was given to selecting alternative sites which would provide for adequate, safe living conditions. The Company's housing proposal involves providing central sanitary sewer and water facilities, improved communications, recreation facilities, and other ammenities necessary to provide pleasant living conditions. None of the location options considered are located near the processing facilities or hazardous or special waste use areas. While the company does plan certain limited cleanup activities for existing waste areas from previous mining operations, the extent of such activities cannot be fully determined at this time. It should also be noted that none of the proposed housing locations are located near these areas.

H-11 It is very unlikely that reinjection would be utilized as a method of disposing of groundwater. Since the shallow aquifer and surface water are free mixing in this area, as evidence by spring flow patterns, the effect on the existing arsenic concentration would be minimal.

I

MAR 2 7 1981

STEVE SYMMS
IDAHO

United States Senate
WASHINGTON, D.C. 20510

March 26, 1981

Mr. Kenneth D. Weyers
Forest Supervisor
Payette National Forest
McCall, Idaho 83638

Dear Mr. Weyers:

I have been contacted by constituents concerning the Draft Environmental Impact Statement for the proposed Stibnite mining operation. People in whom I have a high regard have outlined for me their very strong feelings in favor of this project.

I request that in making your final decision that the overwhelming majority opinion of the community in favor of this project be thoroughly considered. As the Draft Statement pointed out, the opposition to this project was not based on the specific alternatives, but rather only general opposition to any development. Such general opposition is a factor which should receive less consideration in view of our country's emerging mineral crisis.

Thank you for this opportunity to comment on your Statement.

Yours for a free society,

Steve Symms
United States Senator

SS:gl

F-24

PLEASE REPLY TO:

☐ Idaho Falls Office
211 Federal Building
Idaho Falls 83401
(208) 523-6779

☐ Pocatello Office
207 Federal Building
Pocatello 83201
(208) 236-6778

☐ 1051 Blue Lakes Blvd.
(2) North, #3A
Twin Falls 83301
(208) 734-2515

☑ Boise Office
Box 1109
Boise 83701
(208) 334-1776

☐ Lewiston Office
Lewis-Clark Plaza
Lewiston 83501
(208) 743-1492

☐ Moscow Office
108 Federal Building
Moscow 83843
(208) 882-6669

☐ Coeur d'Alene Office
306 Federal Building
Coeur d'Alene 83814
(208) 664-5490

J

MAR 3 0 1981

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION X
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

REPLY TO ATTN OF: M/S 443

27 MAR 1981

Kenneth D. Weyers, Forest Supervisor
U.S. Department of Agriculture
Forest Service, Payette National Forest
McCall, Idaho 83638

RE: EPA Review of the Stibnite Mining Project (Gold Mine and Mill)

Dear Mr. Weyers:

We have completed our review of the Stibnite Mining Project, Gold Mine and Mill Draft Environmental Impact Statement (DEIS). We have rated the Stibnite Project LO-2 (LO - Lack of Objections; 2 - Insufficient Information). This rating will be published in the Federal Register in accordance with EPA's responsibility under Section 309 of the Clean Air Act to inform the public of our views on proposed federal actions.

In general, we feel the DEIS adequately addresses the potential impacts that may arise from the proposed project and also adequately analyzes the project alternatives. However, we do feel more information or clarification in some areas would make the EIS a more complete document.

The issues that we feel deserve additional attention in the FEIS are outlined below and in Attachment I.

Mitigation/Reclamation Plan

J-1

We feel that the FEIS and Record of Decision should commit to using the reclamation plan and the mitigation measures outlined on pages 104 through 111 of the DEIS. We also suggest that when the reclamation plan is developed, the U.S. Forest Service request other resource agencies, such as mining agencies and mining schools, to review the plan. Their expertise and comments may enhance the overall plan.

Water Quality

Our primary concern is potential water quality contamination from leachate and surface runoff, as well as from sediment pond discharges and from the disposal of leaching solutions. We have provided more specific comments on water quality concerns in Attachment I.

F-25

RESPONSE TO COMMENTS BY U.S. ENVIRONMENTAL PROTECTION AGENCY

J-1 A detailed Reclamation Plan is being developed for submittal to the State of Idaho Department of Lands and the U.S. Forest Service. A summary of this plan is presented in Appendix E (Conceptural Reclamation Plan). Before accepting the final Reclamation Plan approved by the Department of Lands, the mining company will be bonded ($750/acre) to insure that the provisions of the plan are implemented. The complete Stibnite Mining Project Reclamation Plan can be reviewed at the Payette National Forest, Big Creek District Ranger Office in McCall, Idaho after July 1, 1981.

Air Quality

We do not feel that the National Ambient Air Quality Standards for PSD increments will be exceeded as a result of the proposed project. Based on other mining studies and local meteorological conditions, total suspended particulates (TSP) is the only pollutant of concern. While local degradation of visibility may occur, no large scale impacts are expected.

Solid/Hazardous Waste Management

J-2

On November 19, 1980 EPA amended 40 CFR Part 261 of the Hazardous Waste Regulations under the Resource Conservation and Recovery Act (RCRA), with regard to mining and mineral processing wastes. This amendment has temporarily excluded from regulation, the solid waste resulting from the exploration, mining, milling, smelting and refining of ores and minerals. This exclusion does not apply to solid wastes such as spent solvents, pesticides wastes, and discarded commercial chemical products that are not uniquely associated with these mining and allied processing operations. Should the Stibnite proposal generate any of these nonindigenous wastes and if they are identified or listed as a hazardous waste under Part 261 of the RCRA Regulations, they must be managed in conformance with the Subtitle C Regulations. Therefore, the FEIS should describe any nonindigenous wastes that may be associated with the Stibnite Project and discuss how they will be handled to conform to the Subtitle C Regulations.

I would like to thank you for the opportunity to review the Stibnite proposal. If you have any questions about our concerns, please feel free to contact me or Bub Loiselle, of my staff, at (206) 442-1285 or (FTS) 399-1285.

Sincerely yours,

Roger K. Mochnick for

Elizabeth Corbyn, Chief
Environmental Evaluation Branch

Attachment

cc: Bob Courson
Mike Johnston
Ken Feigner
Grover Partee

J-2 Throughout the preparation of the EIS document, CSM has been in close contact with the Office of Water and Hazardous Waste, Waste Management Branch, U.S. Environmental Protection Agency, Region X, and the Idaho Department of Health and Welfare - Division of Environment regarding the recently promulgated Hazardous Waste and Consolidated Waste Permit Regulations. This has included filing of the initial Notification of Hazardous Waste Activity and the Application for a Hazardous Waste Permit Consolidated Permits Program. The company is aware that while recent amendments to the Resource Conservation and Recovery Act Hazardous Waste Regulations (specifically 40 CFR Part 261) temporarily excluded from regulation the solid waste resulting from exploration, mining, smelting and refining of ores and minerals; the exclusion does not apply to such wastes as spent solvents and discarded chemical products which may be produced at the facilities. A review of the lists of hazardous wastes identified in the Hazardous Waste Regulations indicates that CSM will not be generating any of these wastes. If at a later time it is determined that any of the wastes listed will be generated, the company will prepare a Hazardous Waste Management Plan in conformance with the Subtitle C Regulations. The Plan will be submitted to EPA for review and approval. The Plan will also be incorporated into the Final Operating Plan on file with the Payette National Forest.

Attachment I

EPA's Comments on the Proposed Stibnite Gold Mine and Mill Project

DEIS

General

J-3 1) Page 8; Because of the chemical constituents that will be used at the Stibnite site, an EPA approved Spill Prevention and Control Countermeasure Plan (SPCCP) should be provided in the FEIS and incorporated in the Record of Decision (ROD). An enforceable commitment by CSM for implementation of the approved SPCCP should be obtained prior to approval of the Mining Plan.

J4 2) Page 60; Eight decision criteria that are used to evaluate the various project alternatives are referenced at the bottom of the page. However, on pages 61 through 62 only seven criteria are outlined.

J5 3) Pages 71-72; The FEIS should more thoroughly discuss the ultimate fate of the heap piles after they have been through the leaching process. Specifically, the DEIS states that the heap waste will be disposed of at the existing tailings pile. According to the Reclamation Plan (page B-25/B-26) the heap waste may be removed or left on the pads at the end of the mine life. This should be clarified in the FEIS so that a better evaluation of the potential impacts from the waste heaps can be made.

J-6 4) Page 160; Although we support the selection of Alternative 5 as the preferred alternative, there seems to be some questions as to the U.S. Forest Service's reasoning behind the choice. Specifically, the DEIS implies that most of the alternatives are similar and that the Forest Service would favor the one requiring the least amount of energy consumption. However, on page 152, the DEIS states that Alternative 5 would require the largest energy requirement. Also, on pages 149 and 151, Alternative 3 apparently meets all 12 of the key evaluation criteria and received the best overall ranking in terms of the environmental effects evaluation. We feel these discrepancies in the evaluation of the alternatives should be clarified in the FEIS.

Water Quality

J-7 1) Page 68; Since some sulfide mineralization exists within the zone of ore to be mined, the potential for acid leachate to impact surface and ground water quality exists, especially in the mine pit areas where higher sulfide concentrations are likely to be found. The FEIS should address how this potential impact will be attenuated during operations and after mining ceases. Also, the quality and quantity of leachate produced under the ultimate disposal method needs to be fully discussed. Particular attention should be given to the role of the natural weathering process in aggravating/enhancing the oxidation of the piles. Mass balance for those constituents which are expected to exceed Primary or Secondary Drinking Water Standards should be presented. The assumptions underlying the leachate estimate and mass balances must be clearly detailed.

J-3 As noted on pages 105, 110 and 123 of the EIS document, a Spill Prevention Control Countermeasure Plan (SPCCP) will be required for the Stibnite project for controlling potential spills of petroleum products at the site. This requirement is applicable to operations storing 660 gallons above ground, or less then 42,000 gallons below ground. The Plan will also include contigency provisions for coping with spill situations involving cyanide. The Stibnite SPCCP will be included in the Final Operating Plan which will be submitted to the Forest Service for review and approval prior to initating any "on the ground" construction activities. CSM plans to store 50,000 gallons of diesel fuel at the facility. Approximately 28,000 gallons will be stored in underground tanks at the mine shop area. Each of the two generator sites will have above ground 7,000 gallon-capacity storage tanks at the sites. Diesel fuel will be transported from Cascade by tank truck. A complete copy of the SPCCP will be maintained at the Stibnite facility, and will be fully implemented within six months after the facility begins operation as required by 40 CFR, Part 112, 0.1 Pollution Prevention.

J-4 As discussed on page 61 of the EIS document, the decision was made by the Forest Service ID Team to consider Wilderness and Wild and Scenic River considerations within the context of several of the evaluation criteria categories due to the broad range of values and concepts this category includes.

J-5 All washed and neutralized processed ore will be removed to the existing tailing pile and, following the termination of mining and milling activities, the area will be reclaimed as outlined in the Conceptual Reclamation Plan which is included as Appendix E. The pads and processing facilities will also be dismantled and the area reclaimed when its of no further use.

J-6 In order to reduce the energy impacts of the project, the Forest Service has modified the Preferred Alternative presented in the DEIS to include a reduced West End dump. The dump, under the conditions and stipulations presented, would conserve approximately 50% of the fuel required under Alternative 5 as originally presented. The Forest Service's Selected Alternative was not judged to have any significant environmental effects beyond those presented for the original Alternative 5.

J-7 Weathering tests run on West End Mine ores indicate that the leachate theoretically expected from the ore body runoff would be in the basic pH range 8.4 to 9.1 (simulated test data). When the mine intersects sulfide mineralization the possibility exists that after long-term exposure acidic runoff could result depending on the material exposed and the conditions. While intrusions of sulfides exist throughout the ore body, extensive exposure to these deposits will not occur until very late in the mining operation. It is in the mining company's best interest not to expose or mine the sulfide ores since they only complicate the heap leaching process.

J8 In this context, the role that the neutralization of the ore heaps will play is a critical concern. Much more information on the chemistry of the process is essential in order to accurately/fairly evaluate the contamination potential of the piles. For instance, how much chlorine will be used to neutralize each heap? Will the chloride produced be chemically fixed or will it become available for leachate transport?

2) Page 93; Under Stockpiling Ore the DEIS states that temporary erosion controls will be implemented at both the mine pits and stockpiling areas to protect local water quality. These controls are a practical method for reducing contact between surface runoff and contaminated areas. We recommend that these controls be specified as mitigating measures in the final Operating Plan.

J9 3) Page 108; The last sentence on this page indicates that any water collected in the mine pits will be routed to a sediment pond(s) and settled prior to discharge to West End Creek or Garnet Creek. From this statement it appears that these discharges (even if only intermittent) will require a National Pollutant Discharge Elimination System (NPDES) permit. The FEIS should discuss if there is actually going to be a discharge to those surface waters.

J-10 4) Page 8-18; The "Description of Operations" indicates that at the end of each operating season all solutions will be neutralized and disposed. If disposal is by discharging to any waters, or by injecting underground, a permit(s) will be necessary. Further discussion is needed in the FEIS on the methods of disposal and the potential for water quality impacts.

Under existing conditions the area to be mined in West End Canyon has a very active spring and shallow subsurface water system. It is expected that during the latter years of mining this system may become a problem in the spring of the year at the lower mine elevations. If sampling indicates that pH or metal concentrations from this water are environmentally hazardous, the Forest Service will require that drainage from the area be disposed of in an acceptable manner in order to maintain the integrity and quality of West End Creek. This would most likely require that the mining company disposing of any mine drainage by spray irrigation over a wide area or utilizing the water for dust control at the mine and on the roads.

As described in several sections of the DEIS, ultimate disposal of the leached ore should have a beneficial impact on water quality. Under existing conditions Meadow Creek flows through the tailing pile. The pile is thoroughly saturated and, as indicated in Table 4, the pile appears to be a major source of arsenic, hardness and total suspended solids in the drainage. Under the proposed plan, Meadow Creek would be rerouted around the pile (see summary of proposed action in FEIS) and the pile would be dewatered. The fines would be covered by courser washed processed ore and the area would eventually be completely stabilized and revegetated. The disposal area would no longer be a significant source of leachate.

J-8 The process utilized to "neutralize" the cyanide in the processed heaps is known as alkaline chlorination. This process is widely employed in the metal-plating industry to oxidize cyanide to a much less toxic cyanate form (approximately 1000 times less toxic), and in the presence of excess chlorine to nitrogen and various salts. The total balanced chemical reaction is as follows:

$$2NaCn + 5Cl_2 + 12NaOH \quad N_2 + 2Na_2CO_3 + 10NaCl + 6H_2O$$

In this application only the partial conversion to the cyanate form will generally occur. The final conversion will proceed under atmospheric oxidizing conditions since the ore will be spread in thin lifts (approximately 6 inches) on the existing tailing pile. Under worst case conditions 2 to 3 tons of chlorine would be necessary for each 40,000 ton heap. However, the chlorine in solution will be collected in the wash pond and reused. No discharge will occur from the self-contained system.

J-9 If it becomes necessary to handle large quantities of mine water in the later years of mining the mining company will need to install a spray irrigation or overload flow system to dispose of settled effluent. In the event that neither of these alternatives are possible, and discharge to West End Creek is the only practical option, a NPDES permit will be necessary. West End Creek water quality will be monitored as presented in Appendix C throughout the operation of the project to detect any changes in local water quality.

J-10 Disposal will be by spray irrigation. This method was successfully used during operation of the pilot plant. No direct stream discharge or subsurface injection is anticipated.

K

IDAHO STATE HISTORICAL SOCIETY
610 NORTH JULIA DAVIS DRIVE BOISE, IDAHO 83706

STATE MUSEUM

March 31, 1981

Mr. Kenneth D. Weyers
Forest Supervisor
Payette National Forest
McCall, ID 83638

Dear Mr. Weyers:

We received and reviewed the Draft Environmental Impact Statement for the proposed stibnite mining operation. Our concern is with the archaeological and historic properties that may be of significance in the area. We will reserve all comments on the project until we receive the cultural resource reports that have been prepared.

Sincerely,

Thomas J. Green
State Archaeologist
State Historic Preservation Office

TJG/kmh

K-1 The Cultural Resource reports together with the Forest Service determination of effect and significance will be provided to SHPO for review and comment as required by 35 CFR 800. Any required mitigation will be included in the operating plan.

L

State of Idaho
DEPARTMENT OF WATER RESOURCES
STATE OFFICE, 450 W. State Street, Boise, Idaho

JOHN V. EVANS
Governor

C. STEPHEN ALLRED
Director

Mailing address:
Statehouse
Boise, Idaho 83720
(208) 334-4440

March 31, 1981

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P. C. FOR PAYETTE N. F.

Mr. Dennis Suihkonen
James M. Montgomery Consulting
Engineers, Inc.
1301 Vista Ave.
Boise, ID 83705

Subject: Stibnite Tailings Berm

Dear Mr. Suihkonen:

Your letter to Mr. Stubblefield dated February 6, 1981, and the Draft Environmental Impact Statement pertaining to the proposed Stibnite mining operation have been reviewed.

Since the proposal states that the material will not be placed in slurry form nor will water be stored, the State of Idaho Mine Tailings Impoundment Structures Rules and Regulations do not apply.. Thus, the Department will not have jurisdiction over the design, construction and maintenance of the tailings impoundment as proposed.

Sincerely,

Norman C. Young
Administrator

PAYETTE N. F.
BIG CREEK R. D.

APR -3

cc: Kenneth D. Weyers, U. S. Forest Service
Western Region

JEB:NCY:ew

F-30

MAR 16 1981

STATE OF IDAHO

DEPARTMENT OF FISH AND GAME

REGION 3
109 WEST 44TH
GARDEN CITY, IDAHO 83704

March 12, 1981

Mr. Kenneth D. Weyers
Supervisor's Office
Payette National Forest
P.O. Box 1026
McCall, Idaho 83638

Re: Comments on Stibnite Mining Project DEIS

Dear Mr. Weyers:

Idaho Department of Fish and Game personnel reviewed the Draft Environmental Impact Statement for the Stibnite Mining Project and consider the document well prepared, thorough, and accurate.

After reviewing the alternatives presented we support the modified Alternative 5 as selected by the United States Forest Service as their preferred alternative. We feel this alternative best protects the fishery resources of the area in regard to two major project components:

1. Waste disposal - this alternative reduces areal disturbances to the watershed by providing no new waste disposal dumps.

2. Road construction - this alternative reduces areal disturbances and total volume of cut/fill disturbances thereby reducing sediment recruitment to the aquatic environment.

We strongly support Canadian Superior Mining stabilizing the existing tailings pile.

Thank you for the opportunity to review and comment on this document.

Sincerely,

James F. Keating
Regional Supervisor
Region 3/Boise

cc: Bureau of Program Coordination
R381-006
State Clearinghouse

EQUAL OPPORTUNITY EMPLOYER

F-31

N

STATE OF IDAHO

DEPARTMENT OF HEALTH
AND WELFARE

DIVISION OF ENVIRONMENT
Statehouse
Boise, Idaho 83720

COPY ROUTED MAR 17 198

P.C. FOR PAYETTE N. F.

March 12, 1981

PAYETTE N. F.
BIG CREEK R. D.

MAR 13 '81

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	CUT	SPD	ACT
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W. EXCL			
FCO			

Mr. Kenneth D. Weyers
Forest Supervisor
Payette National Forest
McCall, Idaho 83638

Dear Mr. Weyers:

The Division of Environment, Department of Health and Welfare has reviewed the Stibnite Mining Project Gold Mine and Mill draft EIS and wishes to submit the following comments.

General Comments

Air

N-1 There does not appear to be any significant air pollution problems if the company will meet the emission levels shown on pages 109, 120 and B-23. We would like to know the BTU rating and proposed fuel for the small furnace used to melt the plated steel wool.

Water

N-2 Our Department must review the modifications to the public water supply system for compliance with *Idaho Regulations for Public Drinking Water Systems - 1977*. We would prefer that the modifications include construction of a well rather than continuing to use the existing surface water intake structure.

Alternative

We agree that the alternative #5 selected by the Forest Service appears to have the fewest adverse environmental impacts and we could support this alternative.

EQUAL OPPORTUNITY EMPLOYER

F-32

RESPONSE TO COMMENTS BY THE STATE OF
IDAHO DEPARTMENT OF HEALTH AND WELFARE DIVISION OF ENVIRONMENT

N-1 The maximum BTU rating of the three small furnaces proposed would be approximately 560,000 BTU/Hr if all three were in operation at the same time.

N-2 Both a well system and a spring diversion and storage option are currently being considered in final plans which will be submitted to the Central District Health Office in McCall and your Department's Regional office in Boise.

Specific Comments

N-3 There are numerous instances where references are cited in the text but are not listed in the "References Cited and Bibliography" section.

N-4 There is disagreement with the text describing data from table 2 - 4 pH values and data in table 2 - 4 (page 18).

N-5 Table 2 - 4 list "Field" values. Is this pH?

N-6 Table 2 - 4 "Conductance" should be termed "Specific electrical conductance" with units in umhos/cm.

N-7 Table 2 - 10, page 28 perhaps would be more useful if family, generic and species names were listed for the insects collected.

Thank you for the opportunity to comment on this environmental statement.

Sincerely,

Lee W. Stokes, Ph.D.
Administrator

LWS/b

N-3 This has been corrected in the text of the FEIS.

N-4 The numbers on Table 2-4 were rounded to the nearest decimal place. The text expresses the exact figures taken from the Environmental Background Report Stibnite Mining Project (JMM, 1980).

N-5 This has been corrected in text of FEIS.

N-6 This has been corrected in text of the FEIS.

N-7 The genus and species names are available in the full support document: Biological Resources Evaluation of the Proposed Canadian Superior, Ltd. Mining Project at Stibnite, Idaho, (DBI, 1980) which can be reviewed at the Big Creek District Ranger Office in McCall, Idaho.

O

MAR 2 6 1981

House of Representatives
State of Idaho

March 24, 1981

Mr. Kenneth D. Weyers
Forest Supervisor
Payette National Forest
McCall, Idaho 83638

RE: Impact Statement
Scibnite Project

Dear Mr. Weyers:

I read with great interest the draft E.I.S. on the above project. It is not often these days a person can envision a project that is economically and environmentally beneficial. The general area needs the additional employment opportunities desperately. Perhaps by diversifying into metals we can avoid some of the deeper depressions caused by a slack building industry.

The enviromental plus is very exciting; I saw the test plots of the revegetation for your used material. It is gratifying to know that the tailings will once again be a source of grazing for wildlife.

The one area of the impact statement that I do not understand and might find fault with, is the hauling of the overburden down off the hill rather than stockpiling on-site and using it in reclaiming the excavation. It would appear to me that to haul the material down would be a terrific waste of energy and a source of unnecessary pollution.

The point has been made that this material might be a source of pollution to the streams, but it would appear to me that the risk could be offset by the known waste of energy and known pollution from the haul.

Again the overall plan looks better than excellent and I hope the project can proceed without delay.

Very truly yours,

Jim S. Higgins

JSH:ah

cc: James M. Montgomery
Consulting Engineers, Inc.

F-34

RESPONSE TO IDAHO REPRESENTATIVE HIGGINS

O-1 In its final decision the Forest Service has elected to include a reduced West End Canyon waste dump (approximately 1.2 million cubic yards) in its Selected Alternative. This was done to reduce air pollution potential and reduce energy consumption.

P

John V. Evans, *Governor*
Daniel T. Emborg, *Administrator*

State Capitol Building
Boise, Idaho 83720

DIVISION OF ECONOMIC AND COMMUNITY AFFAIRS

PAYETTE N.F.
BIG CREEK R.D.

March 2, 1981

MAR - 4

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DFR			
W BIOL			
FCO			
CLERK			

Payette National Forest
Big Creek Ranger District
McCall, Idaho 83638
Attn: Earl F. Dodds

Dear Mr. Dodds:

The Idaho State Clearinghouse has completed its review of the DRAFT ENVIRONMENTAL IMPACT STATEMENT STIBNITE MINING PROJECT - SAI #00115411. We deistributed copies of the proposed decision to the following agencies for their review and comment:

Ida-Ore Regional Planning and Development Association
Department of Health and Welfare/Division of Environment
Department of lands
Department of Water Resources
Department of Fish and Game
Department of Agriculture
Division of Economic and Community Affairs
Idaho Historical Society

We received no comments from the listed agencies prior to the completion of this report. Late comments or requests will be forwarded to your agency.

Thank you for the opportunity to assist you in the review of your Draft Environmental Impact Statement. Please send us copies of your Final Environmental Impact Statement upon completion. If you have any questions, please do not hesitate to call either myself or Lois Wade at 208-334-4718.

Sincerely,

Gloria Mabbutt, Coordinator
Idaho State Clearinghouse

GM/lw

IDAHO
A Land For All Seasons

MAR 2 - 1981

Q

March 17, 1981

Mr. Kenneth D. Weyers
Forest Supervisor
Payette National Forest
McCall, Idaho 83638

Re: Stibnite Mining Project-
Gold Mining and Mill
December of 1980

Dear Mr. Weyers:

This letter represents my comment on the Draft Environmental Impact Statement on the Stibnite Mining Project - Gold Mine and Mill (December 1980) as proposed by James M. Montgomery.

As you will note, my partners and I have located a 103 acre placer claim on the tailings piles in the area in question. Said study notes said claim on page 42. It appears there is an intent to interfere with our claim and cover the same.

Q-1

My partners and I hereby object to the use of our claim area by anyone other than ourselves. As you know, we believe there are recoverable strategic metal in the tailings. I intend to file a "Notice of Intent to Operate" in order to drill, test and explore in the near future so the metals may be recovered.

We are willing to enter into a cooperative agreement with other users allowing us to process the tailings followed by their intended use, whatever it may be.

Please file this letter as our protest and comeent on said study. Place my attorney John S. McKinney, P.O. Box 1442, Salmon, Idaho, 83467, and myself on your mailing list with regards to this matter.

F-36

Very truly yours,

Derrold Slavin

DS:pah

cc: John S. McKinney

RESPONSE TO COMMENTS BY MR. DERROLD SLAVIN

Q-1 The decision to approve or not approve CSM's proposed action calling for use of the existing tailing pile will not be made on the basis of validity of the various claims, but through exercise of the FS jurisdiction to manage the surface resources. The detailed operating plan for the various construction and working phases of the proposed mine will be submitted for approval in a timely manner before the project gets underway. The CSM plan for stabilizing and reclaiming the existing tailing pile is in accordance with the approved Big Creek Multiple Use Plan.

R

RETYPED FOR PUBLICATION Mar. 18, 1981

Mr. Weyers,

As a property owner and business people in Yellow Pine, we feel Superior Mining would be an asset to our community. We need the employment in our vicinity.

As owners of the B & F Cafe and Bar we certainly want employment to be increased.

Thank you,

Faye Stark
Box 377
Yellow Pine, ID
83477

F-37

S

February 28, 1981

PAYETTE N. F.
BIG CREEK R. D.

2[illegible] - 2[illegible]

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	[illegible]	[illegible]	[illegible]
DFR	[illegible]		
W. BIOL.			
FCO			
CLERK			

To: Earl Dodds, District Ranger
Payette National Forest
McCall, Idaho 83638

From: Jerry S. Dixon, biologist
Box 1176
McCall, Idaho 83638

RE: Draft E. I. S. on Stibnite Project.

Dear Sir:

S-1 One interpretation of the 1872 mining law gives CSM the "Right to pursue a reasonable mining operation." But just what constitutes a "reasonable" operation. If another cyclical storm occurs (as happened in 1974) on the East Fork of the South Fork and washes cyanide into the aquatic ecosystem is it "reasonable" to ask the CSM officials to use the East Fork water below their mill for culinary purposes? It is obvious to the most casual observer that a large scale cyanide operation on a national treasure as the East Fork of the South Fork of the Salmon River is not reasonable at all.

What exactly is the strategic importance of gold and silver? Perhaps there can be an argument for cobalt and molybdenum but it would appear that gold and silver are most strategic for their hording potential. Beside the fact that we import and horde gold give me a reason to sacrifice this river for it.

Gold has dropped from $900 plus per ounce to $498 per ounce in a little over a year. Silver has also dropped in price. What price will CSM need to make a go of it? As the world stabilizes and the dollar is strengthened gold prices drop. If the present administration can slow inflation and strengthen the dollar will gold prices drop so that Stibnite is left with empty trailer courts?

RESPONSE TO COMMENTS BY MR. JERRY DIXON

S-1 The water of EFSF of the Salmon River below the operating area will not be used for culinary purposes. Domestic water will be developed from either groundwater or spring sources.

The premise is set forth (page III Alternative 2) that "No Action" provides a baseline but that it is is not a 'reasonable' choice. If this 'No Action' was not examined as a real choice does this not diminish the value of this document? Is it not the case that 'No Action' is every bit as viable of an option if it can be shown that gold and silver are not strategic minerals, environmental costs to Valley County and Idaho outweigh benefits, a boom town could be created that would stress services and then bust if gold prices drop, recreational activities as hunting and fishing would be impacted and most of the jobs would be for out of state people who would work six months and then exacerbate Valley County's already soaring unemployment?

If CSM is sincere about helping out the local economy then one of their options should be to voluntarily pay a severance tax such as is now before the Idaho Legislature. Would CSM be interested in testifying before the legislature on the reasons why a mineral severance tax would be good for our hard pressed county and state?

F-39

On page 23 paragraph 4 there is a reference to a high water where, "Flows exceeded past records." Is there not danger in assuming that this high water or other climatic events as high intensity rain storms or rain on snow events are not highly cyclical and should therefore be expected during the life of the project? I refer to the unusual climatic conditions that produced a hard runoff and erosion in 1964-65 (Platts 1968), "unprecedented total rainfall" in 1962 (Haupt et al. 1963), "excessive precipitation intensities" in 1959 (Kidd 1961), "record-breaking rain-on-snow floods" of 1955 (Haupt et al. 1963), "a hard runoff" in 1954 and a spring storm in 1948 that was a "one in a hundred year event" (USFS EIS 1974). Can you produce the documentation high water runoffs for the last 50 years let alone the last 100 years on the East Fork of the South Fork?

S-2

S-2 Many laymen and occasionally some hydrologists become confused about the real meaning of storm or flood return periods. For example, the commonly referred to 100-year flood or event does not mean that there will be one and only one such flood every 100 yeras. In fact, there is only a 37% chance that a 100-year flood will be equalled or exceeded only once in any 100-year period. There is a nearly equal (36%) chance of experiencing no such storms in the same period. Furthermore, there is a 19% chance of experiences exactly two such events in 100 years. Another way of interpreting the meaning of a 100-year event is to say that there is a 1 in 100 or 1% chance of equaling or exceeding the 100-year event in any one year and, conversely, a 99% chance of non-occurence in any one year.

Fifteen years of runoff data exist for the Stibnite area. Difficulties arise in attempting to predict the magnitude of a 100 year event from so little data. However several methodologies have been developed to determine an n-year (where n is the return period) using site characteristics rather than stream flow data. These methodlogies are used by all state and federal agencies and are useful in making comparisons between calculated and known data. In designing the various components of the Stibnite project, the magnitude of the flood events was determined using a methodology outlined in USGS (1973). This methodlogy uses site and drainage characteristics to determine flood magnitudes, and is used and recommended by the Idaho Depratment of Water Resources, USGS, USFS, and the Idaho Department of Highways.

Is it not the case that the process CSM is using has previously only been done commercially in open areas where risks of a spill and subsequent pollution of surface and ground water was not imminent? If so are we not being asked to use one of Idaho and America's finest watersheds as an experimental site to extend the limits of cyanide leaching techniques?

S-3

Has this cyanide leaching process ever been tested at Stibnite's altitude before using more than a pilot project? Is it not the case that the full scale project will have three pads each at least three times the size of the presen. pilot project and that this greatly increases the chance of an accidental spill?

There is a reference to the unemployment problem in Valley County (page 136 paragraph 6) saying the project will, "Accelerate the diversification of the local economy." However, is it not the case that Valley County is now in a boom period, at least during the summer, because of second home construction and that unemployment is presently high because although there is more that adequate work during the summer there is a dearth in the winter? Will not the CSM employees who will only have work in the summer exacerbate this problem?

S-4

The document states (page 144 paragraph 3) that no rivers are presently being considered for Wild and Senic River status, but is it not the case that both the East Fork of the South Fork and the South Fork of the Salmon River are eminently qualified to be protected as wild an senic rivers? Might these rivers someday be protected in a state Wild and Senic River System as California now has? Is it known how many recreation visitor days there are for floating and boating on the East Fork?

Is it not the case that the East Fork of the South Fork is listed as an Unique Ecosystem by the U.S. Fish and Wildlife Service in their 1980 inventory? What does the Fish and Wildlife Service have to say about cyanide and important fish and wildlife habitats of Idaho? Would mining and cyanide leaching affect

S-5

Prediction of flood events is similar to predicting any disaster. One can look at the existing conditions and look at the past to predict what will happen in the future. It should be noted however, that in discussing a n-year flood, it is defined as a condition that will occur, on the average, once every n years.

S-3 Heap leach has been used in several places in America where the climatic and topographic conditions have been similar to those at Stibnite. Examples include Landlusky, Montana, Bayhorse, Idaho; Zortman, Montana; Crede, Colorado; and Windfall, Nevada.

S-4 Approximately one third of the labor force will be permanent CSM employees and will not be subject to seasonal layoffs. The other workers at the site will be seasonal or contract employees. The contract employees would not be expected to remain in the area during the winter. The seasonal local employees would be subject to winter layoff. Seasonal winter layoff is presently common in the area, due to extreme climatic conditions.

S-5 The Forest Service and Fish & Wildlife Service cooperated in 1980 in inventorying the EFSF Salmon River which resulted in the unofficial classification as "unique ecosystem." The Fish and Wildlife Service has commented on the DEIS as part of the Dept. of Interior comments (see letter A). It is not expected that the proposed mining activities would have any different effect on the river's possible status for Wild and Senic classification than existing disturbances from past mining in the area, or other activities that may occur on patented lands in the area.

the possible status of the East Fork of the South Fork for Wild and Senic River status? How?

S-6

Is not the U.S. Forest Service mandated under law to write this EIS and not a private engineering firm under contract to the potential extractor of the minerals? If that is the case then how objective can this document be when it states as a premise for looking at the project (page iii): "The No Action Alternative provides a baseline against which the impacts of the proposed project and the selected alternative can be measured."

It is obvious that this document is drawn up to give CSM a chance to degrade one of Idaho's finest river. Why should Valley County and Idaho be asked to endanger one of our national treasures so that an American subsidiary of a foreign multi-national can mine with a lethal chemical to get a non strategic mineral that we are already hording vast quantities of?

We shouldn't. The risks are too great and the benefits miniscule compared to what we might lose.

F-41

S-6 The DEIS was written under a Memorandum of Understanding (MOU) between the mining company and the U.S. Forest Service, where by a qualified private contractor can be retained to prepare the DEIS under supervision of the Forest Service. The practice provided for by NEPA regulations, is becoming quite common, and is used to supplement Forest Service resources and complete projects of this type in a timely manner. Under the arrangement, the Forest Service maintains complete administrative and management authorities over the contractor.

T

BIG CREEK R. D.

Seal Beach, Ca.
March 4, 1981

RECEIVED

Kenneth D. Weyers
Forest Supervisor,
Payette National Forest,
McCall, Idaho

Dear Sir,

Thank you for sending me a copy of the DEIS concerning the Canadian Superior mining operation in Stibnite. I read the entire draft with interest and I do have a few comments to make about it.

The pre-mining guidelines seem to be better than adequate; thanks to your office and JMM Engineering. My only reservations are concerning the quality and frequency of the levels 1, 2, and 3 inspections summarized in appendix C.

The DEIS clearly indicates that only the oxide deposits will be mined and the sulfide deposits will be untouched.. I'd like to believe that the men operating the mining equipment would be able to eliminate all heavy metal ores at that point, but I do not think they can. I believe the leach piles will contain some arsenic and mercury which will eventually be found in the waste dump and in the dump drainage water.

T-1 The Level 2 (bi-monthly water sample) does not include a search for arsenic and mercury.. In view of the already high incidence of arsenic and mercury contamination in the area, I believe a bi- monthly search for those two elements is reasonable.

T-2 I have one other suggestion in regard to the water quality reports; I think a copy of each report should be posted in Yellow Pine as soon as it becomes official, or if that is inconvenient, a copy of each report should be sent to the Chairman of the Yellow Pine Village Council for public display in Yellow Pine. Thank you again.

Dorian W. Boyd

F-42

RESPONSE TO COMMENTS BY DORIAN W. BOYD

T-1 At present it was determined that biannual monitoring of arsenic and mercury would be sufficient to detect and significant changes in the concentrations of these elements. If any increase becomes evident the sampling schedule would be increased accordingly.

T-2 The monitoring results will be made available to the citizens of Yellow Pine by the Forest Service as soon as the results are known. The results will be posted in several locations of the town.

4

Yellow Pine, Idaho 83677, Wednesday, January 4, 1981

Dear Earl,

Thank you for having the DEIS (Stibnite Mining Project, Gold Mine and Mill) sent. We're trying to work through it by gradual steps and we hope to be able to get out a letter with our comments sometime before the deadline.

We're having a wonderful winter here after having spent last winter abroad. We enjoy our trips but we also enjoy living here - particularly in the winter. As you know this isn't the kind of snow us snowmobilers and skiers ordered but its as beautiful as ever - especially when we can get out to places like Profile Summit and Stibnite (the snow covers the scars). Speaking of Stibnite, I was in Greece on a sailing vessel trip when you conducted the tour of the proposed site. Sorry I missed it.

I see Howard Buttgenbach occasionally. He's got his shack (temporary) fixed up to give him protection at least from the cold. I don't envy his having to scrounge for water etc. But all this will change in time

You may know that we have a new couple in town who are teaching school here. It happened that John Hanson and I were colleagues (both princip in the Mt. Diablo Unified School District in Concord, California. Just before he was fixing to retire he came up here to do some fishing. Someone told him that I could find him a good fishing hole. I did: the Devil's Bathtub (at the conjunction of the East Fork and Johnson Creek) and he proceeded to pull out two Dolly Vardens, one twenty-six and one twenty-four inches long. After retirement he checked with the McCall Donnelly School District about a job here and (fortunately for Yellow Pine) he got it.

Anyway, to get to the point: John and Lynn are much interested in the proposed Superior operation. They would like to see it take off just as we would - to give Yellow Pine economy a kick in the pants. We are both happy that if it happens it will be under controlled conditions and that the chaos-in-the-hills left by the last operation in Stibnite won't occur again.

Will you please send Lynn and John Hanson a copy of the statement. Thank you very much. I'm sure you'll get a chance to meet them next time you're in town.

Warm regards,

Don Millen

PAYETTE N. F.
BIG CREEK R. D.
FEB

RECEIVED

F-43

V

RETYPED FOR PUBLICATION

March 18, 1981

Kenneth D. Weyers
Forest Supervisor
Payette Nat'l Forest
McCall, Idaho 83638

Dear Sir:

It has come to our attention, in this area, the project of Superior Mining (USA) is going to be held up by a minor group.

I, personally, have been close to this operation, know their goals, as my late husband has worked on the test sight, and because of this, realize their plans will give the economy a boost here in Yellow Pine & Valley County and when finished, the proposed site of Stibnite will be in far better condition than it is today. Frankly, I and many others, are fed up with those who voice, publically, their "anti" notions on projects in which does not touch them personally, in any way, and hold back any attempt to promote economy or jobs.

This is supposed to be a democratic country - the majority rules, not a politoborn (sic) of the minority. I was with the group, last fall, that went to Stibnite to inspect the proposed mining area and was amazed to hear the Stupid reactions of the minority who claim knowledge of what is best for our state. Not a one of the "Anti" people needed the jobs this mine can give us. Nor did they realize the importance of gold to our country, nor did they care.

If the few who object to this mine at Stibnite can pull this kind of weight our country can never have good economy for we have to have resources to fight our crumbling state of affairs. The Anti group feel they are the untouchables yet I can recall the depression of the '30's and that depression hit everyone! We need jobs - we need our economy strong. If this minority is allowed to dictate in Stibnite they gain strength to halt other projects. Now is the time to call a halt to the Anti groups' aims. This country is "of the people, for the people, by the people," the majority has to rule to have freedom. We need mining!

Sincerely,
Jerri A. Montgomery

W

RETYPED FOR PUBLICATION

Mar. 15th, 1981
Yellow Pine, Idaho

Dear Sir:

It has come to my attention from talking to personnel of Canadian Superior Mining Inc., that there still exists opposition to the proposed Mining operation at Stibnite, Idaho. After reading the report of Montgomery Engineer and various other publications, I feel assured that this operation will leave the country in question in far better condition than at present.

We local folks can use the shot in the arm this will give our economy.

I was raised to believe that, in this country, Majority rule was the way things are. The majority of the folks I know are highly in favor of this operation. It depresses me to think that a few individuals can so impede progress on an operation that can only be beneficial to everyone involved.

Sincerely yours,

Buck Stark
Yellow Pine,
Idaho

X

RETYPED FOR PUBLICATION

McCall, Idaho
March 19, 1981

Payette National Forest Supervisor
Payette National Forest
Box 1066
McCall, Idaho

Re: Draft EIS Stibnite Project Gold Mine & Mill

Dear Sirs:

Upon careful evaluation of the alternatives presented concerning Canadian Superior's proposed Mining-milling project near Stibnite I recommend that Alternative No. 3 be implemented. Because this choise includes mining at a maximum level while not severely harming the environment it is the most logical consideration. For the operation to be profitable and thus feasible for Canadian Superior consideration must be given to the economics of the alternatives. Reusing-stabilizing the existing tailings dump would not harm other land and at the same time would "clean-up" the sediments going into adjacent waterways from erosion & runoffs from the existing dump. A single lane road would disturb less land and create less particular emission which results in air pollution.

Canadian Superior is doing a service to the surrounding communities and Valley County by providing jobs and increased tax revenues, which can only benefit the inhabitants of the area considering current economic conditions.

This has tobe a prime consideration in approving the mining operation. The company is required by law to protect the environment. Implementation of the mining plan should clean-up waste left from previous mining activities which can improve environmental conditions. The area can not be viewed as pristine wilderness and should not be treated as such. There is no reason to fear cyanide-leaching operations. If handled properly the procedure is entirely safe.

When one considers where our society would be today without mineral commodities it is a disturbing thought. To obtain those materials there must be an economic incentive for the companies involved.

There must be a high rate of return on the initial investment to warrant expending capital on such a risky business as mining. Therefore Canadian

Superior should be left to mine the Stibnite area in a manner that would make it most economical to them while still being in compliance with reasonable environmental regulations. Any alternative that increases costs & reduces production might, (over time) become economically infeasible, resulting in a tremendous monetary loss to the company. This should be avoided.

I can not help but think that a mining operation at Stibnite could only enhance the quality of life in the area as well as improve, or at least not significantly harm the environment. Therefore I strongly recommend approval of Canadian-Superior's Mining-Milling operations at Stibnite.

Sincerely

Sharon A. Murray

Y

March 21, 1981 RETYPED FOR PUBLICATION

Forest Supervisor
Payette National Forest
McCall, ID 83638

Dear Sir:

For many reasons alternative #3 appears to be the best in our opinion. The other alternatives would have too many adverse effects.

Y-1 Oil companies have developed slant drilling (although often unwillingly) to minimize the deleterious effects of the operation. Why cannot deep mines have the mine opening outside the senstivie area with a tunnel leading to the mine proper. Since they seek the privilege of making a profit from public lands they take care to protect that land and its values.

Yours truly,

Ethel W. Thorniley

Mr. & Mrs. R. Poland Mr. & Mrs. L. Harwood Mrs. M. White
Mr. & Mrs. R. Angst Mr. & Mrs. C. Wilkins Mr. & Mrs. D. Doerr
Mr. & Mrs. J. Rakovan Mr. & Mrs. P. Fountaine

Ethel W. Thorniley
18653 Schoenherr
Detroit, MI 48205

RESPONSE TO COMMENT BY ETHEL THORNIBY ET.AL.

Y-1 The mineralization of the ore deposits in the West End and Garnet Creek drainage are such that underground mining methods cannot be utilized effectively. The company has proposed a surface mine at each site which will not entail the use of tunnels. The mined areas will be reclaimed after mining has ceased and the area (as directed by State Law) will be returned to as near natural conditions as possible. The company will be bonded to both the State of Idaho and the Forest Service to see that an adequate level of reclamation is accomplished.

Z

MAR 3 0 1981

MAC GREGOR TRIANGLE COMPANY

CONTRACTORS • 200 SUNRISE RIM • P.O. BOX 5128 • BOISE, IDAHO 83705

27 March 1981

Mr. Kenneth D. Weyers
Forest Supervisor
Payette National Forest
McCall, Idaho 83638

Subject: DEIS
Stibnite Mining Project

Dear Mr. Weyers:

MacGregor Triangle Company is a diversified general contractor who has, among other interests,constructed roads in the National Forests of Southern Idaho for over 30 years. That experience has included construction in some of the most highly environmentally sensitive areas of the West.

We have had occasion to review the Draft Environmental Impact Statement for the proposed Stibnite Mining Project of Canadian Superior Mining Company, Ltd. We have had the further opportunity of walking the ground for the proposed mine sites, haul roads and related facilities, in anticipation of submitting proposals to Superior Mining for their construction if the operation is approved.

MacGregor Triangle Company urges your approval of the proposed mining operation and prompt favorable action on the DEIS. We would also offer the following specific comments in regard to two aspects of the project.

We can attest to the importance of this project to the economy of the region, and specifically to the severly depressed heavy construction industry of which we are a part. In the current framework of curtailed construction budgets for all normal public contracting agencies, both State and Federal, the infusion of private capital and funding would appear to be genuinely in the public interest. The multiplier and ripple effects of construction spending to all segments of local economies is a well proven fact that does not have to be belabored.

F-49

Secondly, it is our professional opinion that the proposed construction can be accomplished without severe impact on the environment. It would be naive to suggest there are no difficult areas, but nothing we have not successfully encountered before. Again it should be noted that we have been on the site.

In fact our site visitations over the years lead us to conclude that the proposed activity can only improve the present conditions of the Stibnite area.

Thank you for the opportunity to comment and your consideration of those comments.

Sincerely yours,

MacGREGOR TRIANGLE COMPANY

Alan A. Terrill
Construction Engineer

AAT/by

AA

MAR 3 0 1981

March 27, 1981

Mr. Ken Wyers
Forest Supervisor
Payette National Forest
P. O. Box 1026
McCall, ID 83638

Dear Mr. Wyers:

I have reviewed the draft environmental impact statement covering the proposed mining activity in the Stibnite area by Canadian Superior Mining. I conclude that the proposed operations are environmentally sound. As a member of the Yellow Pine community, I am fully aware of the necessity for a broadened economic base in the area. I strongly support the proposed development and urge its official approval.

Yours very truly,

Wallace N. Cory
Yellow Pine, ID 83677

WNC/kah

cc: Representative Jim Higgins
Senator Dave Little
Representative Morgan Munger

F-51

BB

PAYETTE N. F.
BIG CREEK R. D.

WM. L. CROWLEY & ASSOCIATES, Inc.
P. O. BOX 1439, McCALL, IDAHO 83638, U. S. A.

RECEIVED

March 27, 1981

Mr. Earl Dodds
District Ranger
Payette National Forest
McCall, Idaho 83638

Dear Mr. Dodds:

In reviewing the DEIS for the Stibnite Mining Project, several points strike me as worthy of considerable comment.

Among the more notable are:

BB-1 --the questionable objectivity of the engineering firm preparing the DEIS which, from all appearances, is financially under contract to CSM;

--the merit of the proposed cyanide leaching process in such an ecologically sensitive location given the "downstream" implications;

--the apparent lack of consideration given the definite and critical change in the climatological behavior of the Westerlies affecting shorter term weather patterns in North America; and

BB-2 --the economic implications for Valley County and the surrounding community.

Of these points, I am qualified to comment only on the last, although it hardly would take a mental giant to see the implications of the first three.

For a number of years now, I have taken the view that the financial condition of Valley County is like a mildly alcoholic uncle--basically a man of character and integrity, of modest but adequate means and occasionally going on a binge.

In that respect, our local economy during the current "binge" has structured itself into a fragile balance between cyclically heavy unemployment (i.e.--double digit) and the increasing dependence on a transient income stream and labor pool.

RESPONSE TO COMMENT BY MR. WILLIAM L. CROWLEY

BB-1 Please see response to similar comment by Mr. Jerry Dixon (S-6).

BB-2 Please refer to pages 135 to 140 of the DEIS.

From a broader view, meaning international economics, we are in serious financial trouble. This is not an idle statement or even an opinion--it is a matter of fact.

Bringing this down to Valley County's financial future, we are, after all, ultimately part of our national economy which, in turn, is inextricably tied to the economies of Western Europe and Japan.

What all this means for our community is that the ravages of inflation and onerous debt burdens have produced the appearances of a "boom" of sorts, but premised essentially on so-called "inflationary hedges" (i.e.--raw land and second homes) and the tenuous benefits of recreationists.

All of which produce the rather predictable results of high unemployment coincident with apparent affluence. In short, we are skating on extremely thin ice in a local financial sense.

The financial impact of what CSM is proposing is dubious on several counts, but let me cite the more salient.

Firstly, the bottom line of any venture (public or private) is that more money must ultimately come in than go out. By definition, CSM must make some rough projection of the price of gold in relation to its acquisition cost. Over the term of their stated project, it is hardly the case that CSM will see falling or even stable acquisition costs. As far as the price of gold is concerned, while highly speculative at best, there has never been a depression or even serious recession in which the price of gold rose dramatically (or even at all!!). The net result most likely would be an added burden to our already strained unemployment rolls.

Secondly, it might even be acceptable to incur some of the risks in this project if the object were to obtain a more strategic resource such as the antimony from the stibnite ore. However, to ask, in effect, our community to subsidize a project which might make a profit only if continued speculation pushes the price of gold above $750 an ounce is asking far more than is acceptable or even reasonable.

Thirdly, we in Valley County have a very difficult period ahead over the next several years. We must adjust our financial sources and needs in harmony with what we can consistently produce and/or offer over the long term. This may include gold mining, of course, but since that activity is at the extreme end of the speculative spectrum, it should only be considered when our local economy has a much sounder footing and the related ability to absorb associated setbacks from such speculative activities.

If I may be of further assistance, please feel free to contact me.

Sincerely yours,

William L. Crowley
President

WLC/sr

CC

CANADIAN SUPERIOR MINING (U.S.) LIMITED
SUITE 509, PAULSEN BUILDING
P. O. BOX 185
SPOKANE, WASHINGTON 99210
(509) 624-4211 TELEX 32-6324

PAYETTE N. F.
BIG CREEK R. D.

March 27, 1981



Mr. Earl Dodds, District Ranger
Big Creek Ranger District
Payette National Forest
McCall, Idaho 83638

Dear Mr. Dodds:

Canadian Superior Mining (U.S.) Ltd. would like to take this opportunity to respond to the Draft Environmental Impact Statement, Stibnite Mining Project Gold Mine and Mill, prepared for Payette National Forest, Region Four, USDA Forest Service, which was released on January 28, 1981.

The purpose of this submission is three-fold; firstly, to summarize the positive aspects of the project which will significantly benefit the current and future citizens of the area, secondly, to present CSM's preferred waste disposal plan for the West End Mine, and thirdly to discuss certain aspects of the project which were not thoroughly treated in the D.E.I.S.

We at CSM are of the opinion that the beneficial aspects expected from the proposed project by far surpass the negative impacts which may be incurred by its implementation. Current residents of the Stibnite/Yellow Pine area are expected to benefit from the proposed restoration of the environment and the increased economic prosperity accompanying the project. Future citizens will benefit from a diversified economy

F-55

stimulated by the project, and an improved environment after its completion and subsequent reclamation.

In emphasizing some of the beneficial aspects of the project, CSM is not attempting to divert attention from the potential negative effects which are a possibility and, in some cases, a compromise in a project of this magnitude. However, over $2.3 million has been invested in background studies and pre-planning efforts and all of the potential hazards have been identified and solutions of an environmentally responsible nature have been formulated. During 1978 and 1979, a pilot plant was constructed at the site with its primary objective being to demonstrate the environmental soundness of the project. The results of this closely monitored study were completely satisfactory.

In the following paragraphs, the significantly positive benefits the project will have on the physical, biological and human environment as well as the positive effects on the socio-economic climate of the region are described.

Positive Impacts of the Project

The Stibnite area has been described by the E.P.A. as a "potentially dangerous" abandoned chemical disposal site. CSM has proposed in its Plan of Operations the clean-up and stabilization of certain environmentally hazardous conditions which presently exist in the area. The physical, biological and human environments will be improved by the proposed action to stabilize the old tailing pile and by the diversion of Meadow Creek, to bypass these tailings.

The physical environment will be restored as a result of these improvements, as the tailing pile is currently a source of sediment pollution through water and wind erosion. It is expected that the sediment production in the drainage can be reduced by approximately 500 tons annually through this improvement measure. Additionally, the establishment of vegetation on the tailing pile would prevent the dust storms which are so common in the area in summer.

The long-term rehabilitation of the upper Meadow Creek area will enhance the biological environment by increasing the potential for successful recovery of the East Fork South Fork Salmon river fisheries. The decline of the fisheries resources have been linked to increased sediment levels. A reduction in sediment levels will improve fish habitat and encourage the re-establishment of fish populations in the drainginge. It is expected that the diversion of Meadow Creek will produce water of a better quality, as leaching of heavy metals from the tailing materials would be substantially reduced. The improved water quality and reduced sedimentation are expected to result in a greatly improved fishery resource.

The human environment will benefit indirectly from these restorative actions, as the improved physical and biological conditions would allow a greater public appreciation of the area.

Economically, the local communities have much to gain from the proposed mine project. Local employment opportunities, currently limited and a source of problems and disappointment for local residents, would be increased and diversified and help offset recent cutbacks in the woods products industry.

By 1983 the proposed action is expected to create approximately 50 to 60 direct seasonal job opportunities, increasing the available jobs in Valley County by approximately 3%. Indirectly, it is estimated that 25 to 30 service sector jobs will be created as a result of the project.

Significant public benefits would be recognized in the form of needed utility improvements in the area, supplemental county and state tax revenues, and the purchase of local goods and services.

CSM plans to assist in utility improvements necessary at Yellow Pine. The existing water system is currently near capacity and improvements to accomodate project related growth will require additional facilities.

Four types of taxes on the proposed project would provide revenues to the State of Idaho and Valley County. These are:

1. County property tax
2. County net profits tax
3. State mine license tax
4. State income tax

Tax revenues are important to the economy of Valley County in view of the recent decline in the lumber industry which results in reduced Federal Forest Fund revenues and reduced school funding.

<u>West End Mine Waste Disposal</u>

As regards CSM's waste disposal plan for the West End Mine, we wish to draw attention to certain salient points. While some of these points

have been discussed in detail in the D.E.I.S., others have not been so emphasized.

In CSM's original Plan of Operation, a West End waste dump of four to five million tons was planned. Our present plan proposes a waste dump of approximately 1.6 million tons in West End Canyon. In the draft EIS, the Forest Service's preferred alternative calls for no waste dump in the West End Canyon. If the F.S. alternative is implemented it would require:

Internal waste disposal within the mining pit,

and/or

Haulage of waste to the valley floor for disposal.

CSM has conducted a study of the waste disposal options. The results of this study indicate that internal wasting of this material is inadvisable for the following reasons:

1) The economics of precious metals is highly volatile. Material covered by this waste could become economically extractable in the future. Covering potential ore with waste rock is not in keeping with current policies of conservation of natural resources.
2) The small size of the pit (in relation to other open pit mines) and its inherent geometry make internal waste disposal difficult and dangerous.

The CSM study also revealed that the energy efficiency, air quality, and operational costs of the project are negatively affected by the alternative of hauling waste material to the valley floor for disposal. Energy efficiency, air quality and operational costs of the

Forest Service preferred alternative and the CSM proposed alternative are compared below.

Hauling waste material to the valley floor for disposal instead of placing it in a West End Canyon waste dump would negatively affect the project in the following ways:

1) Energy efficiency:

On page 160 of the draft EIS it is stated that the Forest Supervisor has stipulated that the most energy efficient practical alternative will be selected. Further, (on page 158) the Forest Service has indicated that they are concerned over the need to conserve fossil fuels while pointing out that their preferred alternative (Alternative 5) would consume the largest amount of fuel of any alternative considered.

CC-1

The one-way haul distance to the valley floor disposal area is 23,600 feet (4.5 miles), while the haul distance to the proposed West End Canyon waste dump is 4,000 feet (0.76 miles). CSM estimates indicate that a truck hauling to the proposed West End waste dump will handle 114.8 tons of material per hour while a truck hauling to the valley disposal area will only move 55.6 tons per hour. Since a 30 - 50 ton haulage unit utilizes an average 12.2 gallons of fuel per operating hour, haulage to the proposed West End waste dump would consume 172,160 gallons of fuel while haulage of all the waste material to the valley floor would utilize 355,468 gallons. The difference in these options is approximately 183,307 gallons over the life of the project, or a 51% reduction in fuel consumption if waste material is placed in West End Canyon.

RESPONSE TO COMMENTS BY MR. DON BORK (CSM)

CC-1 The Forest Service has revised its Preferred Alternative to allow for the inclusion of a reduced West End Canyon waste dump. The basis for this revision includes:

1) The reduced size and location of the proposed dump.

2) The reduction in potential air pollution which would result from less haul vehicle miles traveled and related road traffic.

3) Reduced energy consumption resulting from less hauling.

4) The results of the preliminary engineering studies completed for the West End dump site which indicate that with proper construction a stable waste rock dump can safely be developed at the site.

The Forest Service reserves the right to review final plans and specifications for the construction of the waste dump, and to require any changes or modification it feels necessary to ensure the stability of the structure. It further reserves the right to order the company to discontinue use of the dump site if their appears to be any problems with its stability or if other environmental problems arise over the life of the project as a result of the West End dump.

2) Air Quality - Particulate matter

Table 5-1 (DEIS) provides the following information:

Table 5-1

Calculated Total Suspended Particulate

Emission for the Proposed Stibnite Mining Project

	Uncontrolled		Controlled	
	Tons/Yr	Lbs/Hr	Tons/Yr	Lbs/Hr
Hauling Road Traffic				
(a) Hauling Ore	36.00	30.00	18.00	15.00
(b) Hauling Waste	18.00	15.00	9.00	17.50
(c) Hauling Tailings	27.00	22.50	13.50	11.25
(d) Water Truck	28.40	47.25	14.20	23.63
Subtotal			54.7	

If the waste material for the project is hauled from the pit to the valley, item (b) would be increased by 6.25 tons per year. This would represent an increase in suspended particulates of 16.5% for this phase of the operating cycle.

3) Operational Cost

The estimated cost of hauling the waste material to the valley rather than the proposed waste dump is $2,160,000 over the life of the project. Reducing the net operating profit by $2,160,000 results in an estimated tax loss of $235,000 to the State of Idaho and $884,000 to the federal government.

For the foregoing reasons CSM feels that a West End Canyon waste dump should be included in the Forest Service preferred alternative.

The waste dump would be reclaimed along with the pit area after mining is completed as shown in the CSM reclamation plan being prepared by J.M. Montgomery Consulting Engineers. With proper engineering, the design of a stable waste dump in the canyon is not anticipated to be a difficult problem. Competent, shallow bedrock of the canyon will provide good foundation support for the fill. The waste material is expected to be fresh durable rock with good frictional and interlocking properties. According to the study completed by Northern Testing Laboratories the steep-sided V-shaped dump area will also create a durable wedge-shaped fill.

Additional Aspects of the Project

Since the submission of the original Operating Plan to the Forest Service which initiated the E.I.S. process, CSM has continued to develop and refine its engineering designs and plans for the project. Some of this work has resulted in changes from the original proposal. One change which we feel needs comment concerns the construction of the leaching pads. It will be noted in the original Plan of Operations proposal that CSM proposed to construct four 300 x 300 foot impervious leach pads. The pads would have been located in Adkin's Flat, north of the Stibnite ruins, and were to be constructed of membrane liners with bentonite coating, covered by a 1-1/2 foot protective sand layer. Following a thorough study and evaluation by JMM and the Forest Service, it was determined by the Forest Service that the "preferred alternative" would involve locating the leach pads on the Meadow Creek landing field due to the previous disturbance which had occurred at that location (the Adkin's Flat area is a relatively undisturbed open meadow). Since that time, CSM has conducted extensive studies concerning soils, subsoils, geotechnical conditions at the

landing field, pad liner materials, foundation requirements, etc. These studies were conducted by Northern Testing Laboratories (NTL) of Boise, Idaho, and Hovater-Way Engineers, Inc. of Laguna Hills, California. Based upon the results of these studies, final design recommendations, criteria, and specifications for the leach pads have been developed. This information will be presented in detail in the final operating plan to be submitted to the Forest Service for review and approval, prior to any construction activitie.

As a result of this study, five pads (approximately 320 x 220) which will be smaller than those originally proposed will be constructed on the landing field. Following necessary site preparation, a 35 mil synthetic reinforced protective lining will be placed. This protective lining will then be covered with five inches of drain rock which in turn will be overlain by a four to six inches of dense sub-base rock. The sub-base rock will then be capped by three inches of compacted asphalt which will be coated with asphalt sealer. By using the above construction technique, process solutions will be effectively blocked from entering the surrounding environment. If the asphalt cap becomes damaged and allows some solution to pass, the synthetic liner will catch the solution which will be diverted through a drainage system into the collecting ditches and ultimately into the solution pond. At no time will the leaching solutions be in direct contact with the outside environment. The entire pad area will be surrounded by berms to prevent any spillage which could result from adverse meterological events.

Both the pads and berms will be subject to constant inspection and maintenence to insure their integrity. Additionally, to further protect the groundwater of the area a series of monitoring wells will be

emplaced downstream from the leach pad installation as an additional safeguard.

Since the decision to use asphalt was not made until the completion of exhaustive studies aimed at identifying a fail safe system, and since this type of "design level" consideration is intended to be included in the final operating plan rather than the DEIS, the DEIS did not discuss project needs related to aggregate sources for use in concrete and asphalt operations. We are now in a position to estimate these needs, and have subsequently completed a study of the Stibnite project area which investigated source availability and suitability for use as aggregate in portland cement concrete, asphaltic concrete, and aggregate base for construction.

The above study was also carried to by NTL of Boise. Based upon the results of the investigations, we estimate that the project will require approximately 30,000 tons of aggregate material. this material would be taken from the hospital dump area, talus slope area, and Glory Hole Wash Plant location . Following excavation of the material from these locations, the affected areas will be reclaimed in compliance with Title 47-15, Idaho Code, the Idaho Surface Mining Act, and other applicable environmental regulations. A detailed description of the reclamation activities is described in the full reclamation plan.

CC-2

In addition, a temporary asphalt batch plant would be located adjacent to the leach pad area. This plant would be permitted and operated according to the State of Idaho New or Modified Industrial Air Emission permit requirements, and other applicable state and federal regulations.

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CC-2 **The Forest Service will require that an independent Environmental Assessment be prepared on any major aggregate source site developed by CSM in conjunction with this project. If the aggregate site includes only rock that was to be mined as part of the overall operation, or if the aggregate sources are to be developed are located on patented land, the EA shquld not be a significant undertaking or may not be required. If, on the other hand, a major aggregate pit is anticipated, then it will be the Forest Service's obligation to review this aspect of the project at the same level of detail any similar proposal would receive. At the time CSM submits its Final Operating Plan this determination will be made.**

It will be further noted in the original Plan that CSM proposed to mine and process the material from the Garnet Creek Mine during the first two years of the project's life. Subsequent studies of the operating constraints at the Garnet Creek deposit as well as changes in haulage road specifications preclude mining all of the Garnet Creek deposit in the first two years.

In the original Plan of Operations, a double lane haulage road was proposed. Environmental considerations have led the Forest Service to select a single lane haulage road for the Garnet Creek deposit in their preferred alternative. This determination coupled with the small areal size of the deposit precludes the efficient operation of sufficient equipment to complete mining in two years.

Present plans anticipate beginning work at Garnet Creek during the first year of operations and carrying this work on during the first three years of the project life.

In summary, it is apparent that the Stibnite project will greatly benefit the local area, Valley County, and Idaho through the improvements to the physical, biological and human environments and by the increased economic opportunities for local residents.

Very truly yours,

Donald W. Bork
Project Manager

DWB:amc

DD

McCall, Idaho
Nov. 26, 1980

Mr. Kenneth Weyers, Supervisor
Payette National Forest
McCall, Idaho 83638

Dear Mr. Weyers:

It is good to know that you are in the field Supervisor, yet I have been disappointed repeatedly to miss you when I've dropped in at the office. I'll keep trying.

DD-1 I want to express appreciation for the Forest Service trip to Stibnite, which was arranged by Herb Jones. Many points were addressed and questions raised. The plan for opening and operating the Canadian Superior gold mine sounds simple and complete. However, I have problems about its safe and environmentally sound operation.

DD-2 As always, my first concern is for the short and long-range stability of the land. What will be the effect of the disposal of the overburden and residue upon sedimentation of streams and upon aquatic and terrestrial life? Will the scars of the sores caused by excavation and roads, be healed without introducing other plant, animal and watershed problems?

DD-3 Accidents are a fact of life. A spill of cyanide could be devastating to land, air and water quality. It is essential to keep the pH factor high in order to prevent deadly fumes from forming from the leaching pad. Idaho is in the zone of acid rain. Could not a cloudburst take unaware, those monitoring the process?

It is believed that in the pilot plant and in preparing for the big operation, theCompany is adhering to the Regulations. However, I question whether the close monitoring necessary to provide safety on the job and in the environs, will be done once the whole system is under way. Monitoring by the Forest Service and the Company should be upon the basis that should an accident or any condition cause the safety to drop below prescribed standards, all mining and processing stops, until those standards are reached and can be maintained.

DD4 There is also the hazard of container and other waste disposal. All waste should be completely neutralized before cast aside or returned to use.

DD5 Bonding by the Forest Service, or whatever business or agency, must deal realistically with the future and provide for clean-up which may be necessary when physical and health defects may show up, long after the Company operation has closed.

RESPONSE TO COMMENTS BY NELLE TOBIAS
(These comments were received prior to the issuance of the DEIS)

DD-1 See letter by Mr. Kenneth D. Weyer, Forest Supervisor.

DD-2 See Chapter 5 (Effects of Implemantation) of the FEIS.

DD-3 The cyanide solution is heavily buffered by the caustic utilized to maintain the pH at 10.2. It is very unlikely the rain events in the Stibnite area would have any effect on the pH of the solution. The pH control on cyanide is carefully monitored and maintained in order to protect the operators and insure that the process works as designed.

DD-4 The company has received a solid waste permit from the Idaho Department of Health and Welfare - Division of Environment that requires the safe and adequate disposal of solid and hazardous wastes.

DD-5 The State of Idaho Department of Lands requires that mine operators bond for $750 an acre to ensure that reclamation activities are complete once mining has ceased. Bonding is also required by the Forest Service.

We have not yet touched the boom and bust syndrome, which an annual 5-6 month operation promises. A stable lifestyle is not fostered by such a seasonal schedule. Rather it will likely draw floaters who have nothing to lose by whatever actions they take. Schools, police and public services will be strained. Permanent residents of the area may find it exciting, yet degrading.

In any plan for the management of public land, I urge that the Agency manage its land with reference to what is being done elsewhere, to add, simplify or negate the project under consideration. Nothing we do is isolated. There is no such thing as "away".

Sincerely,

Nelle Tobias

Nelle Tobias
Rt. #1
McCall, Idaho 83638

cc: Earl Dodds

F-67

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Payette National Forest
McCall, Idaho 83638

2810

December 9, 1980

Nelle Tobias
Route 1
McCall, Idaho 83638

Dear Nelle,

I am sorry that I have missed meeting you when you dropped by my office. Now that the winter snows are upon us, I will be spending more time in town and perhaps we can get together.

I am glad that you were able to make the field trip to Stibnite and review the mining proposal first hand. Many of us have reservations concerning the proposed project which are similar to yours. Most, if not all, of these points will be discussed in the Environmental Impact Statement which will soon be released in draft form for public review and comment. We will be glad to accept your comments, including those in your letter, and address them point by point in finalizing the E.I.S.

I thank you for taking the time to write of your concerns. Indeed, one of the chief purposes of preparing an E.I.S. for this project is to give the public an opportunity to review the proposal in advance of implementation in order that all reasonable measures for protection of the environment can be included in the approved operating plan. Your efforts in this respect are appreciated.

Sincerely,

KENNETH D. WEYERS
Forest Supervisor

INTERIOR AND INSULAR AFFAIRS COMMITTEE
SUBCOMMITTEE ON PUBLIC LANDS AND NATIONAL PARKS
SUBCOMMITTEE ON MINES AND MINING
EDUCATION AND LABOR COMMITTEE
SUBCOMMITTEE ON HEALTH AND SAFETY
SUBCOMMITTEE ON ELEMENTARY, SECONDARY, AND VOCATIONAL EDUCATION
SELECT COMMITTEE ON AGING

LARRY CRAIG
1st District, Idaho

APR 15 1981

Congress of the United States
House of Representatives
Washington, D.C. 20515

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(208) 743-0792

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(208) 667-6130

EE

April 13, 1981

Mr. Kenneth D. Weyers
Forest Supervisor
Payette National Forest
McCall, Idaho 83638

Dear Mr. Weyers,

I apologize for the tardiness of this letter. I have had to take the time to review the draft E.I.S. for the Stibnite Project.

As I see it, the employment potential is very positive. This is a very ideal situation for Idaho, considering the current economic situation.

The environmental situation seems very good and will improve conservation. With the environmental and employment potential both very positive, I fully support the Stibnite Project.

Please contact my office if there is anything I can do. Thank you.

Very truly yours,

Larry E. Craig

Larry E. Craig
Member of Congress

LEC:oo

F-68

APR 8 1981

FF

United States Department of the Interior

FISH AND WILDLIFE SERVICE

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4620 OVERLAND ROAD, ROOM 238
BOISE, IDAHO 83705
FTS: 554-1980 / COMM: 208/554-1980

334

APR 7 1981

Mr. Kenneth Weyers
Forest Supervisor
Payette National Forest
P.O. Box 1026
McCall, ID 83638

Dear Mr. Weyers:

It is with genuine pleasure that I take this opportunity to congratulate you and your capable staff for full consideration of fish and wildlife concerns in the Stibnite Mine Draft Environmental Impact Statement. Our staff was impressed by the high level of effort which contributed to the quality and breadth of fish and wildlife information presented and the clarity with which necessary information and analyses were conveyed. The equity of treatment of various natural resource categories demonstrated the DEIS truely represents objective multiple use planning.

Official U.S. Department of Interior comments on the NEPA document will arrive via the usual channels, so this letter does not necessarily reflect Interior-level opinion or even Fish and Wildlife Service Regional-level opinion. It does not supplement or replace NEPA comments from our Department. We in the Area Office and in the Ecological Services Field Office merely wish to express our appreciation for a job well done outside the formal NEPA process.

My staff and I look forward to participating with the Payette National Forest in the development of your Forest Land and Resource Management Plan.

Sincerely yours,

L. A. Mehrhoff
Area Manager

cc: IDFG, Region 4
(Attn: Anderson)
IDFG, Headquarters
(Attn: Richards)

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

F-69

APR 2 2 1981

GG

Advisory Council On Historic Preservation

1522 K Street, NW
Washington, DC 20005

Reply to:

Lake Plaza South, Suite 616
44 Union Boulevard
Lakewood, CO 80228

April 20, 1981

Mr. Kennath D. Weyers
Forest Supervisor
Payette National Forest
Forest Service
U.S. Department of Agriculture
McCall, Idaho 83638

Dear Mr. Weyers:

The Council has reviewed your draft environmental impact statement for the Stibnite Mining Project Gold Mine and Mill, Idaho, circulated for comment pursuant to Section 102(2)(c) of the National Environmental Policy Act. We note that the undertaking will affect cultural properties which may be eligible for inclusion in the National Register of Historic Places. Circulation of a draft environmental impact statement, however, does not fulfill you agency's responsibilities under Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. Sec. 470f, as amended, 90 Stat. 1320).

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Prior to the approval of the expenditure of any Federal funds or prior to the granting of any license, permit, or other approval for an undertaking, Federal agencies must afford the Council an opportunity to comment on the effect of the undertaking on properties included in or eligible for inclusinn in the National Register of Historic Places in accordance with the Council's regulations, "Protection of Historic and Cultural Properties" (36 CFR Part 800) (enclosed). Until these requirements are met, the Council considers the draft environmental statement incomplete in its treatment of historical, archeological, architectural, and cultural resources. You should obtain the Council's substantive comments through the process outlined in 36 CFR Sec. 800.9. These comments should then be incorporated into any subsequent documents prepared to meet requirements under the National Environmental Policy Act. Brit Allan Storey of my staff may be contacted at (303) 234-4946, an FTS number, for further assistance.

Sincerely,

Louis S. Wall
Chief, Western Division
of Project Review

Enclosure

APR 6 1981

HH

March 30, 1981
1135 East Bannock
Pocatello, Id. 83201

Forest Supervisor
Payetta National Forest
McCall, Idaho 83638

Gentlemen:

RE: Comments on the Stibnite Mining Project draft E.I.S.

I would like to address several comments to the draft EIS of the Stibnite Mining Project.

I generally support the Forest Service's chosen Alternative V, with the assurances that when Canadian Superior Mining completes or terminates operations during any stage of development, an overall improvement of the existing environmental quality of the area results. Part of the cost of doing business is being a good neighbor. Unfortunately, all too frequently, mining companies in the past have not been good neighbors, leaving outrageous scars and a spoiled environment in their wake. Canadian Superior should be carefully regulated and under threat of stiff enough penalties that they do not cause degradation to the environment.

I would like to point out several areas in the draft E.I.S. that need additional clarification:

1. Where will cut material from road building be deposited?

2. It is unfortunate that something cannot be done to clean up the Gloryhole problem. I urge the Forest Service and Canadian Superior to keep options open to minimize environmental degradation caused by it.

3. Additional workers, families, and service personnel may result in an increase of the illegal killing of game. Canadian Superior should assist the Idaho Fish and Game by providing the agency additional enforcement monies and employee education programs.

4. Overburden must be carefully located and stabilized so that it is available for reclamation.

5. Since tourism, which has shown dramatic increases in Valley County, is an important part of the economy, Canadian Superior should make every effort not to adversely impact recreation.

F-71

6. What kind of potential earthquake activity could be expected in the area? Are the leach pads, and other potentially dangerous aspects, sufficiently constructed and protected to withstand such siesmic activity?

7. Disposal of waste water seems to be a potentially dangerous activity. Will safeguards be taken so that all waste water is, indeed, neutralized? Location of alternate disposal sites should be discussed in the E.I.S. More assurances are needed to the public.

8. Canadian Superior should be encouraged to use alternative energy wherever feasible.

Thank you for this opportunity to comment.

Sincerely,

Ron Watters

Ron Watters

RW:pak

BOISE STATE UNIVERSITY
3 9372 00757182 9

DATE DUE