INTRODUCTION

This Record of Decision (ROD) has been prepared in response to a review of a mining plan of operation submitted by Atlas Perlite, Inc., to mine perlite from existing mining claims located approximately 35 miles northwest of Lakeview, Oregon. Both a Draft and Final Environmental Impact Statement (EIS) were prepared analyzing the impacts of the proposed mining operation.

DECISION

On the basis of the analysis contained in the Draft EIS, the abbreviated Final EIS, and consultation with interested tribal governments, the mining plan of operation (POO) submitted by Atlas Perlite, Inc., as modified and described as the agency preferred alternative C, pages 3-13 in the Final EIS, is approved. Briefly, this action will consist of developing a 20-acre perlite quarry on Tucker Hill, constructing a temporary growth medium (soil material) stockpile, upgrading 3.3 miles of an existing road to use for hauling ore, and reclamation of the road and quarry at the end of the 10-year operating period in accordance with a reclamation plan to be approved jointly by the Bureau and the Oregon Department of Geology and Mineral Industries. In addition, an associated processing facility will be constructed on company owned land in the town of Lakeview, Oregon, which is not subject to Bureau approval authority.
The approval of the POO is contingent upon the submission and acceptance of a reclamation plan, the posting and acceptance of an appropriate reclamation bond, implementation of the monitoring and mitigation measures identified in the Final EIS and this ROD, compliance with Section 106 of the National Historic Preservation Act (as outlined in the Memorandum of Agreement between the Advisory Council on Historic Preservation, Bureau of Land Management, and Oregon State Historic Preservation Office for this project), and all required Federal, State, and local government permits being in place prior to commencing operations.

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Alternative A - Company Proposed Alternative

This alternative consists of the mining proposal as contained in the company's mining plan of operation. It calls for developing a 20-acre perlite quarry on Tucker Hill, constructing a permanent, 5-acre waste rock dump, constructing a 0.5-acre temporary growth medium stockpile, upgrading 3.3 miles of an existing road to use for hauling ore, constructing a processing facility on company owned land in the town of Lakeview, Oregon, and reclamation of the road and quarry at the end of the 10-year operating period in accordance with a reclamation plan approved jointly by the Bureau and the Oregon Department of Geology and Mineral Industries.

Mine operations would include the use of a variety of heavy equipment as described in the Final EIS. The majority of the quarry operations would occur during two campaigns per year, each approximately 45 days long (in early summer and late fall to avoid potential conflicts with nesting raptors), as outlined in the blasting schedule contained in Appendix IV of the Draft EIS and page 12 of the Final EIS.

The ore would be stockpiled on-site then hauled via the upgraded access road to Highway 31, then south to Highway 395 into Lakeview where the processing plant would be located. Hauling would occur year round. The processed perlite would be shipped to markets by truck or rail.

All available growth medium occurring on top of the quarry, waste rock dump, and access road would be stripped off, temporarily stockpiled, contoured to a slope angle of 2.5 horizontal to 1.0 vertical, seeded, and monitored for weeds, as described in the Final EIS. Overburden would be placed in a permanent waste rock dump and contoured to an final overall slope angle of 2.5 horizontal to 1.0 vertical, as shown on Figure 4 of the Draft EIS.

Access would be provided using an existing road which would be resurfaced and maintained as described in the Final EIS. The
company would be required to obtain an easement for access across private lands.

During the project life, the company would construct and maintain ditches, water bars, and culverts, where needed for control of drainage and sedimentation.

Reclamation would occur as outlined in the Final EIS and in accordance with the reclamation plan to be approved jointly by the Bureau and the Oregon Department of Geology and Mineral Industries.

Alternative B - Alternative Waste Rock Location

This alternative is the same as alternative A, except the waste rock dump site would be slightly smaller (5.0 acres) and located as shown in Figure 5 of the Draft EIS. This alternative was considered as a means of lessening the total disturbance of the project along with associated visual and cultural impacts.

Alternative C - County Gravel Pit Waste Rock Location (Agency Preferred Alternative)

This alternative is the same as alternative A, except the waste rock would be hauled to the base of Tucker Hill and temporarily stockpiled at an existing, disturbed gravel pit operated by the Lake County Road Department. The material would then be used either as road fill or for reclamation of the gravel pit when operations cease at the pit. No permanent waste rock dump would be required. This alternative was designed to lessen the total disturbance of the project along with associated visual and cultural impacts. This alternative is the Bureau's preferred alternative.

Alternative D - No Action/Continue Existing Management (Environmentally Preferred Alternative)

This alternative is included as a baseline for comparison of environmental impacts of the other alternatives. This alternative would consist of continuing existing management activities in the Tucker Hill area with no perlite mining occurring. Mineral exploration activities would be allowed to continue. Existing exploration sites would be reclaimed.

The Bureau considers this alternative to be the "environmentally preferred" alternative, as impacts to visual quality and cultural uses/values would not occur. The "environmentally preferred" alternative is described by the Council on Environmental Quality as the "alternative that would best promote national environmental policy as expressed in section 101 of the National Environmental Policy Act". This means it is the alternative that causes the least damage to the biological and physical environment and/or best
protects, preserves, and enhances historic and cultural resources.

MANAGEMENT CONSIDERATIONS AND RATIONALE FOR DECISION

Under the 1872 Mining Law, a person has a statutory right to go upon the open (unappropriated and unreserved) Federal lands for the purpose of mineral exploration, development, and extraction. Under applicable surface management regulations (43 Code of Federal Regulations Part 3809), an approved plan of operations is required where mechanized earth-moving equipment or explosives result in a cumulative disturbance of more than five acres in any calendar year. During review the Bureau can require that the plan be modified to prevent "unnecessary or undue degradation" by identifying mitigating measures that the operator must agree to comply with before surface disturbance can begin. The approved plan must also comply with all other applicable laws and regulations.

The Bureau has limited discretion in approving a properly submitted mining plan, but may require reasonable modifications to prevent unnecessary or undue degradation. The operator must assure that operations include adequate and responsible measures to prevent "unnecessary or undue degradation" of the Federal lands and to provide for reasonable reclamation. Unnecessary or undue degradation, as defined under 43 CFR Part 3809, means surface disturbance greater than would normally result when an activity is being accomplished by a prudent operator in usual, customary, and proficient operations of similar character and taking into consideration the effects of operations on other resources and land uses, including those resources and uses outside the area of operations.

It is also recognized, however, that existing treaties with Native American Tribes, cultural resource protection laws (National Historic Preservation Act and Archeological Resources Protection Act), tribal trust responsibilities, and recent laws (American Indian Religious Freedom Act and Native American Graves Repatriation Act) protecting Native American religious practices must also be considered in the decision-making process. The Tucker Hill area is of direct interest and concern to four Northern Paiute groups. The Bureau has consulted with recognized Native American tribes on a government-to-government basis. Consultation with at least two tribal governments has indicated the area has religious significance. Unlike impacts to other resource values, impacts to religious values cannot be mitigated. Both the Klamath Tribes (representing the Yahooskin Band of Northern Paiutes) and the Burns Paiute Tribe are opposed to the project due to the impacts to cultural uses and religious/spiritual values. The project would be in conflict with Klamath Tribes policy of allowing no surface disturbance activities within their ceded lands and recent proclamations issued by these tribes.
Several individuals and environmental groups also oppose the project due to environmental reasons, particularly impacts related to visual and cultural values.

In making the decision outlined above, the Bureau has attempted to balance the statutory rights of the applicant with other conflicting legal mandates as well as recognized tribal interests, uses, and concerns. Throughout the decision-making process, the Bureau has worked with all interested and concerned parties to mitigate, to the extent that is reasonably possible, the impacts of the proposed project to known cultural, visual, and biological values. To that end, the original proposal has been modified to reduce the total amount of surface disturbance from 38 to 32 acres (this includes 8 acres of existing disturbance from previous exploration activities in the area). This, in turn, would reduce the potential impact to one additional cultural site, reduce the overall level of visual impacts, and reduce the overall level of disturbance to soil and vegetation that would require reclamation. In making this decision, it is also recognized that it is not possible to mitigate the impacts to religious or spiritual values that may be associated with the formation.

CONFORMANCE WITH APPLICABLE LAND USE PLANS

The minerals section of the current, approved Bureau land use plan governing management of the area (High Desert Management Framework Plan) calls for keeping the Tucker Hill area "open for mineral development". This decision is consistent with this component of the existing plan, as well as other sections of the plan related to dispersed recreation use, wildlife habitat, and range management.

The decision may be in conflict with the State of Oregon's statewide planning goal 5 which provides protection to scenic and historic areas, while it is consistent with goal 9 which seeks to provide for a variety of economic activities vital to the health, welfare, and prosperity of Oregon citizens. Various agencies with the State of Oregon, including the Governor's office, were given opportunity to review the project and provide the Bureau with a determination of conformance with the State's planning goals. Comments were received from the Oregon Department of Environmental Quality and Department of Geology and Mineral Industries.

The decision also appears to be both compatible and in conflict with a number of components of applicable regional and county plans, as described in the Draft EIS. The Lake County Commissioners, Lake County Chamber of Commerce, the Town of Lakeview, and numerous businesses and individuals within Lake County are supportive of the project.
MITIGATION AND MONITORING

Those project design features, requirements, and mitigation measures specified on pages 12-13 of the Final EIS would be implemented. This includes implementation of a Historic Preservation Treatment Plan (HPTP) to be developed in consultation with the State Historic Preservation Office and the Advisory Council on Historic Preservation as outlined in the Memorandum of Agreement between the Advisory Council on Historic Preservation, Bureau, and Oregon State Historic Preservation Office. Implementation of the HPTP would fully mitigate the archaeological sites that cannot be avoided and would be directly impacted by the project. Mitigation would occur prior to project implementation. However, it is realized that impacts to some religious/cultural sites can not be mitigated.

A formal reclamation plan consistent with the reclamation discussion on pages 6-11 of the Final EIS (description of alternative C) and approved jointly by the Bureau and the Oregon Department of Geology and Mineral Industries would be implemented.

Environmental monitoring will occur during project operation and after final reclamation is complete, until the Bureau releases the reclamation bond, as described on pages 10-12 of the FEIS. Operational monitoring would consist of regular field visits by representatives of the Bureau and/or Oregon Department of Geology and Minerals to ensure compliance with operational and surface management requirements. Annual reclamation progress reports would be submitted to both the Bureau and the Oregon Department of Geology and Mineral Industries. Reclamation would be considered successful when all disturbed sites are stabilized, revegetated, and post-mining land use objectives are met.

PUBLIC INVOLVEMENT/TRIBAL CONSULTATION

Numerous opportunities were provided for public involvement and tribal consultation during project planning. The project proposal was announced in the September 1994 Fremont Frequent Flyer and the May 1995 Lakeview District Planning Update. A scoping letter was mailed to 80 individuals, agencies, and tribal governments on January 30, 1995. A Notice of Intent to prepare an EIS was published in the Federal Register on February 3, 1995, which also announced the beginning of the scoping period. The scoping period closed on March 3, 1995. A total of five scoping comment letters were received.

Atlas Perlite, Inc. has made several presentations on the project to the Lake County Board of Commissioners, communities of Lakeview and Paisley, and the Klamath and Burns Paiute Tribes.

Individual contacts and interviews were made with individuals of
the Klamath, Burns Paiute, Warm Springs Paiute, and Fort Bidwell Paiute Tribes. Additional meetings occurred with individuals/groups of these same tribes and the Bureau staff. A government-to-government meeting was held with the Burns Paiute Tribal Council on June 30, 1995, and with the Klamath Tribal Executive Committee on July 11, 1995. An open tribal meeting and field trip was held on Tucker Hill on August 11, 1995. Both the Warm Springs Paiute and Fort Bidwell Paiute Tribes stated Tucker Hill was outside of their tribal area and wished only to be kept informed of decisions made. Two individuals (one from each tribe) expressed an interest in the area and were consulted individually.

The Draft EIS was made available for a 60-day public review. A Notice of Availability of the Draft EIS was published by the U.S. EPA appeared in the Federal Register on October 6, 1995, initiating the public review period. The Bureau published its Notice of Availability in the Federal Register on the same date. In addition, Notices of Availability were published in several local newspapers on October 5 and 6, 1995. The availability of the draft was also announced in the September and November 1995 editions of the Bureau’s publically distributed newsletter covering Oregon and Washington, the Bureau News. Over 100 copies of the Draft EIS were mailed out to Congressional offices, Federal agencies, state agencies, tribal governments, local governments, and interested groups and individuals. Over 20 additional copies were requested and mailed during the review period to interested individuals. These individuals were added to the list of recipients for this ROD and Final EIS.

During the review period, a second government-to-government meeting was held with the Burns Paiute Tribal Council on November 8, 1995 to discuss the DEIS. A government-to-government meeting was also scheduled with the Klamath Tribal Executive Committee on November 14, 1995. However, this meeting was cancelled due to the Federal government shutdown. A follow-up meeting was held on January 17, 1996, prior to completion of this ROD. The Lake County Commissioners also held a special public meeting to hear public comments and concerns about the project on November 27, 1995. Representatives from the Bureau and Atlas Perlite were at this meeting. The review period on the DEIS ended on December 5, 1995. Approximately 20 oral comments or comment letters were received. Comment letters were included in Chapter 4 of the Final EIS, along with individual responses to each letter. A 30-day public review period was provided on the Final EIS. Only one oral comment was received on the FEIS from a representative of the Klamath Tribes requesting correction for the record of a statement made in response to a comment letter #5 in the FEIS where the Bureau stated the Native Americans with direct lineal descent in the Tucker Hill area are the Burns Paiute. The respondent felt that the Native Americans with direct lineal descent are the Klamath Tribes. In fact, there is disagreement over this issue and the response more accurately should have stated that the Native Americans with direct
lineal descent in this area are individuals of both the Burns Paiute and Klamath Tribes. A letter was received from the Association of Oregon Archaeologists requesting to be kept informed of the Section 106 activities and offering assistance, but provided no comments specific to the FEIS.

Finally, a 30-day appeal period is being provided on this ROD. Details of this appeals process are included in the following section.

APPEAL PROCEDURES

Any party adversely affected by this decision may appeal in accordance with 43 CFR Part 3809.4 which provides separate appeal procedures for the proposed operator (mining applicant) and all other parties. These two separate procedures are described below.

It is suggested that any party submitting a notice of appeal, send it by certified mail, return receipt requested.

Operator

Any operator adversely affected by the decision may appeal to the State Director. Such an appeal must be filed, in writing, with the officer authorizing the decision (Lakeview District Manager) within 30 days of receipt of the decision. The decision shall be in effect during the pendency of any appeal. However, a request for stay of the decision may accompany such an appeal.

The appeal to the State Director must contain:

a) the name and address of the appellant.
b) the name of the mining claim(s) and serial number(s) assigned to the mining claim(s) recorded pursuant to 43 CFR Subpart 3833 which are subject to the appeal. 
c) a statement of reasons for the appeal and any arguments which would justify reversal or modification of the decision.

The State Director shall promptly render a decision on the appeal, in writing, by certified mail. If the State Director’s decision is adverse to the appellant, it may be appealed to the Board of Land Appeals, Office of Hearings and Appeals, in accordance with 43 CFR Part 4.4. This decision shall be effective while waiting for the outcome of any such appeal.

All Other Parties

Any other party, other than the operator, adversely affected by this decision may appeal by submitting a written notice of appeal within 30 days of receipt of this decision in accordance with 43
CFR Part 4.4 to the District Manager, Lakeview District, Bureau of Land Management, P.O. Box 151, Lakeview, OR 97630. The notice of appeal must include a statement of reasons or file a separate statement of reasons within 30 days of filing the notice of appeal. The filing of any such appeal shall not stop this decision from being effective. The notice of appeal must state if a stay of the decision is being requested. A copy of the notice of appeal, statement of reasons, and other documents should be sent to the Regional Solicitor, Pacific Northwest Region, U.S. Department of the Interior, Lloyd 500 Building, Suite 607, 500 N.E. Multnomah Street, Portland, OR 97232. If the statement of reasons is filed separately it must be sent to the Board of Land Appeals, Office of Hearings and Appeals, 4015 Wilson Boulevard, Arlington, VA 22203.

Approved:

Edwin J. Singleton
District Manager
Lakeview District

April 24, 1996
Date
AMENDED
PLAN OF OPERATIONS AND
RECLAMATION PLAN
FOR THE
TUCKER HILL PERLITE PROJECT

Prepared for:
USDI BUREAU OF LAND MANAGEMENT
LAKEVIEW DISTRICT
LAKEVIEW, OREGON 97639

Prepared by:
ATLAS PERLITE, INC.
Denver, Colorado

With the Assistance of:
JBR ENVIRONMENTAL CONSULTANTS, INC.
5365 Mae Anne Avenue, Suite B-2
Reno, Nevada 89523

April 1996
Revised June 1996
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ATLAS PERLITE, INC.

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1 INTRODUCTION

1. A General Background

In 1987, Atlas Corporation acquired the Tucker Hill perlite property located in south-central Oregon about 50 miles north of the California state line (Figure 1). The property position includes approximately 886 acres of land. The project area is located on public land administered by the Bureau of Land Management (BLM), Lakeview District.

A small portion of the Tucker Hill perlite deposit was originally discovered and staked by a group of local prospectors in 1949. Shortly after location, a bulk perlite sample was collected and crudely expanded in a fire assay furnace by the U.S. Bureau of Mines in Tucson, Arizona. The property then underwent a brief period of surface mining. Unfortunately, this mining was conducted on a portion of the property that contains a high percentage of marekanite nodules (obsidian), and large adjacent areas of high-grade perlite went unrecognized. Mining operations ceased in 1954. In June 1981, Tenneco Oil Company located approximately 80 mining claims and later sold its property to Houston Oil and Minerals Exploration Company (HOMEX) who conducted some mapping and bulk sampling in 1982. HOMEX in 1983, 1984, and 1985 constructed 3-4 miles of road, drilled in excess of 100 exploratory holes, and mined, sampled and tested approximately 50 tons of perlite. In 1986, prior to acquisition of the property by Atlas from HOMEX, Western States Minerals Corporation conducted drilling and bulk sampling.

Upon acquiring the Tucker Hill property in July of 1987, Atlas remapped and reinterpreted the geology of the deposit. Between 1987 and 1990, Atlas completed 18 core and reverse circulation drill holes and submitted a number of samples for expansion testing. A resource estimate incorporating the new data was developed in 1991.

Compiled expansion test data, drill core information, reverse circulation drill information and geologic mapping indicate a reserve potential of between 50 and 100 million tons of commercial grade perlite. Bulk samples of Tucker Hill perlite have been shown to perform in test evaluations as well as or better than other perlite products currently being produced. Bulk sample tests indicate that Tucker Hill perlite is of the universal variety suitable for a wide variety of expanded perlite products.

While the size of the Tucker Hill deposit, together with its high quality, make it a world-class deposit, the market for perlite products is not large, nor is it rapidly increasing. Consequently, development of a new source of perlite ore is constrained by such factors as supply, demand and the economics of mining, processing and shipping. Therefore, Atlas' proposed plan of operations is designed to accommodate these factors.
This Amended Plan of Operations and Reclamation Plan is being submitted in compliance with 43 CFR 3809 BLM regulations for surface mining of public lands and the State of Oregon Revised Statutes (ORS) 517. The operations in this plan are those conducted on public lands and include the proposed haul road, quarry, waste rock dump, and the ore and growth medium stockpiles for the Tucker Hill Project.

1.B APPLICANT INFORMATION
The claim names, claim types, and BLM serial numbers for claims associated with the project are listed in Table 1.B-1.

**TABLE 1.B-1 PROJECT UNPATENTED LODE CLAIMS**

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The Tucker Hill Project site and haul road is located in Lake County, Oregon within sections 23 through 26, and 35 in Township 34 South, Range 19 East (Figure 2).

1.C NAME OF INDIVIDUAL COMPLETING APPLICATION

Larry J. Gorell, Sr. Environmental Coordinator

1.D BUSINESS ADDRESS

Atlas Perlite, Inc.
370 Seventeenth St., Suite 3050
Denver, CO 80202-5631

1.E BUSINESS TELEPHONE

(303) 629-2440

1.F CORPORATE INFORMATION

Corporate Name:
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370 Seventeenth St., Suite 3050
Denver, CO 80202-5631

President Information:
Mr. Gary Davis
370 Seventeenth St., Suite 3050
Denver, CO 80202-5631

Treasurer Information:
Mr. Jerome C. Cain
370 Seventeenth St., Suite 3050
Denver, CO 80202-5631

Secretary Information:
Mr. Jerome C. Cain
370 Seventeenth St., Suite 3050
Denver, CO 80202-5631

Oregon Resident Agent Information
C.T. Corporation System
800 Pacific Building
Portland, OR 97205
2 - OPERATING PLAN

2.A  PROJECT LOCATION AND DESCRIPTION
The Tucker Hill Project is located in south-central Oregon, approximately 35 miles northwest from the town of Lakeview. The project is accessed by traveling north of Lakeview on U.S. 395, west on Highway 31 to the Tucker Hill road and then south 3.3 miles on the Tucker Hill road to the Tucker Hill Quarry site (Figure 1).

Tucker Hill is within the rain shadow of the Cascade Mountains. The area has a semi-arid climate. Mean daily maximum temperatures are in the mid 80 degrees, with mean minimum temperatures in the low 20 degrees. Annual precipitation ranges from 7 to 15 inches, with a mean of 10.25 inches. Most precipitation comes as winter snow or spring rain. Summers are typically hot and dry. Vegetation is predominantly a sagebrush/bunch grass community typical of Nevada and eastern Oregon.

2.A.a Project Boundaries
Figures 1 and 2 illustrate the Tucker Hill Project location which is contained in the sections listed on Table 2.A-1. The entire operation is estimated to disturb approximately 32 acres over the next 10 years. Prior to any surface disturbance, the claimant and the BLM will meet to flag or stake the boundary of the area within which surface disturbance is allowable under this plan. To prevent unnecessary and undue degradation, Atlas will then be responsible for ensuring that all mining activities or related surface disturbance occur within this boundary.

<table>
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<th>Table 2.A-1  LEGAL DESCRIPTION OF THE AFFECTED LANDS</th>
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</tbody>
</table>

2.B  CULTURAL AND ARCHAEOLOGICAL RESOURCES
Atlas Perlite, Inc. is aware that certain cultural and archaeological values exist in the Tucker Hill area. Atlas will manage its operations to preclude or minimize impacts to these values. Atlas will work with the BLM and the Oregon State Historical Preservation office to assure the identification of cultural values, religious beliefs, or traditional practices of Native American people which may be affected by this project. Also, Atlas will cooperate with the BLM in its Native American consultation process, as required by the 1992 amendments to the National Historic Preservation Act and other relevant rules.
2.C  **SURFACE OWNERSHIP**

*Figure 2* shows land status in the project area. The project is located on public lands that are administered by the BLM.

2.D  **PROJECT DESCRIPTION AND ASSOCIATED DISTURBANCE**

2.D.a  **Overview**

Atlas proposes to develop a small quarry at the Tucker Hill perlite deposit. The 15- to 20-acre quarry is situated at an elevation of 4,980 feet on Tucker Hill. An existing 3.3-mile access road would be upgraded and utilized as a haul road. The haul road would connect the Tucker Hill Project with Highway 31. Quarrying of the deposit would produce high grade perlite ore. The ore produced from the Tucker Hill quarry would be hauled via the existing access road to Highway 31 and then south to the town of Lakeview for processing. Processed perlite product would be shipped in bulk to manufacturers or end users by truck or rail.

2.D.b  **Quarry**

The Tucker Hill deposit would be quarried using conventional methods consisting of drilling, blasting, loading and hauling. The rock would be drilled with diesel-powered blast hole drills using 10- to 12-foot drill hole centers depending on material. The holes would be loaded with a blasting agent (ANFO), a mixture of ammonium nitrate and fuel oil) and blasted in accordance with regulations of the federal Mine Safety and Health Administration.

The Lakeview Interagency Fire Center will be notified of the Tucker Hill blasting schedule a minimum of two (2) days prior to any blasting.

*Figure 3* shows the proposed disturbance including the mine configuration, haul road and growth medium stockpiles over a ten year period. A cross-section of the quarry as it is exposed at one, five and ten year intervals, is shown in *Figure 4*.

The blasted rock would be loaded with front-end loaders into haul trucks (22 to 25 ton capacity). Waste rock would be hauled to the waste rock dump site located at the Lake County gravel pit in Section 24 (*Figure 3*). Ore would be hauled over the existing access road to Highway 31 and then south to the process facility in Lakeview, where it will be screened, sized, and transloaded for rail or truck shipment.

Based upon the current mine plan, the estimated quantity of perlite ore that could be extracted over a ten year period by Atlas Perlite, Inc. is approximately 1.5 million short tons. The estimated waste tonnage associated with this ore production is 72,000 tons.
2.D.c Waste Rock Dumps
The waste rock dump would be located in the northwest corner of the existing Lake County gravel pit. The waste rock will be used by the county either as material for the county road maintenance program, or as fill for final reclamation of the gravel pit.

2.D.d Operations
After the initial start up period in 1996, the bulk of the proposed quarry operations would take place during two blasting campaigns per year, each approximately 45 days during early summer and late fall to avoid conflicts with wildlife. There may be a need for an additional short blasting period (approximately seven days, not necessarily consecutively) between December and January 31 and/or July 1 through 31. Blasting would be scheduled as described in Appendix I. Quarried material would be stockpiled in place on the quarry floor. There would be two trucks averaging 10 trips per day per truck working a five day work week (normally Monday through Friday) from approximately 6 a.m. to 6 p.m. daily. The hauling would be done year round and there would be an average of two people at the quarry while hauling. During the blasting campaigns, there would be three to four people on site during the work day. The equipment and facilities Atlas plans to use at the quarry include:

- 2 - 25 ton Dump Trucks
- 1 - D9 or equivalent Dozer
- 1 - 980 or equivalent Front End Loader
- Drill Rig
- 1 - 3,000 gallon Water Truck
- Light Vehicles (pick-up trucks)
- Office Trailer

Initial construction of the Tucker Hill project is scheduled to begin in the summer of 1996. Given the mineable reserves and projected production rates the expected mine life is minimum of five years. For planning purposes, however, ten years is considered a realistic production period. It is conceivable that market conditions would allow an opportunity to extend the operations beyond what is currently anticipated. In the event an extension is warranted, permits would be amended accordingly. Table 2.D-2 shows the anticipated production schedule for the next 10 years.
TABLE 2.D-2 PRODUCTION SCHEDULE

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Ore Production*</th>
<th>Annual Waste Production*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50,000</td>
<td>25,100</td>
</tr>
<tr>
<td>2</td>
<td>50,000</td>
<td>4,500</td>
</tr>
<tr>
<td>3</td>
<td>75,000</td>
<td>2,500</td>
</tr>
<tr>
<td>4</td>
<td>75,000</td>
<td>2,500</td>
</tr>
<tr>
<td>5</td>
<td>100,000</td>
<td>2,500</td>
</tr>
<tr>
<td>10</td>
<td>250,000</td>
<td>7,100</td>
</tr>
</tbody>
</table>

*In nominal short tons (ST)

2.D.e Operating Components

The operational components that would be created by the Tucker Hill Project consist of the haul road, growth medium stockpiles, the quarry and associated ore stockpile(s) (Figure 3). Existing roads and pads created in part by Atlas and in part by others during the exploration of the project and located out of the ultimate pit perimeter, are also a component of the Tucker Hill project (Figure 5). Table 2.D-3 lists the approximate acreage of disturbance, both existing and proposed, for each component associated with the Tucker Hill project. Proposed disturbance shown is estimated for both the five and ten year periods. The existing disturbance associated with the 1994 drilling program access (0.4 acres) and the largest bulk sample site (0.8 acres) are contained with the proposed disturbance.

TABLE 2.D-3 SURFACE DISTURBANCE (EXISTING AND MAXIMUM PROPOSED)

<table>
<thead>
<tr>
<th>Disturbance Component</th>
<th>Existing Acres</th>
<th>Proposed Acres</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5 Yr.</td>
<td>10 Yr.</td>
</tr>
<tr>
<td>Main Haul Road</td>
<td>3.7</td>
<td>3.5</td>
<td>4</td>
</tr>
<tr>
<td>Quarry Area</td>
<td>0</td>
<td>13.8</td>
<td>20</td>
</tr>
<tr>
<td>Growth Medium Stockpile</td>
<td>0</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>1994 Drill Access</td>
<td>0.4</td>
<td>-0.4</td>
<td>-0.4</td>
</tr>
<tr>
<td>Exploration Roads</td>
<td>2.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bulk Sample Sites</td>
<td>2.1</td>
<td>-0.8</td>
<td>-0.8</td>
</tr>
<tr>
<td>Total</td>
<td>8.4</td>
<td>16.6</td>
<td>23.3</td>
</tr>
</tbody>
</table>

AMENDED PLAN OF OPERATIONS AND RECLAMATION PLAN FOR THE TUCKER HILL QUARRY PROJECT
ATLAS PERLITE, INC.
THOUSANDS June 12, 1994
2.D.f Growth Medium Management

Prior to construction of the quarry and upgrading of the haul road, the available growth medium (soil material) that can feasibly be obtained with standard equipment would be removed and stockpiled (Figure 3). Growth medium material would be removed from all disturbed areas, except the growth medium stockpile locations, by either bulldozing the existing growth medium material and vegetation into piles along the slopes and near the reconstructed haul road, or loading the material into trucks and hauling the material to designated stockpile locations.

The growth medium stockpile would be constructed like a waste rock dump. The material would be end-dumped to its angle of repose and then regraded to slopes of about 2.5h:1v. The completed stockpile would be stabilized during the operational phase by seeding with a seed mix to be determined through consultation with the BLM. The application of seed would follow stockpile construction at a time conducive to seed germination.

Monitoring of growth medium stockpiles, and disturbed and reclaimed areas, will include the detection and appropriate removal of any invader species. Specific invader species and their control will be determined by consultation with representatives of the Lakeview BLM.

2.E Project Access

2.E.a Haul Road

The project site would be accessed using the existing 3.3 mile road. The existing road would be resurfaced with crushed stone or gravel, where necessary, to provide for an all weather travel surface. Turn-outs would be constructed where appropriate to provide for safety. During operations, the road would be graded and watered to maintain the surface and control fugitive dust. The existing road would be expanded to an approximate running width of 18 feet with total disturbance width not to exceed 32 feet with a maximum cutbank height of approximately six feet. An existing two-track road would be upgraded on the private lands directly south of Highway 31 to the east of the existing corrals.

2.E.b Access Control

Public access to the quarry area would be restricted for the duration of the operation. This would be accomplished administratively and by the posting of warning signs located in strategic areas and marked with words of "warning" applicable to the danger associated with the operations.

Access would be provided to individuals or groups requiring access to or through the quarry area for such purposes as education, research and/or cultural/religious practices. However, there is no public access on that portion of the haul road which crosses private land.
2.F **Surface Waters**

There are no surface water bodies located on the Tucker Hill Project area. The nearest surface water is Chewaucan Marsh, which is approximately one mile distant at the closest point. Control of potential erosion products resulting from surface water runoff is discussed in Section 3.G, Drainage and Sediment Control.
3. A  PREVENTION OF UNNECESSARY OR UNDUE DEGRADATION
The Reclamation Plan has been developed in accordance with BLM Handbook 3042-1, "Solid Minerals Reclamation Handbook." Details of the Reclamation Plan will be monitored and administered by the DOGAMI as well as the BLM. Design and construction of the project facilities would be conducted in a manner which prevents unnecessary or undue degradation of the environment. Reclamation shall conform to the standards set forth in Chapter I.D. of BLM Handbook 3042-1.

3. B  PROJECT SCHEDULE
The project life through completion based on the current plan is 10 years. The schedule could be affected if conditions change sufficiently. As a result of the modest size and nature of the project, concurrent reclamation for the waste rock dumps and haul road is not practicable. Reclamation would be performed upon termination of operations. Reclamation of existing exploration-related disturbances outside of the proposed quarry area would be reclaimed during the life of the proposed quarry operations.

If operations sit idle for longer than two years, measures will be taken to prevent erosion and other damage to the environment in accordance with BLM Handbook H-3809-1 (Chapter 7, II C.).

3. C  POST OPERATIONAL LAND USE
The objectives of the reclamation plan include preventing or minimizing safety hazards, stabilization of disturbed areas, and providing for a post operation surface condition that would be consistent with the long-term land uses as specified by the BLM.

3. D  POST OPERATION TOPOGRAPHY
Figure 6 is a map of the expected post-operation topography at the Tucker Hill project area at the end of ten years.

3. E  RECLAMATION OF WASTE ROCK DUMP
Because Lake County may use some of the waste rock material for their road maintenance operations or as an aid in reclamation of the county gravel pit, the county would reclaim the existing gravel pit in accordance with requirements of the BLM and DOGAMI upon closure of the pit.

3. F  ROAD RECLAMATION
Long-term management of the haul road would be determined as part of the reclamation process. Possible options include:
• Permanently close the road, bring the road bed back to the original contour as closely as possible, and revegetate the road corridor. Fill material, enhanced with available growth medium, would be pulled onto the roadbed to fill against new road cuts and restore the slope to its existing contour as needed. Compaction would be relieved during excavation by ripping and smoothing the surface with the excavator bucket. This process would help inhibit soil loss from runoff and provide a suitable seedbed. Revegetation of the regraded area would be consistent with methods described under Revegetation;

• Regrading and recontouring of the haul road could be done to return the road bed to approximately its existing configuration;

• Stabilize the road as needed for protection of the watershed and road bed. Maintain existing access for BLM administrative purposes; or

• Maintain the road for both public and administrative use. This option would require an easement or right-of-way for the portion of the road across private lands.

For the purposes of the reclamation cost estimate, the most costly option (completely reclaiming the road) was used to determine a reclamation bond.

3.G DRAINAGE AND SEDIMENT CONTROL

The goal of the drainage and sediment control plan is to convey runoff from reclaimed areas and upgradient undisturbed areas through the project site in a manner which would protect the reclaimed areas and prevent degradation of down gradient water quality. The drainage and sediment control plan is designed to require no maintenance.

The main method of drainage and sediment control at the project site would be revegetating all disturbed areas, with the exception of the quarry. Drainage on roads would be by ditching, installation of waterbars and, where appropriate, culverts. Road running surfaces would be rocked to reduce sediment runoff. Drainage facilities would be designed to accepted road engineering standards. Reclamation will be considered acceptable if there are no rills over 6-inches in depth and/or width after three years.

During operation, the quarry would be a topographic depression and all precipitation falling onto the quarry surface area would be contained on-site. Construction by this method would help control potential erosion from site run-off. Because the quarry is located on the top of Tucker Hill, no watershed exists up-gradient of the quarry, and only the precipitation directly falling onto the quarry area could be impounded. However, the site is arid, annual evaporation exceeds precipitation, and the perlite is fractured. These factors would lead to rapid infiltration or evaporation of precipitation. Consequently, it is highly unlikely that any water would be impounded.
Based on available data (see New Mexico Bureau of Mines and Mineral Resources or BMMR data in Appendix II), there are not any sulfides present in the ore or waste rock to contribute to acid rock drainage in the event there was standing water for a brief period. Three analytical testing procedures performed on the Tucker Hill perlite by the New Mexico BMMR (total metals [acid soluble], leachable metals [TCLP], and acid/base accounting) indicate that the ore contains low levels of metals, and that the metals tested would not be mobilized in the environment. The test for acid-base potential indicates there is a substantial excess of neutralization potential of the material which suggests that the potential for the generation of acidic conditions, and potential mobilization of metals, would be very low. Table 3.G-1 provides a general lab analysis of the material sampled from Tucker Hill.

**Table 3.G-1 Typical Chemical Analyses (Percent)**

<table>
<thead>
<tr>
<th>SiO₂</th>
<th>74.2%</th>
<th>CaO</th>
<th>1.3%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al₂O₃</td>
<td>12.6%</td>
<td>Na₂O</td>
<td>3.8%</td>
</tr>
<tr>
<td>Total Fe</td>
<td>0.5%</td>
<td>K₂O</td>
<td>4.5%</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>0.52%</td>
<td>LOI</td>
<td>3.3%</td>
</tr>
<tr>
<td>TiO₂</td>
<td>0.06%</td>
<td>Moisture</td>
<td>0.2%</td>
</tr>
<tr>
<td>MgO</td>
<td>0.10%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**3.H Revegetation**

The revegetation methods described at this time are generally based on common industry practices. Further refinement is anticipated as site specific results are derived from future test plot and seed bank programs. A seed bank would be obtained from an off-site test plot seeded from native plants growing on the Tucker Hill formation. Two off-site test plots will be developed in locations acceptable to the BLM. The test plots would be designed, monitored and analyzed by the mining company in conjunction with the BLM and DOGAMI.

The seed mix included in this proposal is based on known soil and climatic conditions and was selected to establish a plant community which would support post-mining land uses as prescribed by the BLM. The present seed mix is designed to provide species that can become established in the environment of south-central Oregon, are proven species for revegetation, and/or are native species found in the plant communities prior to disturbance.

Of the seeds listed in Table 3.H-1, a minimum of seven species, including grasses, forbs, and shrubs, would be seeded based on seed availability at the time of planting and the success of species concluded from the test plots and concurrent reclamation.
### Table 3.H-1 Revegetation Seed Mixture

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
<th>Pounds Per Acre*</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Agropyron spicatum</em></td>
<td>Bluebunch Wheatgrass</td>
<td>5.0</td>
</tr>
<tr>
<td><em>Danthonia unispicata</em></td>
<td>Single Spike Oat Grass</td>
<td>3.0</td>
</tr>
<tr>
<td><em>Leymus cinereus</em></td>
<td>Basin Wildrye</td>
<td>2.0</td>
</tr>
<tr>
<td>(<em>Elymus cinereus</em>)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Atriplex confertifolia</em></td>
<td>Shadscale</td>
<td>3.0</td>
</tr>
<tr>
<td><em>Poa sandbergii</em></td>
<td>Sandberg Bluegrass</td>
<td>1.0</td>
</tr>
<tr>
<td><em>Elymus elymoides</em></td>
<td>Bottlebrush Squirreltail</td>
<td>1.0</td>
</tr>
<tr>
<td>(<em>Sitanion hystrix</em>)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Astragalus</em> sp.</td>
<td>Astragalus</td>
<td>1.0</td>
</tr>
<tr>
<td><em>Trifolium</em> spp.</td>
<td>Clover</td>
<td>1.0</td>
</tr>
<tr>
<td><em>Artemisia tridentata</em></td>
<td>Great Basin Sagebrush</td>
<td>2.0</td>
</tr>
<tr>
<td><em>Purshia tridentata</em></td>
<td>Antelope Bitterbrush</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*Seeding rate is for hand broadcasting of pure live seed (PLS). The seeding rate for each species would be adjusted to result in a total of 20.0 PLS pounds per acre.

The specific seeding rates, mulch type and application rates, fertilizer requirements, and revegetation techniques would all be established through the test plot program.

Seeding activities would be timed to take advantage of optimal climatic windows and would be coordinated with other reclamation activities. In general, earthwork would be completed in the summer or early fall. Seed bed preparation and seeding would be done in the fall, or when appropriate.

Squirreltail grass would be used for temporary stabilization of soil and to prevent weeds from invading disturbed soil areas.

Revegetation planning would be coordinated by Atlas and the BLM.

### 3.I Reclamation of Quarry

The quarry walls would be left with overall slopes of approximately 22 degrees with benches approximately 10-12 feet vertical by approximately 25 feet horizontal. This would provide a very stable final slope.
There would be no surface discharge from the quarry. The relatively small amount of runoff from the surrounding land surfaces and precipitation directly into the quarry would either evaporate or percolate into the exposed bedrock in the quarry bottom.

The proposed operation involves the quarrying of a uniformly high-grade perlite deposit. The geologic setting of the deposit allows for the extraction of ore from a single open pit quarrying operation. As multiple adjacent quarries would not be developed, sequential back-filling is not possible. Further, placing the excavated waste from the waste rock dump into the quarry would not result in an improved backfill condition since the bulk (99 percent) of the excavated matter removed would be perlite ore. Backfill would create an economic obstacle should the quarry be re-opened.

Prior to final reclamation, public safety concerns would be evaluated with the BLM and the DOGAMI. If determined to be necessary by the agencies, the company would construct a barbed wire fence approximately four feet high along the margin of the pit about 25 feet back from the highwall edge. The fence would be posted with warning signs located in front of the fence and spaced every 200 feet. The permanent fence and weather resistant metal signs would provide for public safety for many years following mining.

If visual impacts due to quarry walls are later determined to be adverse, the company will work cooperatively with BLM to develop acceptable mitigation, which may include vegetation or rock staining.

**3.J  MONITORING AND MAINTENANCE OF RECLAIMED AREAS**

Environmental monitoring of the project area would consist of both operational and post-reclamation monitoring. Operational monitoring would extend for the duration of operations and would cease when operations are terminated. Post-reclamation monitoring would commence on any reclaimed area following completion of the reclamation work for the area and would occur along with, and/or following, operational monitoring until the project’s reclamation bond is released to Atlas. Annual reports on the progress of the reclamation would be submitted to BLM and DOGAMI.

The BLM and Atlas will monitor revegetation of all surface disturbed areas (outside of the main excavation pit) using random transect line intercept methods of survey. Four sample areas, with two 50-foot transects per area, will be chosen to represent the different areas of Tucker Hill. Percent composition, density, cover, and frequency of type of vegetation data will be monitored along each transect. This information will be used to determine if the Reclaimed Desired Plant Community (RDPC) is being established. A RDPC is defined as:

A perennial plant community established on a disturbed site which provides stability through management and land treatment, and which produces the type and amount of vegetation
necessary to meet or exceed both the land use and activity plan objective established for the site.

The RDPC will achieve as close to 100 percent of the perennial plant cover of adjacent vegetation communities as possible.

Monitoring will start the first year after reseeding of a reclaimed site and will continue every growing season for a maximum of five years, or until 40 percent cover of RDPC is achieved, or until the Authorized Officer determines that the plant community has met the revegetation goals. At the end of three years, those areas not meeting 40 percent cover of RDPC will be evaluated by Atlas and the PLM to determine the best course of action to achieve reclamation goals. This may include reseeding and/or removal of unwanted plant species. Monitoring will then continue for two years following corrective action.

Reclamation would be considered successful when the disturbed sites are stabilized, secondary plant succession is established, and the conditions are set to realize the land use objectives. The type and frequency of monitoring applicable to the Tucker Hill project is found in Table 3.J-1.

<table>
<thead>
<tr>
<th>Type of Monitoring</th>
<th>Operational Frequency</th>
<th>Post-Operational Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition of drainages and sediment control</td>
<td>Monthly</td>
<td>Annually for three years</td>
</tr>
<tr>
<td>Condition of reclaimed areas</td>
<td>Annually</td>
<td>Annually for five years</td>
</tr>
</tbody>
</table>

3.K EFFECT OF RECLAMATION ON FUTURE MINING
Reclamation of the site could affect future mining of the area in so far as market conditions also allow continued operations. Future deposits may be identified, and could be developed as separate mining sites, or as an extension to the existing quarry.

3.L DRILL HOLE PLUGGING
All exploration drill holes at the project site have been plugged according to the State of Oregon requirements. Although no additional drilling is currently planned, any additional holes resulting from future development drilling within or adjacent to the quarry would also be plugged according to these requirements.

3.M CONCURRENT RECLAMATION
Revegetation of exploration roads and pads not located within the mining component boundary would take place during the mining of the Tucker Hill project. Reclamation would be considered successful when the disturbed sites are stabilized, secondary plant succession is established, and the conditions are met to realize the land use objectives.

3.N  **SOLID AND HAZARDOUS WASTE**

Atlas Perlite, Inc. and its contractors will comply with all applicable federal and state laws dealing with the storage and disposal of chemicals, petroleum products, and RCRA Subtitle C hazardous waste, and RCRA Subtitle D solid waste.
4 - ACCEPTANCE OF RECLAMATION RESPONSIBILITY

Atlas Perlite, Inc. agrees to accept the reclamation responsibility for operations at the Tucker Hill Project Area. Atlas will post a surety as required by the State of Oregon regulation ORS 517 and the BLM Surface management regulations as contained in 43 CFR 3809.
5.1 METHODOLOGY

Earthwork production rates and hourly operating costs for equipment were calculated using Means Heavy Construction Cost Data (1995). Hourly labor costs are based on the U.S. Department of Labor General Wage Decision No. NV95-5 (Davis-Bacon rates). In order to ensure that the cost estimate for the reclamation bond is high enough for either the state or BLM to perform the reclamation, this cost estimate was prepared under the assumption that Atlas personnel would not be available at the time of reclamation. Table 5.1-1 provides a summary of the mining components that would require reclamation under this plan and the costs associated with each.

<table>
<thead>
<tr>
<th>TABLE 5.1-1 RECLAMATION COST ESTIMATE BY COMPONENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component/Activity</td>
</tr>
<tr>
<td>Haul Road Reclamation</td>
</tr>
<tr>
<td>- Steep Portion</td>
</tr>
<tr>
<td>Regrading</td>
</tr>
<tr>
<td>- Flat Portion</td>
</tr>
<tr>
<td>Regrading</td>
</tr>
<tr>
<td>Ripping</td>
</tr>
<tr>
<td>- Entire Road</td>
</tr>
<tr>
<td>Seedbed Preparation</td>
</tr>
<tr>
<td>Seeding</td>
</tr>
<tr>
<td>Culvert Removal</td>
</tr>
<tr>
<td>-Growth Medium Stockpile</td>
</tr>
<tr>
<td>Recontouring</td>
</tr>
<tr>
<td>Scarifying</td>
</tr>
<tr>
<td>Seeding</td>
</tr>
<tr>
<td>-Additional Seeding (Two)</td>
</tr>
<tr>
<td>Haul Road &amp; Growth Medium Stockpiles</td>
</tr>
<tr>
<td>-Pit Perimeter Fence</td>
</tr>
<tr>
<td>-Pit Highwall Staining</td>
</tr>
<tr>
<td>Mob and Demob Equipment</td>
</tr>
<tr>
<td>Post-Reclamation Monitoring</td>
</tr>
<tr>
<td>Sub-Total All Reclamation</td>
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<tr>
<td>Add-On Items</td>
</tr>
<tr>
<td>Insurance (1.5% of total labor)</td>
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<tr>
<td>Contract Administration (18% of total)</td>
</tr>
<tr>
<td>Bond Performance (1.5% of total)</td>
</tr>
<tr>
<td>Bond Payment (1.5% of total)</td>
</tr>
<tr>
<td>Profit (10% of total)</td>
</tr>
<tr>
<td>GRAND TOTAL</td>
</tr>
</tbody>
</table>
5.2 **HOURLY COSTS FOR EQUIPMENT AND LABOR**

- Hourly equipment operating rates are from Means Heavy Construction Cost Data, 1995.
- Hourly labor rates are from U.S. Department of Labor, General Wage Determinations (Davis-Bacon) (1995).

Cat D9N Bulldozer = $91/hr

Cat 235C Hydraulic Excavator = $138/hr

Chisel Tooth Harrow & Seed Drill (pulled by Terex 82-30B tractor) = $72/hr

Laborer (Group No. 1, Zone 5)

- **Base Salary** = $19.34
- **Fringe** = 6.65
- **SIIS (10.52%)** = 2.03
- **FICA (7.65%)** = 1.48
- **Unemp. (3%)** = 0.58

= $30.08/hr (rounded to $30)

Equipment Operator (Group No. 2, Zone 3)

- **Base Salary** = $25.01
- **Fringe** = 6.55
- **SIIS (10.52%)** = 2.32
- **FICA (7.65%)** = 1.68
- **Unemp. (3%)** = 0.66

= $36.22/hr (rounded to $36)

BLM Reclamation Technician (GS 7, Step 1)

- **Base Salary** = $18.00
- **Benefits (32%)** = 6.00
- **Leave Surcharge (18%)** = 3.00

= $27.00/hr

Seed Cost

- **Per Pound** = 7.00
- **Per Acre (20.0 lbs/acre)** = 140.00

5.3 **RECLAMATION COSTS - HAUL ROAD**

**Total Road Length** 17,424 ft (3.3 miles)

Flat Terrain - 12,714 ft - knock down side berms, rip, scarify, mulch and reseed

Steep Terrain - 4,710 ft - regrade, scarify, mulch and reseed

5.3.1 **Regrading Cost**

Reclamation Treatment: Knock down berm on flat portion of haul road.

Push growth medium along haul road length.
Assumptions:
- 3' high berm on both sides of road
- 100' dozing distance
- $12,714 \text{ ft} \times 9 \text{ ft}^2 = 4,238 \text{ CY}$
- Decrease avg. operator correction factor from 0.75 to 0.5 to account for placing growth medium while regrading road.

Equipment:
- Cat D9N @ $91/hr

Labor:
- Operator @ $36/hr

Average Production:
- 1200 LCY/hr (100' dozing distance Cat Book)

Correction Factors:
- Average operator = 0.5
- Loose material = 1.2
- Maneuverability = 1.00
- Job efficiency = 0.83
- Grade (average) = 1.00

Average Production (corrected):
- 1200 LCY/hr x 0.5 x 0.83 x 1.2 = 600 LCY/hr

Hours & Cost:
- 4,238 CY/600 LCY per hour = 7 hrs
- 7 hrs x $91/hr = $637
- 7 hrs x $36/hr = $252

Regrading flat portion of haul road.

Total $889

5.3.2 Ripping Cost - Flat Portion of Haul Road

Reclamation Treatment:
- Rip exposed flat road bottom surface to relieve compaction.
Assumptions:
- Flat terrain, 18' width requiring ripping
- Ripping depth of 18 inches
- $12,714 \text{ CY}$ of material

Equipment:
- Cat D9N @ $91/hr

Labor:
- Operator @ $36/hr

Average Production:
- 1500 LCY/hr (Cat Book Seismic Velocity Charts)

Correction Factors:
- Job efficiency = 0.83

Average Production (corrected):
- 1,500 LCY/hr x 0.83 = 1245 LCY/hr

Hours:
- $12,714 \text{ CY}/1245 \text{ LCY}$ per hour = 11 hrs

Cost:
- 11 hrs x $91/hr = $1,001
- 11 hrs x $36/hr = $396

Ripping costs for flat portion of haul road.

Total $1,397

5.3.3 Seedbed Preparation Cost - Entire Haul Road Length

Reclamation Treatment:
- Scarify loose material to 6 inch depth.
Assumptions:
- 5,808 LCY of material

Equipment:
- Cat D9N @ $91/hr

Labor:
- Operator @ $36/hr

Average Production:
- 2050 CY/hr (Cat Book)

Correction Factors:
- Job efficiency = 0.83

Average Production (corrected):
- 2050 CY/hr x 0.83 = 1702 CY/hr

AMENDED PLAN OF OPERATIONS AND RECLAMATION PLAN FOR THE TUCKER HILL QUARRY PROJECT
ATLAS PERLITE, INC.
5.3.4 Regrading Cost - Steep Portion of Haul Road

Reclamation Treatment: Pulling up fill material onto roadbed surface.
Assumptions: 4' x 18' average fill area, 1.5 CY per linear foot of road.  
Equipment: Cat 235C @ $138/hr (Means) 
Labor: Operator @ $36/hr 
Fill Factor: 57.5% 
Heaped Capacity: 2.75 CY x 57.5% = 1.58 LCY 
Average Production: 225 LCY/hr (Cat Book) 
Correction Factors: Job efficiency = 0.83 
Average Production (corrected): 225 LCY/hr x 0.83 = 187 LCY/hr 

Hours & Cost: 7,065 CY/187 LCY per hour = 38 hrs 
38 hrs x $138/hr = $5,244 
38 hrs x $36/hr = $1,368 

Excavation costs of steep portion of haul road. Total $6,612

5.3.5 Seed and Seed Application Cost

Reclamation Treatment: Distribution of seed mix by hand broadcasting. 
Material Cost: Seed mix @ $140/acre (hand broadcasting) 
Average Production: Assume 1 man labor crew 
Cost: 
Material: 7.7 acres x $140/acre = $1,078 
Labor: 7.7 acres x $60/acre = $462 

Seed application costs for the haul road. Total $1,540

5.3.6 Culvert Removal Cost

Reclamation Treatment: Remove culverts to re-establish natural drainage. 
Number of Culverts: 2 - (21" x 20') shallow fill culverts 
Assumptions: 18 ft road segment width (avg) 
3 ft road fill height (avg) 
20 ft road top surface length (avg) 
40 CY of material/culvert 
Equipment: Cat 235C @ $138/hr (Means)
5.4 RECLAMATION COST - TOPSOIL STOCKPILE LOCATIONS

Assumptions: Estimated 0.5 acre of disturbance. Rip and regrade surface area. Application of seed by hand.

5.4.1 Recontouring Costs

Reclamation Treatment: Rip stockpile area.
Assumptions: 0.5 acre of disturbance.
Ripping depth of 18 inches.
Equipment: Cat D9N @ $91/hr
Labor: Operator @ $36/hr
Average Production: 1085 CY/hr (Cat Book Seismic Velocity Charts)
Correction Factors: Job efficiency = 0.83
Average Production (corrected): 1085 CY/hr x 0.83 = 901 CY/hr
Hours: 1,210 CY/901 CY per hour = 1.5 hrs
Cost: 1.5 hours x $91/hr = $137
1.5 hours x $36/hr = $54

Rip/regrade costs for the topsoil stockpile areas. Total $191

5.4.2 Scarify and Seed Cost

Reclamation Treatment: Scarify loose material to 6 inch depth.
Hand broadcast seed.
Assumptions: 0.5 acre of surface disturbance.
Equipment: Cat D9N @ $91/hr
Labor: Operator @ $36/hr
Average Production: 2050 CY/hr (Cat Book)

AMENDED PLAN OF OPERATIONS AND RECLAMATION PLAN FOR THE TUCKER HILL QUARRY PROJECT
ATLAS PERLITE, INC.
Correction Factors:
- Job efficiency = 0.83

Average Production (corrected):
2050 CY/hr x 0.83 = 1702 CY/hr

Hours & Cost:
404 CY/1702 LCY per hour = 1 hr
1 hr x $91/hr = $91
1 hr x $36/hr = $36

Seedbed preparation costs for flat portion of haul road.

Material Cost:
Seed mix @ $140/acre

Average Production:
Assume 1 man labor crew
Seed mix 0.5 acre/hr

Labor Cost:
$60/acre ($30/hr/man)

Cost:
Material 0.5 acre x $140/acre = $70
Labor 0.5 acre x $60/acre = $30

Seeding costs for the topsoil stockpiles.

5.5 RECLAMATION COSTS - TWO ADDITIONAL SEEDINGS

Assumptions:
Assume haul road and growth medium stockpile areas will require two additional seedings to meet revegetation objectives.

Labor Cost:
$984

Materials Cost:
$2,296

Two Additional Seedings.

Total $3,280

5.6 RECLAMATION COSTS - PIT PERIMETER FENCE

Assumptions:
Construction of a 4-strand barbed wire fence around the pit perimeter, posted with warning signs.
3400' pit perimeter.
21' post spacing + cribs

Materials:
180 posts @ $2.25/post
10 rolls barbed wire @ $32/roll
23 signs @ $10/sign

Labor Cost:
$700

Materials Cost:
$955

Pit Perimeter Fence.

Total $1,655
5.7 **Reclamation Costs - Pit Highwall Staining**

<table>
<thead>
<tr>
<th>Total Perimeter</th>
<th>3,400 ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reclamation Treatment</td>
<td>Apply stain to portions of pit highwall visible from key observation points.</td>
</tr>
<tr>
<td>Assumptions</td>
<td>One-half of pit perimeter will be visible, of which upper 25 feet of highwall will require staining</td>
</tr>
<tr>
<td></td>
<td>$1,700 \text{ ft} \times 25 \text{ ft} = 42,500 \text{ ft}^2$</td>
</tr>
<tr>
<td></td>
<td><em>Advanced Concrete Technologies</em> of Santa Ana, California provided a verbal cost estimate on 4/8/96 which ranged from $0.15 to $0.35 per square foot, depending on steepness of slope. Estimated cost includes labor, materials and transportation. The average cost of $0.25 used for this estimate.</td>
</tr>
<tr>
<td>Cost</td>
<td>$42,500 \text{ ft}^2 \times 0.25 = 10,625$</td>
</tr>
<tr>
<td>Total</td>
<td>$10,625$</td>
</tr>
</tbody>
</table>

5.8 **Mob and Demob Equipment Costs**

| Assumptions | 2 hours mobilization time from Lakeview, 4 hours mob+demob |
| Costs | $100/hr for each piece of equipment. 3 pieces of equipment @ $400/mob-demob = $1,200 |
| Mob-Demob Costs | Total $1,200 |

5.9 **Post-Reclamation Monitoring Costs**

| Assumptions | Semi-annual inspections for 5 years |
| | 10-hour work days for first 3 years; 5-hour work days for last 2 years |
| | Approx. 80 mile round trip, Lakeview to Tucker Hill Quarry |
| Equipment | 4-wheel drive pick-up truck @ $11/day + $0.34/mile |
| Labor | Reclamation Technician @ $27/hr |
| Cost | 28 days x ($11/day + (80 miles x $0.34/mile)) = $1,070 |
| | 24 days x 10 hours/day x $27/hour = $6,480 |
| | 4 days x 5 hours/day x $24/hour = $540 |
| Post-Reclamation Monitoring cost estimate. | Total $8,090 |
FIGURES
Existing Road

New Road 1.5 Width

EXPLANATION
S - Surface Rights
M - Mineral Rights

- BLM -Atlas Lode Claims
- Private Lands
- BLM (S & M)
- BLM (S) and State (M)
- State Mineral Leases BLM(S)
- Private Surface BLM minerals

SCALE IN FEET

Atlas Perlite Inc.
TUCKER HILL PROJECT
FIGURE 2
LAND STATUS MAP
Atlas Perlite Inc.
TUCKER HILL PROJECT

FIGURE 3
ALTERNATIVE C
Proposed Disturbance At End Of 10 Years
APPENDIX I

BLASTING SCHEDULE
## Blasting Schedule

### 1996

<table>
<thead>
<tr>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APRIL</th>
<th>MAY</th>
<th>JUNE</th>
<th>JULY</th>
<th>AUG</th>
<th>SEPT</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wintering bald eagle clearance required. LRA Biologist.</td>
<td>Wildlife clearance required to minimize / eliminate impacts to nesting raptors, later wintering bald eagles, roosting bats, and other sensitive wildlife species.</td>
<td>Late fledging raptor clearance required LRA Biologist.</td>
<td>No blasting coordination required</td>
<td>Winter bald eagle clearance required LRA Biologist.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 1997 - 2006

<table>
<thead>
<tr>
<th>JAN</th>
<th>FEB</th>
<th>MARCH</th>
<th>APRIL</th>
<th>MAY</th>
<th>JUNE</th>
<th>JULY</th>
<th>AUG</th>
<th>SEPT</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wintering bald eagle clearance required LRA Biologist.</td>
<td>No blasting February 1 - June 30.</td>
<td>Late fledging raptor clearance required LRA Biologist (usually golden eagles due to Eagle Protection Act).</td>
<td>No blasting coordination required</td>
<td>Wintering bald eagle clearance required LRA Biologist.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX II

NMBMMR CHEMICAL ANALYSIS
**REPORT OF ANALYSES**

<table>
<thead>
<tr>
<th>Lab No.</th>
<th>Sample Identification Number</th>
<th>Acid Soluble</th>
<th>TCLP</th>
<th>Tons CaCO₃/1000 tons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cd ppm Cr ppm Pb ppm Cu ppm Sc ppm Ag ppm As ppm Hg ppm Cd ppm Cr ppm Pb ppm Sc ppm Ag ppm As ppm Hg ppm</td>
<td>NP</td>
<td>APP</td>
</tr>
<tr>
<td>Perlite Ore</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1345</td>
<td>5 yr. com &lt;1.2</td>
<td>24 5 25 16</td>
<td>0.06</td>
<td>0.10</td>
</tr>
<tr>
<td>1345 dup</td>
<td>&lt;1.2</td>
<td>20 27 15</td>
<td>0.06</td>
<td>0.10</td>
</tr>
<tr>
<td>1346</td>
<td>1 yr. com &lt;1.2</td>
<td>24 25 16</td>
<td>0.06</td>
<td>0.21</td>
</tr>
<tr>
<td>1346 dup</td>
<td>&lt;1.2</td>
<td>22 24 13</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>1347</td>
<td>3 yr. com &lt;1.2</td>
<td>24 26 17</td>
<td>0.06</td>
<td>0.21</td>
</tr>
<tr>
<td>1347 dup</td>
<td>&lt;1.2</td>
<td>24 23 15</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Expanded Perlite</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1348</td>
<td>1 yr. com &lt;1.2</td>
<td>28 28 10</td>
<td>0.06</td>
<td>0.21</td>
</tr>
<tr>
<td>1349</td>
<td>3 yr. com &lt;1.2</td>
<td>23 23 12</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>1350</td>
<td>5 yr. com &lt;1.2</td>
<td>21 28 11</td>
<td>0.09</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

2 Samples are composite (com) samples of ore to be mined during years 1, 3 and 5 of anticipated mine life. Dup = duplicate sample for check analyses.
3 Acid Soluble Analyses - Analytical method uses aqua regia digestion to detect total quantity of metals in the sample. Results do not indicate leachable metals.
4 TCLP = Toxic Characteristic Leachate Procedure. All sample results were less than the analytical detection levels. The samples all pass the TCLP test.
NP = Neutralization Potential as tons CaCO₃ per 1000 tons material.
APP = Acid Producing Potential as tons CaCO₃ per 1000 tons material.
NAPP = Net Acid Producing Potential; (APP-NP) negative number indicates neutralizing potential.

Source: NMBMMR Chemistry Laboratory analytical report, and personal communication, Lynn Brandvold, Senior Chemist, NMBMMR Chemistry Laboratory, January 5, 1996.