Stormwater Management Permit Application

for

Iron Mountain Quarry's

New Shine Quarry

February 25, 2010

Jefferson County, Washington

<u>Volume 3:</u>

- **Wetland Mitigation Sequencing Letter**
- **Conceptual Wetland Mitigation Plan and Indirect Impacts Analysis**
- **Full Wetland Inventory and Delineation**

New Shine Quarry
Stormwater Management Permit

APPLICATION TABLE OF CONTENTS
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Mr. David Wayne Johnson
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621 Sheridan Street
Port Townsend, WA 98368

Re: Iron Mountain Quarry - New Shine Quarry
Wetland Mitigation Sequencing Analysis

Dear Mr. Johnson:

Jefferson County Municipal Code 18.22.350(1) requires that an applicant proposing to impact wetlands first comply with mitigation sequencing; that is, evaluating, in sequence, the options considered to avoid, minimize, rectify, reduce and compensate for wetland impacts. Mitigation sequencing must necessarily take into account economic considerations and logistical factors concerning the use proposed for a site.

The following presents Iron Mountain Quarry's (IMQ) compliance with the avoidance and minimization steps of mitigation sequencing for the New Shine Quarry site. This analysis was prepared in consultation with the applicant. A separate conceptual mitigation plan has been prepared by Environ to address rectifying, reducing and compensating for direct and indirect unavoidable impacts to wetlands and wetland buffers.

Site Information

The area that IMQ has under lease from Pope Resources is approximately 142 acres in size. The site is covered by a thin layer of soils over basalt bedrock. Geologic mapping shows a continuous deposit of Tertiary Eocene Volcanic basalt bedrock extending from the subject site and the adjacent Shine Quarry to the Port Ludlow area approximately 3 miles to the northeast.

The topography of the site is undulating and includes a north-south trending ridge. Maximum topographic relief is on the order of 300 feet, from elevation 340 feet atop the highest ridge near the northern portion of the site, sloping to a low point next to an unnamed creek in the southeast corner of the site. Most of the site is now covered by early seral phases of evergreen upland forest that have regrown following clear cutting a decade or two ago.

The wetland delineation by Environ found twenty wetlands. These wetlands were generally in depressions, slopes or a combination of the two. These wetlands were classified and rated and buffer widths were identified for each wetland based upon these ratings. Figure 2 of Environ's Wetland Delineation and Inventory (see Application Volume 3) shows the wetland boundaries and their buffers.

Approach to Hard Rock Mining

A feasible hard rock mine requires a location that contains adequate land to conduct on-site mineral stockpiling and processing and adequate mineral reserves in order to economically justify the investment in land, equipment, administrative and processing facilities and related infrastructure such as roads and storm water management facilities.

Hard rock mining generally proceeds through five stages: 1) tree harvest, 2) clearing to expose rock with stockpiling of soils for later restoration work, 3) initial blasting to establish a clean working face; 4) mining/processing of rock along the working rock face and 5) restoration. Practical and regulatory standards require the exposed rock face to be established in benches, generally no more than 35 feet in elevation for each bench step. High rock walls are prohibited. This benching requirement leads to a significant volume of un-minable minerals adjacent to any area not being mined.

Avoidance and Minimization

IMQ approached the New Shine Quarry site and mitigation sequencing through an iterative process that considered which wetlands and wetland buffers could be avoided while still having adequate mineral reserves to assure project feasibility and adequate areas for administrative uses, equipment, processing facilities and infrastructure, including roads and stormwater management facilities.

Based upon the leased area, a grading plan was prepared to estimate maximum minable mineral reserves. This initial plan, identified here as Scenario 1 (see Exhibit 1), assessed mineral extraction without regard to wetlands. Scenario 1 identified approximately 11.0 million cubic yards of minerals available in the leased area. This initial plan (and all subsequent plans) placed the required administrative and processing facilities along the western portion of the site near the existing access road, which is their most logical and feasible location.

These initial mining studies assumed use of the existing mining/logging road that enters the site as the permanent access road into the mine's administrative and processing facility area on the west and for access to the mineral reserves on the east. This existing road was used in the past when mining was conducted and during past logging operations. This road lies north of Wetlands A, B, and C and west of wetlands E, F, G and H. This road acts as an effective limit to buffers from these wetlands. There are significant mineral reserves underlying these wetlands, but IMQ determined that these wetlands could be avoided while still having adequate reserves for a feasible mining project.

In order to expand the buffer between the processing areas and Wetlands A, B and C, IMQ evaluated if the access road into the mine could shift further north from the existing logging road. In order to maintain adequate room in the processing areas, the existing access driveway from the private road had to be maintained as the access into the mine site. However, IMQ was able to design a new mining road further north than the old logging road. This established a greater buffer between the processing areas and Wetlands A, B and C.

As part of this mining study, IMQ also evaluated whether it could avoid Wetlands R and S and the buffers to these wetlands at the northern edge of the site. Like avoidance of the southerly wetlands, avoidance of these northerly wetlands would leave significant mineral resources behind at the northern boundary.

Avoiding any direct impacts to Wetlands A, B, C, D, E, F, G, H, R and S and avoiding any impacts to the buffers associated with all of these wetlands other than Wetland C would yield significantly less than the material available to be mined in the leased area under Scenario 1. This scenario, identified here as Scenario 2a, was not quantitatively modeled, but it appears that this scenario would still allow for the feasible establishment of a mine on this site.

IMQ next evaluated whether it could avoid the string of wetlands L, M, N, O and P. A grading plan was prepared to avoid direct impact to wetlands L, N, O and P and the western half of wetland M. In order to maintain adequate mineral reserves, the portion of wetland M that extends easterly and the eastern portion of the buffer to wetlands L, N, O and P could not be avoided. This plan is identified as Scenario 2b (see Exhibit 2). Scenario 2b results in available mineral reserves of 6.7 million cubic yards. While this results in a significant reduction in reserves, as compared with prior Scenario 1, the remaining quantity of reserves still available would allow for an economically feasible mining proposal.

Finally, IMQ evaluated whether all other wetlands could be avoided (i.e. in addition to the above consideration, avoiding direct impacts to all of wetland M, all of wetlands I, II, J and K, and impacts to their buffers. This plan is identified as Scenario 3 (see Exhibit 3). The mineral reserves available under Scenario 3 would be only 2.4 million cubic yards. Such a mineral reserve cannot economically justify the expenditures for equipment, administrative and processing facilities and other necessary infrastructure. As such, IMQ concluded that its feasible limit of wetland avoidance was Scenario 2b, which avoids direct impacts to all of wetlands A through H, L, half of M, and all of N through S.

Table A presents the three scenarios evaluated through quantitative modeling.

Table A - Avoidance Analysis			
Scenario	Wetland and Wetland Buffer Avoidance	Mineral Reserves Available	% Reduction of Reserve from Prior Avoidance Scenario
1	No Avoidance	11.0 million yd^3	0
2a	Avoidance of direct impacts to wetlands A-H, R and S, and their the majority of their associated buffers	Not quantitatively modeled	--
2b	Avoidance of direct impacts to wetlands A-H, L, half of M, N-S; avoidance of direct impacts to the majority of the buffers to these wetlands.	6.7 million yd^3	39%
3	Avoid of all wetland and their associated buffers	2.4 million yd^3	59%

Please let me know if you have any questions.

Very truly yours,

Brent Carson

Enclosures