

All portals will be sealed when workings cease. Mining conditions in the future may warrant additional ventilation. Surface breakouts, from the seam, for ventilation will be made in Bear Canyon and may be made in Trail Canyon.

The current mining system employs room and pillar mining with continuous miners. Pillars are removed wherever possible. In the virgin coal areas, development will allow use of either room and pillar or Long-wall methods or a combination of both, with room and pillar preferred wherever feasible.

As the mine develops, main entries will be driven in sets of either four, five, or six, with barrier pillars separating each set. These main entries will run East to West and South to North, to the property boundary. Sub-main entries will run at right angles from the main entries to the limits of the property.

Overall, an advance-retreat mining system is projected for this mine with retreat mining employed prior to abandonment of each section.

Barrier Pillars

Barrier pillars will be left where required to protect entries and steep escarpments within the permit area. Possible escarpment failures and the subsidence wave caused by maximum coal recovery is expected to cause only minor damage that can be mitigated. Mining will be stopped a min of 200 ft (barrier pillars) from the surface to maintain stability of the surface in the places where coal outcrops occur.

B.C.

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Barrier pillars to protect main and sub- main entries have been made large enough (100 ft or greater) to assure protection of the entries for their useful life. When the area serviced is mined out, entry pillars will be recovered on the way out.

3.4.2.3 Protection of Natural Surface Structures & Streams

~~Co-Op's commitment to C.W. Mining will~~ maintain a min of 200 ft barrier pillars to outcrops ~~with~~ where required by lease stipulations, or protection of streams and wildlife to minimize the possibility of escarpment failure and resulting detrimental impacts to down stream water quality or nesting raptor. Submains under ~~the escarpment area~~ these areas in Bear Canyon will be left unless otherwise approved. No retreat mining will take place under these escarpment areas, which are outside of the potential subsidence zones shown on Plate 3-3. The only stream channel which lies over the minable portion of the permit area is Bear Creek, where it flows through Federal Lease U-024316. See Appendix 3-C for an explanation of the protection zone delineation. Adequate barrier zones will be left to protect adjacent stream channels, such as Bear Creek. Downstream channels are protected from disturbed area runoff contamination by utilization of sediment ponds. Temporary sediment controls i.e.; silt fences, straw bail dikes, etc. will be installed and vegetation will be reestablished as required in the event of impacts by escarpment failure.

Renewable vegetative resources exist within the wild Horse Ridge subsidence zone in the form of timber and grasslands which are used for grazing. As discussed in appendix 3-C, minimal detectable subsidence is expected on the surface. Past experience has shown that tension fractures which result from subsidence are localized and minimal, so these resources resources should not be impacted. Further discussion is contained in Appendix 3-C.

3.5.5.2 Mitigating Measures to be Employed to Reduce Impacts on Vegetative Resources

All recontoured areas will be planted and revegetated during the first appropriate season following grading and redistribution of topsoil. This program will include any necessary addition of remedial treatments to the soil. A suitable, permanent and diverse vegetative cover has been selected on the basis of appropriate land management agency requirements and will be established on all reclaimed areas (Chapter 9). The schedule of the program is presented in Section 3.6.6. What follows is an outline of the major aspects of the revegetation plan. The specific measures involved will be addressed on a site specific basis.

Seeding and Planting. All plants used to revegetate the disturbed areas will be native or compatible species selected specifically for the vegetative community, as detailed in Section 9.3.2. Seed types will include wheatgrass, salina wildrye, sagebrush, pinyon and juniper and are listed in Chapter 9, Section 9.5. Wherever possible, seed will be drilled or disked into the ground. In steep slope areas, where such techniques are difficult or impossible, hydro-seedings or cyclone spreader seeding will be done.

SUBSIDENCE CONTROL AND MONITORING PLAN

SUBSIDENCE

Subsidence can normally be expected to occur over areas where second mining has taken place (pillaring). See Section 3.4 for mining operation. Based on the geologic interruptions within a mine, subsidence becomes very difficult to predict, due to the variable nature of the mining panels. However, Figure 3H-1 will give an estimate of the maximum subsidence that may be expected in mine studied in the Western U.S. Maximum subsidence for an average panel in the Bear Canyon Mine has been estimated from Figure 3C-1, using the criteria shown in Table 3C-1. Subsidence has been estimated ~~for mining 3 seams~~. based on the number of seams mined in the area

Past experience in this area shows no indication that subsidence would be this drastic. No actual subsidence has been noted from areas pillared as much as 40 years ago, and the subsidence monitoring network initiated in 1987, has shown only minor (0.47 ft max 1992) variations in elevation. Based on this, little, if any, detectable subsidence is expected to become apparent when mining under these depths. Some minor fracturing and an escarpment rock fall have been noted in the adjacent Trail Canyon Mine area, and although these are assumed to be mine-related, they occurred in areas of relatively low cover and unknown outcrop protection. Only minor fracturing has been noted in relation to the Bear Canyon Mine (see Plate 3-3).