TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

December 4, 2006

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor, Task Manager
Joseph C. Helfrich, Environmental Scientist/Biology, Team Lead

FROM: Peter H. Hess, Environmental Scientist/Engineering PHH Lyon

RE: Lease Addition U-46484 & U-61049, Co-Op Mining Company, Bear Canyon Mines #3 and #4, C/015/0025, Task ID #2680

SUMMARY:

The Permittee submitted an application to the Division on July 21, 2005 to add additional acreages to several of the Federal coal leases as well as fee coal. Those acreages and lease identification numbers include the following:

1) U-024316.....80 acres
2) U-61049.....2,196.09 acres
3) U-46484.....1,400 acres
4) U-61048.....1,108.27 acres
5) Fee Coal.....2,740.00 acres
Total Added Acreage.....7,524.36 acres

This additional permit acreage will have a significant effect on the life of the Bear Canyon operation, increasing its permitted acreage from 3,336.18 acres to 10,840.54 acres. The 7,524.36 acres being added is being referred to as the Mohrland Addition.

The first review generated relative to this application was designated as Task ID #2292. Numerous deficiencies were returned to the Permittee to address.

The Permittee responded on May 21, 2006. The Division has assigned this project an identification of Task ID #2526 for the review of the Permittee's response for record keeping purposes.

The Permittee responded to the deficiencies aired by the Division and the USFS on August 9, 2006. The Division review of that response has been identified as Task ID #2597.

The Divisions review of the Task ID #2597 application generated deficiencies that were forwarded to the Permittee. The Permittee responded to those deficiencies on October 30, 2006.

Due to concerns aired by the Division and the USFS relative to the mine plans projected in the Tank seam at Bear Canyon (NW1/4 NE1/4 of Section 19, T 16 S, R 8 E), the USDOI/BLM/SLO and the Permittee submitted revised maps which provided corrected overburden information in this area on November 17, and 21, 2006.

This technical memo will address the adequacy of the October 30, 2006 response and the new overburden information (identified as Task ID #2680) received on November 17 and 21, 2006 as it relates to the engineering discipline of the R645 Coal Mining Rules.

TECHNICAL ANALYSIS:

OPERATION PLAN

MINING OPERATIONS AND FACILITIES

Regulatory Reference: 30 CFR 784.2, 784.11; R645-301-231, -301-526, -301-528.

Analysis:

General

The Task ID #2292 submittal adds additional acreages of coal reserves to the Bear Canyon operation. There are no additional surface facilities anticipated at this time of application. All reserves mined from the Tank seam (#4 Mine) in the Mohrland area are projected to come outside through the #3 Mine located in the Wild Horse Ridge addition of Bear Canyon.

Type and Method of Mining Operations

The submittal states on Page 5-10 (Task ID #2292 application) under section R645-301-523 Mining Method that a new method of mining is to be initiated. In addition to continuous mining methods, the retreating longwall method of secondary extraction is to be implemented. Continuous mining will be used to develop the secondary extraction areas.

The application states that the operation will produce between 750,000 and 2,000,000 tons per year with two to four (continuous) miner sections working 360 days (See page 5-14, Recovery Rate of the application). The response received on May 21, 2006 (Task ID #2526)

does not contain a revision to page 5-14 that would reflect additional tonnage recovered by a longwall recovery method.

The response to the deficiencies aired in Task ID #2597 (identified as Task ID #2680 and received by the Division on October 30, 2006) contains a revised / updated Page 5-10 which is part of Chapter 5 of the Mining and Reclamation Plan. The revised page 5-10 contains the following information relative to anticipated coal production:

1) C.W. Mining anticipates an average annual production of 2,100,000 tons from the longwall secondary extraction method being proposed.

2) 400,000 tons of coal (average annual) will come from primary entry and longwall panel development using continuous mining methods.

3) 600,000 tons of coal (average annual) will come from pillar extraction methods using continuous mining methods.

C.W. Mining Company will be the only coal producer in Utah practicing both longwall and continuous methods of secondary coal extraction. The Permittee has adequately addressed the minimum requirements of **R645-301-523,** Mining Methods.

Facilities and Structures

The structures which exist at the Bear Canyon operation include the scale house / administration building, the maintenance shop, fuel storage tanks, coal processing tipple / truck loading facilities, ventilation fans for the Mines, electrical substation, above ground conveyors, sediment control devices, and topsoil storage piles. All are depicted on Plates 5-2A through 5-2G.

Findings:

The minimum regulatory requirements of this section of the R645 Coal Mining Rules have been met.

EXISTING STRUCTURES

Regulatory Reference: 30 CFR 784.12; R645-301-526.

Analysis:

The Bear Canyon MRP contains photos and descriptions of the facilities that are in place at the site in Appendix 5-A. The Permittee updated Appendix 5-A and resubmitted the file as part of Task ID #2526.

Two errors were noted with the revised Appendix 5-A:

1) Photo #11 (page 5A-16, Appendix 5-A) depicts two coal storage bins which were utilized as part of the Bear Canyon #1 Mine. The bin in the foreground has been reclaimed, and thus no longer exists. The bin in the background which blended coals from the Blind Canyon seam as well as the Hiawatha seam (#1 Mine) is in the process of being reclaimed with those facilities as of the date of this document.

2) Photo #8 (page 5A-14, Appendix 5-A) depicts the transformer sub-station which was associated with the Bear Canyon #1 and #2 Mines. The substation has been de-energized for some time and is in the process of being reclaimed, as of the date of this document.

The two errors identified in Appendix 5-A, Table 5A-1 (Task ID #2526 response) have been corrected with the August 9, 2006 (Task ID #2597) response. Both facilities have been noted as being reclaimed.

Findings:

The application meets the minimum regulatory requirements of this section of the R645 Coal Mining Rules.

RELOCATION OR USE OF PUBLIC ROADS

Regulatory Reference: 30 CFR 784.18; R645-301-521, -301-526.

Analysis:

There are no mining activities being conducted or being proposed within 100 feet of a public road right-of-way. Although an Emery County road terminates at the Permittee's gate, same is a great distance from the mining activities being conducted. There is no need to relocate this road.

Findings:

This requirement is not applicable to this submittal.

AIR POLLUTION CONTROL PLAN

Regulatory Reference: 30 CFR 784.26, 817.95; R645-301-244, -301-420.

Analysis:

The Permittee has submitted, as part of the Task ID #2680 application, (**Appendix 4-G**) a copy of the current air quality approval order, DAQE-145-02, which was issued to CO-OP Mining Company on February 22, 2006.

DAQE-145-02 permits an average annual coal production volume (or throughput) of 1,950,000 tons per rolling 12-month period.

According to information provided by the Permittee in Chapter 5, page 5-10, section **R645-301-523 Mining Method**, the average annual production to come from the Bear Canyon Mines is anticipated to be 3,100,000 tons per year. This includes 2,100,000 tons coming from the proposed longwall with the remainder coming from continuous mining primary and secondary extraction methods.

As a stipulation for approval, the Permittee must commit to the Division that an application to increase the throughput to 3,100,000 tons for the Mine through the Utah Division of Air Quality must be made, such that it is in place prior to the start up of the longwall secondary extraction method, (i.e., June 1, 2007).

Findings:

The minimum regulatory requirements of this section of the R645 Coal Mining Rules have been met.

COAL RECOVERY

Regulatory Reference: 30 CFR 817.59; R645-301-522.

Analysis:

Coal recovery is addressed on page 5-14, **Recovery Rate** of the Task ID #2292 submittal. Utilizing continuous miner advance and retreat techniques, a seventy percent recovery rate has been determined. Table 5-1, Coal Reserves – Bear Canyon Mine lists the in place tonnage, as

well as the recoverable tons for six Federal coal leases (U-61048, U-61049, U-024316, U-024318, U-020668, and U-38727). Tonnages for the fee coal area are also listed.

Based upon information learned during a meeting with the USDOI / Bureau of Land Management / SLO on July 11, 2006, the coal reserves associated with Federal lease U-46484 are segregated on the east end of the lease by the Bear Canyon fault and several smaller faults. In order for that lease to be mined in a cost efficient manner, the Permittee must develop the underground workings such that the lease can be accessed from the north side. It is not known if the Permittee has any exploration data for the lease area. Page 5-15, as received on August 9, 2006, contains information relative to in place tonnage, as well as recoverable tons from Federal lease U-46484. Thus, Table 5-1 has been updated to correctly include the recoverable tonnage (based upon knowledge available on July 11, 2006) to be mined.

The Permittee has provided a copy of the lease information for the 2,740 acres of fee coal owned by C.O. P. Coal Development Company. This agreement is included in the R2P2 information and is considered current.

The USDOI / BLM / Utah State Office provided the Division a copy of the R2P2 approval / modification letter for Federal coal leases U-61048, U-61049 and U-46484 on September 27, 2006. The approval letter was forwarded to the Office of Surface Mining in Denver, Colorado, with the following comments:

1) The R2P2 addresses all required items per 43 CFR 3482.1(b).
2) The BLM finds that the R2P2 complies with the Mineral Leasing Act of 1920, as amended, the lease terms and conditions, and the regulations in 43 CFR 3480.
3) The BLM has determined that maximum economic recovery of Federal coal will be achieved.
4) The BLM recommends that the Secretary of the Interior approved the R2P2 modification as part of the Federal mine plan approval.

Although the above information was not provided directly by the Permittee, the Division accepts the provided information as meeting the minimum regulatory requirements of this section of the R645 Coal Mining Rules.

Findings:

The minimum regulatory requirements of this section of the R645 Coal Mining Rules have been met.

SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

Analysis:

Renewable Resources Survey

R645-301-525.110; The Permittee has submitted three maps (Plate 7-4, Water Monitoring; Plate 7-12, Water Monitoring; and Plate 7N-2, Appendix 7N (water monitoring locations) depicting water monitoring locations as part of the Task ID #2597 submittal.

Plate 7N-2 depicts the water monitoring sites used for the Appendix 7N study, "Revised Hydrogeologic Evaluation of Bear Canyon Mine Permit and Proposed Expansion Areas".

Plate 7-12 depicts all of the State appropriated water rights held in the proposed lease addition. A revised Plate 7-12 was received on November 21, 2006.

Plate 7-12 is submitted at a scale of one-inch equals 1,000 feet, (or 1:12,000).

Pre-Subsidence surface contours are clearly shown.

There are no commercial buildings or residential dwellings depicted.

Water rights for the proposed lease addition are listed in Chapter 7, Table 7-6, Page 7-32. Quantity and quality information relative to these water sources is contained in the Utah DOGM water-monitoring database. The Permittee has committed to monitoring all water sources within the proposed permit addition.

Although R645-301-525.110 is not specifically addressed on page 5-16 of the Task ID #2680 submittal, Plate 7-12 (received 11/21/2006) and other information that is easily accessible meets the requirements of that section of the R645 Coal Mining rules.

Subsidence Control Plan

R645-301-525, Subsidence Control Plan

The Permittee's response (Task ID #2680) received on October 30, 2006 contains a revised page 5-16 which provides direction to Appendix 5-C. "Subsidence monitoring points are shown on Plate 5-3. **Appendix 5-C** contains the subsidence monitoring and control plan."

Appendix 5-C begins by discussing subsidence controls that have been implemented relative to secondary pillar extraction utilizing continuous mining methods. A revision added to page 5-16, section **R645-301-525 Subsidence Control Plan** contains the following statement; "An escarpment stability and subsidence evaluation was performed by Malecki Technologies. This report calculated the maximum subsidence effects of longwall mining and then reduced them by 50% for room and pillar. In the areas where longwall mining will take place the maximum effects will be used." (See Page 13, bullet #3 of "Modeling of Castlegate Sandstone Escarpment Stability" by Maleki Technologies, Inc.) This report is included as Appendix 5Q."

Appendix 5Q contains a single document titled "Modeling of Castlegate Escarpment Stability" by Malecki Technologies, Inc., Consulting Mining and Geotechnical Engineers. The document evaluates surface subsidence in the Wild Horse Ridge addition of the Bear Canyon permit area. The affects of secondary coal extraction (room and pillar secondary extraction / CM methods) on the stability of the escarpments located in that area is also part of the evaluation.

The submittal indicates on Page 5-10 (Task ID #2680 application) under section R645-301-523 Mining Method that a new method of mining is to be initiated. In addition to continuous mining methods, the retreating longwall method of secondary extraction is to be implemented. Continuous mining will be used to develop the secondary extraction areas.

Longwall extraction methods utilize technology that provides for planned subsidence in a predictable and controlled manner, (See R645-301-525.311).

The Permittee has submitted revisions to the currently approved subsidence control plan / subsidence monitoring regime as part of Appendix 5-C. The approved plan addresses monitoring of secondary mining areas using continuous mining / pillar extraction methods. The proposed revisions to this section of the MRP will address longwall secondary retreat methods.

The revisions submitted to the subsidence control and monitoring plan rely heavily on the report authored by Mr. Hamed Malecki, "Prediction of Surface Deformation Resulting From Longwall Mining Over the Bear Canyon Reserve".

R645-301-525.312 requires that if a Permittee employs mining technology that provides for planned subsidence in a predictable and controlled manner, the Permittee must take necessary and prudent measures "...to minimize material damage to the extent economically and technologically feasible to non-commercial buildings and occupied residential dwellings..." There are no non-commercial buildings or occupied residential dwellings within the proposed lease addition. Therefore, the requirements of this section are not applicable to the proposed lease addition.

The Permittee has indicated on page 5-18 (Chapter 5, Task ID #2680 submittal) that a section of the Left Fork of Fish Creek (where it flows through a portion of Federal lease U-61049 (Section 19) and private property (Section 18)) lies over a mineable portion of that lease. This area exists where the amount of overburden beneath the stream channel (based upon Plate 5-1C) varies from 750 to 1200 feet. Plate 5-1C depicts this area, which lies in the SW1/4 SE1/4 of Section 18 and the NW1/4 NE1/4 of Section 19. If secondary extraction is practiced through this area, subsidence could affect this stream channel.

Surface ownership in Section 19 (See PLATE 1-2, Surface Ownership, approved Bear Canyon MRP) is by the USFS, Manti-LaSal National Forest. Section 18 is owned by C.O.P. Coal Development Company.

Page 5C-9, paragraph two, lines 5 and 6 commit to the monitoring of the Fish Creek channel in Section 19, (for water loss while undermining).

Plate 5-1A, Blind Seam Workings, does not depict any mining in this area, (i.e., the NW1/4 NE1/4 of Section 19).

Plate 5-1B, Hiawatha Seam Workings, similarly does not depict any mine workings directly beneath this section of Fish Creek. Subsidence contours for the four longwall panels which are being projected to be developed and extracted (2010 through 2015) in this area depict a line of **ZERO** surface deformation running on a bearing North 57 degrees West. This line of ZERO surface deformation appears at an overburden depth of approximately 1200 feet (adjacent to longwall panel #1, i.e., LW 1).

The USDOI/DOI/BLM-USO provided a compact disc of the Resource Recovery and Protection Plan maps for the mining projections in the Tank Seam, the Blind Canyon seam, and the Hiawatha seams of the Federal lease addition. These maps are in the Federal R2P2 document, which has been forwarded to the Secretary of the Interior for approval.

Plate LMU-3, CO-OP Mining Company, Tank Seam / B Seam Projected Mining, depicts the anticipated mine entry layout for the main entries, sub-main entries, pillar areas using continuous methods, protection barriers, and longwall secondary extraction areas. Overburden depths are shown using isopach lines.

Plate LMU-3 depicts an overburden depth of 1,200 feet where the tailgate tension zone area of TS LW 7 (Tank Seam, Long Wall panel #7) butts against the North Mains of the #4 Mine. This is the area where the Left Fork of Fish Creek was previously identified as being a potential problem relative to potential subsidence effects of a perennial stream.

When the overburden contours shown on Plate LMU-3 are compared with the contours shown on PLATE 6-2, OVERBURDEN MAP, TANK SEAM, (P.E. stamp October 27, 2006, date received at DOGM October 30, 2006), (as submitted with the Task ID # 2680 application) an error of 400 feet is detected. Thus, an additional four hundred feet of material is available for the settling process. This material is well above the fracture zone described in the Malecki Technologies report titled **PREDICTION OF SURFACE DEFORMATION RESULTING FROM LONGWALL MINING OVER THE BEAR CANYON RESERVE,** Chapter 2.0, Subsidence Mechanism, pages 4 and 5. This 400-foot segment of the stratagraphic column lies in the *continuous deformation zone*, and little affect will occur to the Fish Creek channel.

The Fish Creek channel flows almost directly south in this area of Section 19, slowly descending over reduced burden thickness to a point where it crosses the Tank seam coal outcrop.

All surface deformation predictions are based on the "three-dimensional influence function method while accounting for site specific conditions "method of modeling used by Malecki Technologies, Inc., and an angle of draw of 22.5 degrees (See page 5C-3, paragraph two, **SUBSIDENCE CONTROL AND MONITORING PLAN, SUBSIDENCE** of the Task ID #2680 application). If an 800-foot burden depth is assumed, the horizontal length projected as the potential area of affects (the horizontal length of the tension zone) is calculated at 330 feet. A burden depth of 1200 feet will project a tension zone 500 feet wide from the edge of the tailgate in TS LW 7. At a scale of 1" equals 1,500 feet, the tensile zone calculates to be 500 feet in width. If one measures a 500-foot distance from the edge of the yielding tailgate pillars for TS LW 7, the edge of the tensile zone stops on the outside edge of the non-yielding pillars supporting the mains running from NW to SE. Thus, the non-yielding pillars should prevent any deformation of the surface in this area of Fish Creek. The Division considers this protection to be adequate.

Task ID #2680 contains Plate 5-3, SUBSIDENCE MAP, which depicts the ANTICIPATED amount of surface deformation (multiple seam extraction) predicted by the Permittee, as well as the areas of influence using the 22.5-degree angle of draw. Page 5C-3 states the following; "....historically, mines in the area have experienced an angle of draw of approximately 15 degrees". Page 10 of the Malecki Technologies, Inc. report titled "Prediction of Surface Deformation Resulting from Longwall Mining Over the Bear Canyon Reserve" states those measurements of angle of draw for single and multiple seam mining have varied between (from/PHH) 25 to 30 degrees. These values are higher than average for the East Mountain (22.5 to 25 degrees, Fejes, 1985). Hence, the Permittee's use of the 22.5-degree angle of draw for this lease addition has supporting documentation, which meets the requirements of R645-301-525.542, Approval of Site Specific Angle of Draw.

Plate 5-3. SUBSIDENCE MAP is P.E. certified by Mr. Mark Reynolds, a Utah registered professional engineer. Thus, the requirements of R645-301-542.300 and 512.130 have been addressed.

TS LW 7 is projected to be extracted from March 2009 through September 2009; thus access to the mountain above the extraction area for the purposes of monitoring water loss is projected to be possible at this time.

Page 5C-9, **PROTECTION**, states that "in order to protect water resources and state appropriated water rights form impacts, C.W. Mining has designed their mine layout so that the areas where these resources exist with less than 900 feet of overburden between the resource and the coal, the resource will be outside of the affected area."

Chapter 5, page 5-18, **Protection of Natural Surface Structures,** lines 12 and 13 state that "adequate barrier zones will be left to protect adjacent stream channels, such as Bear Creek".

The Division realizes that area over TS LW 7 will not see the maximum amount of deformation (predicted by the Malecki model to be 4.9 feet) until the second panel (Panel 8) is extracted.

R645-301-525.450 and 525.452 and 525.453 require that the Division prevent or minimize subsidence or subsidence related damage...by

a) R645-301-525.452.....leaving support pillars of coal.
b) R645-301-525.453.....leaving areas in which no coal is removed, including a description of the overlying area to be protected by leaving coal in place.

Based upon the review of Plate LMU-3, CO-OP Mining Company, Tank Seam / B Seam Projected Mining, the Permittees subsidence control plan is adequate to meet the requirements of the aforementioned coal mining rules.

The Permittee references a mining handbook on page 5C-10. The Permittee has provided information relative to the title of the book, the author of the article referenced, page number, edition, etc. The USDOI/BLM/USO has referenced this same article (Mining Reference Handbook, Chapter 13, Ground Control / Support, Daniel F. Kump, P.E., Alan A. Campoli, P.E., page 256, **Table 13.10 Minimum Cover for Total Extraction under Water Bodies.** This table provides support indicating that total extraction can be practiced beneath water bodies where a coal seam having a thickness greater than 7.5 feet can be safely performed **with a minimum burden thickness of 450 feet.** The minimum burden thickness shown on Plate LMU-3 at the edge of the tension zone is 600 feet. The non-yielding support pillars located in the main entries

will support the length of the Fish Creek perennial channel that was previously identified as a problem.

The USDOI/BLM/USO provided the following information to the Division on November 27, 2006; "...past work and interagency precedence has established the minimum overburden depth for full extraction mining, below a perennial stream, to be 60 times the mining height where the Manti-LaSal National Forest (MLFS) is the surface management agency, unless jointly agreed by the MLFS and BLM to be changed for a specific instance. This standard was reaffirmed by both the MLFS and BLM during the 17 November 2006 conference call". "In reviewing the overburden map provided by Norwest Corporation ("International Energy, Mining and Environmental Consultants") and maps showing the approximate location of the possible perennial sections of Fish Creek closest to the planned full extraction areas, BLM has found the minimum overburden to be some 750 feet (cross section attached). Because the coal thickness (and mining height) in the area is projected to be 7 feet, the minimum overburden, based on past precedence and work experience, is 420 feet. In this case, the overburden is approximately 330 feet more than the minimum".

There are no impoundments or dams within the proposed lease addition that require protection.

Appendix 5-C describes what considerations the designing mining engineer utilizes relative to the layout of the underground mine workings in order to minimize or prevent damage to surface areas where planned subsidence is not projected to be used. These considerations may include:

1) Orientation of longwall and /or pillar panels to strike/dip of the seam.
2) Width of longwall panels.
3) The design of non-yielding pillars for bleeder and /or sub-main protection.
4) The design of yielding pillars for gate roads between adjacent longwall panels and their affect on the subsidence trough profile throughout.
5) The design of barriers to protect surface features requiring protection.

The Permittee does not project the use of barrier abutments between adjacent longwall panels for the purpose of ground control. Based upon the analysis of **Table 5C-1, Estimated Maximum Subsidence,** page 5C-6 (Task ID #2680), **the average depth** noted for the Tank seam workings in the following Federal leases is as follows:

1) Federal lease U-024316 and U-46484 .....1,400 feet.
2) Federal lease U-020668 and U-38727 .....3,300 feet.
3) Fee and Federal lease U-61049.....4,600 feet.

Therefore, the Division anticipates that it will be necessary for the Permittee to revise its Mine projection to implement barrier abutment pillars for the purpose of ground control when mining at depths near or in excess of 2,300 feet.

R645-301-525.410 requires that the Permittee include, as part of the method of underground extraction, a description of the method of underground mining including the size, sequence and timing of the development of the underground workings. This map must show when and where specific portions of the mine's workings will be developed and extracted. This map is also needed to ensure that surface property owners are properly notified at least six months in advance of mining in accordance with the requirements of R645-301-525.700.

The Permittee has submitted, as part of the Task ID #2680 application, a projection of the proposed #4 Mine workings in the Tank seam (See PLATE 5-1C/ LMU-3). The first longwall panel to be extracted (TS LW 1) is depicted as being extracted from June of 2007 through September of 2007. This panel has dimensions of 4080 feet by 500 feet (face width).

Sequential longwall panels with their projected extraction dates are also depicted, as well as areas that will see primary development and secondary extraction via continuous mining methods. Thus, the Bear Canyon Mines operation is the only coal mining operation in the State of Utah that will utilize both longwall and continuous mining secondary extraction methods to recover this resource.

R645-301-525.420 requires that the application contain a map of the underground workings that describes the location and extent of the areas in which planned-subsidence mining methods will be used, and that identifies all areas where the measures described in 525.440, 525.450, and 525.470 will be taken to prevent or minimize subsidence and subsidence related damage.

PLATES 5-1A, 5-1B, and 5-1C meet the requirements of 525.420 because the locations of barriers (support pillars of coal) which will be left, the locations where planned subsidence is to be implemented, and areas where pillar designs are implemented to prevent or minimize to the extent possible (i.e., yielding pillars in the gate roads) subsidence related damage are depicted. Barrier pillars between adjacent longwall panels are not being implemented as part of the current mining projection in the Tank seam.

Section **3.0 MINING, GEOLOGIC CONDITIONS AND SUBSIDENCE CHARACTERISTICS,** pages 7-11, (MTI report) describes the methods which the Permittee, through consultation with MTI, have implemented to reduce the potential for subsidence related cracking near the surface.

As described in **3.1, Conceptual Mine Layout Designs**, C.W. Mining engineers have oriented the longwall panels that are being proposed in the Federal lease addition on a bearing of N 55 degrees W. MTI determined in 2001 that major geologic joint sets have an orientation of either N 15 degrees W, or N 85 degrees W. Thus, the panel orientation varies at least 30 degrees from either of the major geologic joint sets (i.e., slip surfaces) in the area. Malecki Technologies, Inc., states that this offset alignment is beneficial for the stability of development workings because it avoids alignment of joints and mine openings. This 30-degree offset in the orientation of the longwall panels with the major joint sets also "increases its chances of limiting the number and length of mining induced surface fracturing at final mining boundaries".

MTI also states that this 30-degree variance in orientation is effective in reducing the potential for subsidence related cracking at the surface.

The second mining engineering design method utilized by C.W. Mining Company to minimize the potential for subsidence related damage to surface lands is the utilization of yielding pillars for gate road support. These yieldable pillars are developed on fifty-foot centers, utilizing three mine entries. Thus, two complete pillars are developed per cross-cut.

The size of the yielding pillars has been selected by the C.W. Mining staff in order to control gate road pillar bumps. The thirty-foot wide pillars will reduce the potential for strain energy accumulation. The size was selected, based upon successful experience in the East Mountain and Trail Mountain longwall operations (i.e., Energy West Mining Company).

These yieldable pillars have also been shown to collapse completely as the adjacent panels are extracted on retreat, rendering virtually no effect on the subsidence trough being generated. The tensile stresses that are accumulative over the gate road entries ("transient" subsidence, see page 5 of the MTI report) in adjacent panels crush out. This has been confirmed by Dyni, 1991. Thus, the subsidence trough is extended across adjacent panels until the width of the lease is extracted.

The use of barrier pillars to protect either critical areas of the underground workings or surface features which have been identified as needing protection is discussed on pages 5-16, and 5-17. A minimum barrier width of 100 feet is left to prevent the transfer of mining induced subsidence impacts "across boundaries and property adjacent to the permit boundary". The Permittee claims that this 100-foot width is adequate to protect property from subsidence effects transmitted via the influence of angle of draw within the area.

Mine main and sub-main entries are protected by barriers having a minimum width of 100 feet to assure protection of those entries for their usable life.

Outcrop protection is discussed on page 5-17 of the MRP. Outcrops in the Bear Canyon permit area are either buried under overburden, or are burned some distance from the surface. Where neither condition exists, the coal is weathered or oxidized, and its marketable quality is jeopardized. Mining is stopped within 200 feet of the surface to minimize the potential for this negative affect on Mine product, as well as to leave support for the outcrop area.

Barriers will not be left where natural surface features are over or adjacent to coal burn areas. It is not always possible to leave barriers directly beneath the feature. Coal burn may surround the area directly beneath the surface feature, or the surface feature may lie over the burnt coal/unburned coal interface. As coal burn material has no structural support, leaving a barrier here would "cause an interruption between the natural and man made subsidence causing greater impacts to the surface. Because of this, no barrier will be left in these areas unless it is needed for roof stability or temperature considerations (MSHA), in which case the minimum possible size will be used" (100 foot width).

R645-301-525.430 requires a description of the physical conditions that will be encountered in the Federal lease addition area, such as:

i. depth of strata being mined
ii. seam thickness
iii. multiple coal seams
iv. dip of coal seam(s)
v. lithology of overlying strata
vi. the angle of draw which the Permittee feels is applicable in predicting where potential surface impacts could occur adjacent to the mine workings
vii. nature of the overburden
viii. strength characteristics of overlying strata and mine floor (tensile, compressive)
ix. near surface geology
x. geologic discontinuities (major fault areas)
xi. fractures and lineaments
xii. degree of extraction
xiii. surface topography
xiv. groundwater
xv. water level elevation and fluctuation
xvi. rate of face advance
xvii. production scheduling when mining through critical areas

Most of this information can be obtained from the Malecki report, "Prediction of Surface Deformation Resulting from Longwall Mining Over the Bear Canyon Reserve", pages 8 and 9. Page 8 contains descriptive text in the section **3.2, Geology, Rock Strength, and Stress Field,**

which discusses the anticipated surface affects resulting from single and underlying seam coal extraction.

Section **4.0 Predicted Ground Movements** (pages 14 through 16), describes the method used by Malecki Technologies, Inc., to predict the amount of subsidence occurring following extraction of longwall panels in both the Tank seam and Hiawatha seams in this proposed lease expansion. The MTI group used a "three dimensional influence function method while accounting for site specific conditions using subsidence data collected from the neighboring Deer Creek Mine" (Energy West Mining Company).

This type of modeling "relies on the influence of an extracted volume on the displacement components of a remote point on the surface" (MTI report, page 14).

The MTI group made subsidence calculations for three longwall blocks consisting of vertical movements, changes in surface slopes, and strains. Blocks 1 and 2 have been evaluated in the Tank seam. Block #3 has been evaluated for the Hiawatha seam.

Block #1 consists of five longwall panels having face widths varying from 500 to 640 feet. Seam thickness varies from five to 7.6 feet; an extraction height of 7 feet has been assumed.

Block #2 consists of four longwall panels having a face width of 600 to 800 feet. All four panels will be retreated from the NW to SE. Seam thickness varies from 5 to 8 feet. An extraction height of 7 feet has been assumed.

Block #3 consists of four longwall panels having face width of 640 feet, retreated from NW to SE. Seam thickness varies from 5 to 15 feet, with a fixed extraction height of 8 feet, (See pages 14 and 15 of the Malecki report).

The MTI group made subsidence predictions for each of the three mining blocks mentioned above using a numerical model calibrated with base line subsidence data from the Energy West East Mountain mining area.

As shown in Table 1, Predicted Subsidence Parameters for Single and Two Seam Extraction Design Options, surface areas being undermined via extraction of the Tank seam are predicted to settle (for Blocks 1 and 2) just under five feet (4.9 feet).

In areas where portions of the extracted Tank seam are underlain by mineable reserves in the Hiawatha seam, (where the two mined coal seams will account for 15 feet of the stratagraphic column), the MTI model anticipates a settling of the surface of 10.4 feet.

Subsidence studies conducted by the USBM in the East Mountain area report angles of draw ranging from 16 to 33 degrees with an average of 25 degrees. A final subsidence factor of 67 percent for single seam mining was determined. Thus, the 4.9 feet predicted by the MTI model for a 7-foot seam is realistic when compared to the 67 percent subsidence factor developed by the USBM (4.69 feet in a seven foot seam).

The Malecki report makes the following statements:

1) "Similarities in geology and geometry (i.e., mine design factors based upon depth of cover, face width, yielding gate pillars, and mining height) between the proposed lease addition area and East Mountain (Energy West Mining Company) justify the use of back (i.e., reverse) analysis of parameters for the predictive model."
2) "Some uncertainty exists for predictions made with the model due to variations in geology and mining geometry, including actual mining heights. Precise estimates of subsidence can only be achieved as site specific data become available and mine plans are finalized."

Thus, the aforementioned establishes the need to monitor subsidence over the extracted areas in order to determine whether the predictive model can be considered accurate enough to use for analysis of future subsidence mechanisms.

The Division must note in this document that mining projections are changed regularly all through the coal industry. Therefore PLATES 5-1A, 5-1B and 5-1C may or may not be accurate by the time the Mines are developed.

Performance Standards For Subsidence Control

Section **5.0 MONITORING PROGRAM** of the Malecki report (page 23) suggests a limited monitoring plan to verify if the predictive modeling is accurate. The report recommends the following:

1) Establish a monument line across the first longwall block (500 to 640 foot face width); locate this monument line near the center of this block.
2) Establish this monument line on 50-foot centers for a detailed comparison of the MTI model predictions.
3) Measurements should include a precision level survey to measure.
   a) Vertical settlement.
   b) Horizontal strain, using a steel tape extensometer.

GPS methods may be used; aerial photographic methods are another alternative.

This monitoring will provide data to determine site-specific angle of draw, subsidence factor, and tensile strains that can be used for more accurate subsidence prediction in the Bear Canyon lease addition area. The Malecki report states that "the arrangement and location of the monument line or method of survey can vary according to site-specific conditions influenced by topography, roads, etc."

The Malecki report states "C.W. Mining has not observed surface cracking above the existing Wild Horse Ridge panels (continuous mining pillar extraction) and thus does not foresee the need for detailed monitoring". Supporting this is the statement "USBM researchers report very few mining induced cracks over East Mountain. This coincides with the USBM study (Fejes, 1985) that "*there were no visual effects within the subsidence area. The local vegetation were not altered, and no surface fissures were detected*" (See MTI report, page 15, section **4.2 Model Calibration**).

The MTI group believes "a visual inspection is deemed sufficient over the deeper mines. The survey data should include crack location, orientation, horizontal length, and width."

MTI thus recommends a limited monitoring program so that the presence of surface cracks (if any exist) can be verified.

The Permittee has submitted revised pages 5C-7 and 5C-8 which reflect the installation of seven new subsidence monitoring points relative to Federal lease U-61049 (points 51-57). Six of these points are adjacent to existing roads in the area. These points are all located in Federal lease U-61049, as follows:

a) Point 51 is located in Section 13, T16S, R7E.
b) Points 52, 53, 56, and 57 are located in Section 18, T16S, R8E.
c) Point 55 is located in Section 19, T16S, R8E.
d) Point 54 is located out side of the Federal lease boundary for U-61049 and U-38727.

The Permittee has also committed to establishing the survey monument line across the first panel on 50-foot centers as recommended within the Malecki report, (section **5.0 MONITORING PROGRAM**), page 23. Points 25A-K will determine if the Malecki model is accurately depicting what is really happening over the mined area.

Additional survey monitoring lines will be established one year prior to mining at a spacing of 250 feet as recommended in Attachment 3, (i.e., the Malecki report). If subsidence occurs as the Malecki model predicts, the 250-foot spacing will continue. If it is determined that the subsidence profile is not following the profile predicted by the Malecki model, additional

monitoring points will be added to determine what is actually occurring and the Bear Canyon model will be updated accordingly (See page 5C-8).

The Permittee proposed monitoring plan also commits to the following:

1) Subsidence stations will be field-surveyed annually.
2) A field observation shall be made yearly of the mining area, including escarpment areas and obvious mining related impacts will be noted and located on a map.
3) A copy of the map showing the noted mining related impacts will be kept at the mine office, and available for inspection.
4) A copy of this same map will be forwarded to the Division as part of the annual subsidence report.

The Permittee's proposed monitoring plan appears to be logical; however, the Division would like to make the following recommendations:

1) Monitoring Points 25A-K will be installed over a panel having a face width varying from 500 to 640 feet. If the data compiled from this survey line confirms that the Malecki model is accurate, additional monitoring of panels #2 and #3 is felt to be redundant. If the Malecki model is shown to be inaccurate, then the additional survey lines at this face width are felt warranted.
2) The Division feels that the Permittee should commit to the monument survey line as the panel face widths are increased to the maximum 800-foot width, (Block 2 face width).

The Permittee's response received on October 30, 2006 states that if the monitoring of the 250 increments indicates that the subsidence is occurring according to the Malecki model, the 250-foot span for the monitoring points will continue. If annual monitoring indicates that the Malecki subsidence model does not correlate with what is actually occurring, the Permittee commits to updating the subsidence model.

The deficiency document generated by the Division relative to the Task ID #2597 generated the deficiencies listed below:

R645-301-525.440, the Permittee must commit to installing **ONE** subsidence monitoring point in each longwall panel as close to the longitudinal and latitudinal center of the panel as possible in order to determine when subsidence has reached its maximum in that area. Comparison of this data with adjacent monitoring points will determine if the subsidence trough is at the supercritical stage.

The Permittee's Task ID # 2680 response contains a commitment to install one subsidence monitoring point per longwall panel, (See page 5C-8, top of page, line 9).

R645-301-525.440, the Permittee must commit to **compiling an analysis** of the subsidence monitoring data that is submitted with the annual monitoring report for the area that was extracted during the current monitoring year. An analysis of the monitoring data for previous years over areas adjacent to those extracted during the current monitoring years is also required. However, the analysis of data for areas which have been extracted two years prior to the current monitoring year **IS NOT NECESSARY.**

The Permittee's response received by the Division on October 30, 2006 (Task ID #2680) contains on page 5C-8, paragraph two, the commitments necessary relative to monitoring, and the compilation of an analysis of the submitted data for the current monitoring year and the two previous years.

PLATE 5-3A has been updated to show the potential subsidence zone FOR THE MULTIPLE SEAM EXTRACTIONS for the lease additions. The Malecki modeling analysis used an angle of draw of 35 degrees in order to reduce subsidence and strains over the gate pillars, (E-mail communication between Mark Reynolds and MTI on August 24, 2006). Mr. Malecki used an angle of draw varying from 25 to 30 degrees in his written report to calculate a smaller influence zone (460-750 feet) in agreement with values reported by the USBM. The subsidence contours are depicted in one-foot increments, and show the maximum subsidence amount of ten feet, (as predicted within the MTI report, "Prediction of Surface Deformation Resulting from Longwall Mining Over the Bear Canyon Reserve"). Thus, Plate 5-3A depicts the maximum amount of subsidence in the areas where the Tank, Blind and Hiawatha coal seams will be extracted.

PLATE 5-3A is certified by Mr. Mark Reynolds, a Utah registered professional engineer.

R645-301-525.410, Method of Coal Removal

The application states on Page 5-10 that it is the Permittee's intent to implement retreating longwall secondary extraction methods to extract coal. Plate 5-1C, Tank Seam / B Seam Projected Mining accurately depicts the size, sequence and timing of the development and extraction of the underground workings. Similarly, Plate 5-1B, Hiawatha Seam Projected Mining and 5-1A, Blind Seam workings show the projected sizes of the longwall panels and the development / extraction dates through the year 2021.

R645-301-525.200, Protected Areas

The application mentions on Page 5-19 that no buildings have been identified above the potential subsidence zone (in the newly proposed lease addition). There are no abandoned oil or gas wells within the permit boundary.

The Permittee states on revised page 5C-10 (submitted with Task ID #2680 on October 30, 2006) that there are currently (as of 2005) six raptor nests located inside the affected area. "These areas are discussed in greater detail in Appendix 3L. Anticipated escarpment failure is discussed in greater detail under the applicable lease." Nest locations are confidential information and are shown on Plate 5-3A (confidential folder).

The Permittee's Task ID #2680 application states that if secondary extraction is projected to occur beneath escarpment areas where raptor nests have been identified, the Permittee will attempt to time this process such that it does not occur during the raptor nesting season."

The application is deficient; in accordance with the requirements of:

R645-301-525.200, R645-301-358.200, 358.300;

This discipline must state that the requirements to protect the identified nesting areas need review and approval by the Utah DOGM reclamation biologist as well as the US Fish and Wildlife Service, the USFS and the Utah Division of Wildlife Resources.

Performance Standards For Subsidence Control

Page 5-18, **Protection of Natural Surface Structures & Streams** of the Task ID #2680 submittal discusses the methods to be utilized by the Permittee to protect escarpments, raptors, and down stream water quality. A portion of Fish Creek, where it flows through a portion of Federal lease U-61049 and private property is to be protected by establishing a zone, as described in Appendix 5-C. The Permittee has provided maps (PLATES 5-1A, 5-1B and 5-1C) that correlate the surface location of the areas to be protected with the underground workings, and how the protection area correlates with the extraction area, (i.e., how does the surface location correlate with the longwall face).

Bear Creek flows through a mineable portion of Federal lease U-024316. This submittal is proposing to add 80 acres of reserves to this lease. Page 1-7 provides the legal descriptions for the lease areas to be added / approved by this submittal. The eighty acres being added to Federal lease U-024316 is the E1/2 NW1/4, which is more than a thousand feet from the Bear Creek channel. Therefore, the precautions used by the Permittee are not applicable to the area where the eighty acres are being added to the Bear Canyon permit area.

R645-301-525.500, et al.; Repair of Damage

The Permittee discusses potential negative effects of secondary longwall extraction in the lease addition being proposed in Chapter 5, page 5C-9 of the Task ID #2680 submittal.

Loss of riparian water and State appropriated water rights is of great concern to the surface management agency as well as the Division. The Permittee states that one area of concern is an area of Fish Creek in section 19 between two areas of lease U-61049 where water sources could be impacted. The Permittee proposes to monitor the 800-foot length of channel in Section 18 for water loss as it is being undermined. Page 7-61D of the Task ID #2680 application, section **United States Forest Service,** also contains a commitment to repair cracked streams or ponds using pond liners, grouting or other technologies available to repair the cracks.

Should the Permittee affect water rights on USFS land, or on lands adjacent to the Forest that may affect the hydrologic balance within the Forest, the Permittee must submit a mitigation plan to the Division and the USFS for review and approval prior to the initiation of repair work.

Due to the depth of overburden in the new lease addition, the Permittee anticipates that no State appropriated water rights are expected to be impacted. The Division also believes that Mine plans must be adequate to the point that channels, (i.e., perennial streams) are protected as they are the conveying mechanism to the beneficial use area for State appropriated water supplies.

The Permittee has provided, as part of the Task ID #2680 application, additional text which contains a commitment (See Chapter 7, page 7-61D, section **United States Forest Service**) to repair cracked streams or ponds such that any water resources affected would be restored to the original location.

The Permittee states that the loss of surface vegetation damaged by methane liberation through fissures caused by mining subsidence is of little concern because the Permittee has never encountered methane gas underground. The Permittee is proposing to develop new coal reserves that may have mining conditions unfamiliar to the Permittee, i.e., deep cover / possible methane gas liberation. The provided text does not constitute a mitigation plan, should problems arise.

This application meets the requirements of **R645-301-525.420, 525.480**, and **R645-301-731.530**.

Notification

The Permittee has provided projection maps of the #4 Mine workings depicting the anticipated dates when development mining will cross into the proposed lease additions. The

map does not show the surface landowner delineations, but section lines are depicted such that correlation with PLATE 1-2, SURFACE OWNERSHIP can be performed by the Permittee. The Permittee has developed the information necessary to send the required notification letters to the surface owners in the time frame mandated under **R645-301-525.700.** The Permittee's response received October 30, 2006, (Task ID #2680) indicates that Plate 5-1A, 5-1B, and 5-1C now correlate with Plates 1-1, Permit Area, Plate 1-2, Surface Ownership, and Plate 1-3, Sub-Surface Ownership via established section lines.

Findings:

The application meets the minimum regulatory requirements of this section.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 784.24, 817.150, 817.151; R645-301-521, -301-527, -301-534, -301-732.

Analysis:

Road Classification System

All eleven roads within the Bear Canyon Mines disturbed area have been classified as primary, (See page 5-21, section R645-301-527 Transportation Facilities of the approved MRP). All roads associated with the lease additions are the property of the surface landowner.

As such, surface roads in Federal leases U-024316, U-46484, U-61048 and U-61049 are owned either by the U. S. Forest Service or the C. O. P. Coal Development Company.

If the Permittee has a need to utilize any USFS roads in the future, it will be necessary for them to obtain a Road Use Permit from that agency.

Plans and Drawings

Maps, plans and drawings of the eleven primary roads within the Bear Canyon Mine disturbed area are contained on Plates 5-2 and 5-4, as well as Appendices 5-J and 5-K.

Chapter 5, page 5-21 of the Bear Canyon MRP makes the following statement; "construction of the Mohrland Road is discussed in Appendix 5-L." At the present time, Appendix 5-L does not exist. The Permittee intends to do this permitting in the future. Plans and drawings will be submitted at that time.

Primary Road Certification

Plates 5-2A-G depict the plan views of the surface facilities associated with the Bear Canyon Mines from the ball park area to the #'s 1, 2, 3, and 4 Mine portal areas. Thus, all of the eleven primary roads are depicted. Mr. Charles Reynolds, General Manager, and Utah registered professional engineer has placed his P.E. certification on each of these maps. Similarly, Plate 5-4A-D contains cross-sections and P.E. certifications for the primary access road (coal haul road / Bear Canyon), the Shop road and pond "A" access road (4B), the shower house road and #2 Mine road (reclaimed) ((4C)), and the #1 and #2 conveyor access roads, and the #3 Mine access road in the Wild Horse Ridge area, (4D).

Appendix 5-K contains cross sections and stability analyses for the #4 Mine, or Tank seam primary road. Neither the road design nor the stability analyses have a certification by a Utah registered professional engineer. Thus, the requirements of R645-301-512.200 have not been met.

The response received from the Permittee on August 9, 2006 (Task ID #2597) indicates that the required "as-built" maps and P.E. certification for the #4 Mine Tank seam access road have been forwarded to the Division as part of Task ID #2588. The review / approval of that information is pending, as of the date of this document.

Findings:

The minimum regulatory requirements of this section have been met.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Coal Mine Waste

Page 5-26 of the Task ID #2292 application contains one text change on page 5-26. That change proposes to change the location for the final disposal of coal mine waste from the #3 and #4 Mines from Slurry Pond 5A at the Hiawatha Complex (C/007/011) to Refuse Pile 1 (MSHA ID #1211-UT-09-02157-04) at the same site. Refuse Pile 1 is adjacent to and NE of the old railroad depot / station location at the Hiawatha site.

The Division should make sure that the Permittee has changed the location for final deposition of the Bear Canyon waste in the Refuse Pile #1 area of the Hiawatha permit in that respective mining and reclamation plan.

Refuse Piles

As previously noted, all coals produced in the #3 and #4 Mines will be brought to the surface out of the #3 Mine belt portal. Coal processing waste will be generated at the Bear Canyon tipple, and material that is not picked off, and crushed for use as road base underground will be shipped to the Hiawatha permit area (C/007/011) for final disposal in Refuse Pile #1.

Impounding Structures

There are no impoundments associated with the Task ID #2292 application.

Burning And Burned Waste Utilization

This section is not applicable to this amendment.

Return of Coal Processing Waste to Abandoned Underground Workings

Coal processing waste will not be returned to abandoned underground workings.

Excess Spoil:

No spoil is generated at the Bear Canyon mining operation.

Findings:

The minimum requirements of this section have been addressed.

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

Regulatory Reference: 30 CFR Sec. 784.30, 817.180, 817.181; R645-301-526.

Analysis:

Appendix 5-A, Table 5A-1, Existing Structures (page 5A-2) was resubmitted as part of the Task ID #2597 response. Corrections have been made to Table 5A-1 to depict the structures that have been built relative to the Wild Horse Ridge addition.

Findings:

The application meets the minimum regulatory requirements of this section of the R645 Coal Mining Rules.

SIGNS AND MARKERS

Regulatory Reference: 30 CFR Sec. 817.11; R645-301-521.

Analysis:

The requirements of this section have been addressed within the currently approved mining and reclamation plan for the Bear Canyon operation.

Findings:

The minimum regulatory requirements of this section have been previously addressed.

USE OF EXPLOSIVES

Regulatory Reference: 30 CFR Sec. 817.61, 817.62, 817.64, 817.66, 817.67, 817.68; R645-301-524.

Analysis:

There are no proposed changes to this section of the approved mine plan.

Findings:

The minimum regulatory requirements of this section have been previously addressed.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Affected Area Maps

Revised maps that have been submitted relative to this application include Plate 1-1, Permit Area Map, and Plate 5-3, Subsidence Map. Problems have been identified with Plate 5-3, Subsidence Map, in that the areas of potential surface impact have not been correctly identified.

Mining Facilities Maps

Plates 5-2A through 5-2H are contained in the Bear Canyon reformatted mining and reclamation plan, and have been approved and incorporated by the DOGM.

Mine Workings Maps

Mine workings are depicted on Plates 5-1A and 5-1C for the Blind Canyon seam (#3 Mine) and the Tank seam (#4 Mine) respectively. The Plates that have been re-submitted as part of Task ID #2680 are certified by a Utah registered professional engineer.

Plates 5-1A and 5-1C show the anticipated dates of secondary extraction for the mining sections in the Blind Canyon and Tank seams respectively.

Monitoring and Sampling Location Maps

Plates 7-4A, Spring Canyon Potentiometric Surface, 7N-2, Water Sampling Locations and 7-4, Water Monitoring have been submitted as part of the Task ID #2680 application.

Plate 5-3, Subsidence Map depicts subsidence monitoring station locations, escarpment locations, potential subsidence zones, and mine workings for the #1 and #2 Bear Canyon Mines. Mine workings for the #3 and #4 active mines are also shown.

Plate 5-3, Subsidence Map, has been certified by Mr. Mark Reynolds, a Utah registered professional engineer.

Certification Requirements

All of the plates submitted as part of Task ID #2680 application have been certified by a Utah registered professional engineer.

Findings:

The application meets the minimum regulatory requirements.

RECLAMATION PLAN

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Certification Requirements

None of the cross sections for the cut and fill drawings shown in Appendix 5K, Attachment A are P.E. certified. These include the following:

a) TS-16, Sections 1, 2, 3, and 4.
b) TS-17, cross sections 0+00 through 3+50.

These cross sections depict both the pre-mining and post-mining surface configurations and as such, are considered as part of the requirements meeting final surface configuration maps, as well as reclamation backfilling and grading maps. "As builts" of the reclamation work including an aerial view drawing will be required post-reclamation.

The response received from the Permittee on August 9, 2006 (Task ID #2597) indicates that all cross-sections depicted in Appendix 5K have been resubmitted with the snow storage amendment response (Task ID #2588).

Findings:

The applicant's response meets the minimum regulatory requirements of this section of the R645 Coal Mining rules.

RECOMMENDATIONS:

The Bear Canyon lease addition application, Task ID #2680, meets the minimum regulatory requirements of the R645 Coal Mining Rules, and it should be approved.

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