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February 17, 2000

To: Internal File

Thru: Mike Suflita, Reclamation Hydrologist III, Team Lead *MS*

From: Peter Hess, Reclamation Specialist III *PH*

RE: 160 Acre IBC, Lodestar Energy, Inc., White Oak Mines, ACT/007/001-IBC99F

**SUMMARY:**

Lodestar Energy, Inc. is proposing to permit a 160 acre lease modification relative to Federal coal lease No. U-017354. Approval of IBC99F will allow the permittee to develop and extract coal reserves which will otherwise be bypassed. The permittee's proposed mining plan is to develop and maintain a maximum of a fifty percent extraction ratio in both the upper and lower O'Connor coal seams. Minimum size pillars on 70 x 70 foot centers will be developed in much of the lease area. Pillars larger than 70 x 70 may be developed, and secondary extraction on these, in conjunction with the removal of bottom coal, will be practiced, in coordination with the MSHA approved roof and rib control plan. Life of mine will be lengthened by approximately four years, based on the five year mine projection maps submitted with the application.

**TECHNICAL ANALYSIS:**

**OPERATION PLAN**

**MINING OPERATIONS AND FACILITIES**

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

**Analysis:**

**Type and Method of Mining Operations**

Section 523, Mining Method(s), (page 500-9 of 43 of the currently approved MRP) has

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been revised to incorporate a mining plan revision which, if all criteria are met, should meet the requirements of the USFS/USBLM stipulation of "no surface impacts, including subsidence" for the 160 acre lease modification area of Federal coal lease U-017354.

The revised plan calls for the development only of coal pillars on 70 x 70 foot centers, with the extraction of bottom coal where seam thickness allows. Bottom coal extraction may occur either during the development stages of the lease area (primary mining) or during the retreat process from the area, depending on decisions made by the Mine's production management. The revised mining plan for the 1999 Modification to Lease U-017354 commits the permittee **to not conduct second mining on pillars** developed on 70 x 70 foot centers, either by "slabbing" or by pocket and wing extraction methods, which require MSHA approval as part of the Mine's roof and rib control plan.

The development only of coal pillars on seventy foot centers is indicative of a fifty percent extraction ratio by area, when twenty foot wide rooms are developed. Thus, one half (by area) of the upper and lower O'Connor coal seams (White Oak #1 and #2 Mines) will remain in place to support the surface.

Pillar designs with centers greater than 70 x 70 feet may be developed at the discretion of the mine's engineer and the MSHA approved roof and rib control plan. Secondary extraction on same may be implemented by either "slabbing" or pocket and wing extraction methods, **but the fifty percent extraction ratio by plan view area will be maintained**, regardless of the center design implemented.

Overburden depths vary from 200 feet to 3000 feet, with eighty percent of the lease modification area having more than 500 feet of cover. There should not be any "plug" type subsidence in this area, because fifty percent of the coal seam by plan view area will remain in place. Some pillars will be weaker than others because bottom coal will be removed where seam thickness allows. However, since both coal seams vary in thickness from seven feet to sixteen feet, and two foot top coal thicknesses are left in place for roof control considerations where seam height allows, pillar height may vary from seven to fourteen feet. Ten foot high pillars should be the norm.

The revised mining plan for the lease modification area in Federal coal lease U-017354 also refers to three monitoring plans to ensure extraction ratio, pillar stacking and subsidence monitoring. These monitoring plans will be discussed under the **SUBSIDENCE CONTROL PLAN**.

**Findings:**

The revised mining plan, as it has been submitted for implementation in the area of the 1999 lease modification area for Federal coal lease U-017354 accurately reflects a plan which has a much greater chance of not causing surface impacts, including subsidence than did the "room and pillar" mining method referenced in the original submittal.

The findings for this section of the first technical analysis referenced that the permittee needed to include the mining plan which was approved by the USBLM for review by all concerned agencies. Although this has not been done, the revised plan as submitted, has received concurrence from the USBLM, and does offer a much greater chance of success for not causing surface impacts than does the mining plan in the original submittal.

The requirements of R645-301-511.100, and 511.200 have been met.

## **SUBSIDENCE CONTROL PLAN**

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

**Analysis:**

### **Subsidence Control Plan**

The revised mining plan analyzed above refers to three monitoring plans which will be used to control the mining activities in the upper and lower O'Connor coal seams. These plans will provide accurate monitoring which in turn will effectively minimize or negate surface impacts due to mining of the two-seam Federal lease. The plans are as follows:

1) Subsidence Control Plan

The revision received February 17, 2000 includes two map revisions, Plates 5-1A, which is the five year mine plan for the White Oak #2 Mine (lower O'Connor seam) and Plate 5-1B, which is the five year mine plan for the #1 Mine in the upper O'Connor. Four subsidence monitoring points are indicated, one for each panel to be developed during 2000 through 2003. The monitoring points will be installed prior to development of the top seam for the establishment of baseline elevation data, and will be monitored throughout the mining of the bottom seam, until subsidence monitoring of the area is no longer deemed necessary by the UDNR/OGM and the surface management agency.

The subsidence monitoring points will be differentially surveyed twice during the first year of mining in the lease modification area. Pedestrian surface walk-overs will be conducted post-snow melt and pre-snow fall annually to inspect for mining related surface impacts in lease modification area U-017354. If no subsidence is detected during the first and second differential level survey, then the frequency for conducting same will be reduced to once a year. The frequency for conducting the pedestrian surface walkovers may also be reduced to an annual inspection. The information which is compiled, will be analyzed and submitted to the UDNR/OGM not more than 45 days after collection of the field data, when such data is gathered more than once a year. When data is only collected annually, it may be submitted as part of the permittee's annual report.

Monitoring of the subsidence control points by differential level survey and the overlying surface will continue until no longer deemed necessary by the UDNR/OGM and the concerned surface management agency.

2) Monitoring of Extraction Ratio

The "approved" maximum of fifty percent extraction of coal by plan view area will be monitored by the permittee by comparing daily/monthly production records against mine maps. Mine maps showing where bottom coal has been extracted, and where slabbing or pocket and wing extraction methods have been utilized will be marked on a shift by shift basis and will be maintained by the Mine's engineer. Calculations comparing daily/monthly production records to the aforementioned maps will be forwarded quarterly to the USBLM and the UDNR/OGM for confirmation.

3) Monitoring of Pillar Stacking

Coordination of Pillar Sizes in the Upper and Lower O'Connor Coal Seams.

Primary development mining of coal support pillars (seventy foot centers, minimum) and secondary extraction of bottom coal, as well as some pillar size reduction will be practiced in both the upper and lower O'Connor coal seams, (White Oak #1 and #2 Mines). The top seam will be mined first, as depicted on Plate 5-1B from 2001 through 2003. Frequent engineering check surveys will be conducted to ensure that the mine plan developed by the permittee is conducted according to projection, (Plate 5-1B). This information will be used to correlate the stacking of identically sized pillars in the #2 Mine, (Plate 5-1A).

The stacking of pillars will be monitored by the Mine's engineer to ensure that a success ratio of better than 90% is occurring in the two coal seams. A report, which is P.E. certified by the engineer monitoring the pillar stacking, will be forwarded to the Division and the concerned surface management agency on a quarterly basis.

**Findings:**

The three monitoring plans for coal extraction, pillar stacking, and subsidence as described in the aforementioned analysis plus the commitment to maintain a fifty percent extraction ratio of coal by plan view area describe a mining/monitoring plan which has a much greater potential for not inducing surface impacts, including subsidence than the plan which was described in the original submittal. It should be noted, however, that attempting to design a coal extraction method which foresees the effects of numerous geologic variables, as well as other uncontrollable effects is not physically possible. Ground control is as much an art as a science, therefore, for this individual to imply that this mining plan will positively prevent all surface impacts, including subsidence is not possible.

**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:**

**Mine Workings Maps  
Monitoring and Sample Location Maps**

Plates 5-1A and 5-1B show both Mine Plan Projections and Subsidence Monitoring Point Locations. It should be understood that the two headings noted above involve the same map and that is the reason they are listed together.

The application includes two maps, Plates 5-1A and 5-1B which depict "projections" for the development of pillars in the White Oak #2 (lower seam) and the #1 Mine (upper seam). Four areas are projected to be extracted in the top mine of lease modification area U-017354 from 2001 through 2003, (Plate 5-1B). Similarly, three areas are projected for extraction on Plate 5-1A, (White Oak #2).

Plates 5-1A and 5-1B are five year mine map projections; as such, they may contain discrepancies, if compared to actual mine workings maps, which must be updated at intervals of not more than six months, (30 CFR 75.1202-1 (a)).

Plates 5-1A and 5-1B are P. E. certified by Richard B. White of EarthFax Engineering.

Maps generated by the monitoring of coal extraction mentioned above will accurately depict the mine workings, and areas where pillars and bottom coal have been extracted will be depicted. Same will be P.E. certified and submitted to MSHA bi-annually to meet the requirements of 75.1202-1(b)(2). Similar maps will be submitted to the UDNR/OGM and USBLM quarterly.

Plates 5-1A and 5-1B depict four subsidence monitoring points, for use in determining elevation drops through differential level surveys.

**Findings:**

Plates 5-1A and 5-1B are mine plan projections, and as such are acceptable as mine workings maps in this submittal. Accurate, P.E. certified maps depicting the actual underground mine workings in the #1 and #2 Mines will be submitted quarterly as part of the coal extraction monitoring regime, as well as bi-annually to meet MSHA requirements.

Subsidence monitoring points are depicted on Plates 5-1A and 1B.

The requirements of the R645 rules relative to mine workings maps and monitoring locations for subsidence have been met for this submittal.

**RECOMMENDATIONS:**

The coal extraction plan and methods for monitoring same, as well the monitoring of pillar stacking and subsidence control accurately reflect a plan which has a great potential for not inducing surface impacts, including subsidence. It is recommended that the aforementioned mining plan and its associated monitoring methods for extraction of coal reserves in the upper and lower O'Connor coal seams of Federal coal lease U-017354 be approved.