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STATE OF UTAH  
NATURAL RESOURCES  
Oil, Gas & Mining

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June 27, 1985

TO: Lowell Braxton/Sandy Pruitt

FROM: Randy Harden, Reclamation Engineer 

RE: Draft Comments Concerning the Scofield Waste Rock Disposal Site and Abatement Requirements for NOV #2 of 2, N85-2-7-2, Skyline Mine, Utah Fuel Company, ACT/007/005, Folder #7, Carbon County, Utah

For abatement of NOV #2 of 2, Utah Fuel must provide information to DOGM as necessary to verify that the initial configuration of the fill area was constructed as specified in the approved designs.

Action Required for Abatement of Violation

Necessary information must include the certified inspection and approval of the work performed to date in the Scofield Waste Rock Disposal Site. Some confusion as to when inspections are to be carried out was expressed by Mr. Zobell during a site visit on June 19, 1985. As a point of clarification, inspection of the work must be performed during the execution of the work requiring certification.

In accordance with UMC 817.71(i), "The fill shall be inspected for stability by a registered engineer or other qualified professional specialist experienced in the construction of earth and rockfill embankments at least quarterly throughout construction, and during the following critical periods: (1) removal of all organic material and topsoil, (2) placement of underdrainage systems, (3) installation of surface drainage systems, (4) placement and compaction of fill materials, and (5) revegetation. The registered engineer or other qualified professional specialist shall provide to the Division a certified report within 2 weeks after each inspection that the fill has been constructed as specified in the design approved by the Division. A copy of the report shall be retained at the mine site."

If no qualified activity was accomplished during the quarter, Utah Fuel must still submit a report to the Division so stating. Utah Fuel will have to submit a report(s) to the Division, detailing what activities have been accomplished at the rock waste disposal site from initiation of the work at the site to date in order to satisfy the conditions of the above section.

#### Other Concerns and Considerations Pertinant to the Disposal Site

Consideration as to what should be done with vents and cracks resulting from the adjacent coal fire were also discussed on site. Neither the rock waste disposal plan nor the Division's approval elaborated on vents, cracks, or fissures developed from the adjacent and potentially underlying fire. In light of the vents found on the north side of the disposal area, the following precautions should be taken by Utah Fuel:

#### Recommended Revision to Operation of the Rock Waste Disposal Pit

When and where vents or cracks are discovered in or immediately adjacent to the disposal site, Utah Fuel shall rip (or fill) then compact the area to a depth of 3 feet above and between the venting area and the waste rock material. These vents or cracks shall be located on a suitable map of the waste rock disposal site and submitted with the certified reports. The date of the discovery of the vents or cracks should be noted on the reports as well as the date that they are filled and compacted.

It is recognized by the Division that not all of the vents or cracks that currently have been discovered in the immediate vicinity of the pit are readily accessible by equipment and that they do not present any serious danger or problem until the fill material encroaches upon them. These cracks and any others found above the fill material which are not readily accessible should be monitored until such time as they can be reached and compacted with suitable equipment.

#### Committment to Revision in the Operation Plan of the Waste Rock Disposal Site

Utah Fuel shall review and commit to the above recommendations to the Operation of the waste rock disposal site, or, should present an alternative plan to the Division for approval within the next 30 days. This change is considered to be a modification of the operation plan and is not part of the abatement requirements of NOV #2 of 2.

### Differential Compaction

Prevention of the formation of cracks due to differential compaction between the rock waste material and the adjacent material in the pit was also discussed. As is the case with most compacted fill materials, cracks and pockets can occur at the contact between the fill and the existing material. To help alleviate or prevent this from occurring it was suggested that the adjacent material also be compacted during each lift of the fill. This will help provide a more suitable foundation for the next lift as the fill area widens out as well as reducing the potential for cracks due to differential compaction.

Two points of concern over the formation of such cracks are that they provide a route for surface water to migrate into the fill and that they create an area where the gasses from the fire may migrate.

Surface water entering the fill through such cracks can create several problems. The water can cause piping in the fill material and create pockets or voids in the fill or adjacent material. Pot holes or low spots can then be created which further collect water and accelerate undercutting and erosion. Such voids would also allow oxygenation of the fill material and would defeat the purpose of compaction of the materials.

These voids could also create conduits for the transfer of heat from the adjacent fire and although not likely, could cause the spreading of the fire into the waste fill material.

It is recommended by the Division that Utah Fuel incorporate into their operation plan, provision for compaction of adjacent material to the fill during subsequent lifts in the waste rock disposal site.

### Unsuitable Conditions During Compaction

Some small potholes were noted in the areas where compaction of the first lifts had occurred. Mr. Zobell indicated that these holes were created by snow contained in the waste material. The snow was compacted into the fill and later melted leaving these voids and pockets. This area should be recompacted prior to placement of additional fill for the next lift. Compaction of the waste rock material should not be allowed by the certified inspector when snow or other conditions would degrade the expected compaction requirements.

### Removal of Organic Material in Preparation for Fill

It was pointed out to Mr. Zobell by Ms. Pruitt during the site inspection that not all organic material had been removed from the area prior to placement of fill as outlined in UMC 817.71(i) and previously stated. This organic material consisted of sparse grasses and weeds and was not considered deleterious to the fill operations. It was however pointed out that some woody shrubs and brush do exist higher up on the north side of the pit and clearing and grubbing of that material should occur prior to filling in that area.

### Potential Propagation of Coal Fire

Potential propagation of the coal fire into the rock waste material and/or the coal seam mined in the strip pit were discussed. It appears extremely improbable that the construction of the rock waste fill constructed by Utah Fuel will contribute to the propagation of the existing fire into the coal seam mined in the strip pit. It is equally improbable that in the event that the coal waste were to catch fire that this would result in the ignition of the coal seam in the strip pit.

Justification of the above assumption is as follows. Since abandonment of the Scofield Strip Pit erosion from above and off of the highwall has resulted in a talus slope at the base varying from 15 to 25 feet wide. This material provides a standoff between the coal seam and the coal waste fill horizontally for the same distance.

It can also be assumed that erosion in the pit has partially filled the bottom the pit and has moved the coal waste material to a point relatively higher than the coal seam. Additional grading and filling of the bottom of the pit by Utah Fuel in preparation for disposal of the coal waste by eliminating low spots and points where water had been collecting in the pit also helped elevate the waste in relation to the coal seam. Although the exact vertical relation between the coal seam and the waste material could not be determined without trenching or drilling it is evident that whatever increase in elevation over the coal seam would be beneficial. Any fire or heat generated from the coal waste pile would then have to propagate downward rather than just horizontally.

Placement of the compacted coal waste in the pit will further isolate and reduce the lateral extent of the coal outcrop by burial of the coal seam along the outcrop.

It would appear that the most likely place that the fire could propagate into the coal seam would be to the extreme west end of the pit. The mined coal seam was left exposed and unmined for approximately 30 to 50 feet to where the coal would outcrop on the hillside. This narrow band of the coal seam extends over and around the area where evidence of active burning can be seen below the strip pit. This narrow tongue of coal may already or has the potential for ignition and carrying the fire around and along the outcrop of the coal seam mined from the strip pit.

#### Potential for Ignition of the Coal Waste Material

Ignition of the coal waste material requires the presence of heat, fuel and oxygen. To ascertain the likelihood of a fire in the coal waste material, each of these three elements should be examined.

The presence of oxygen to the material can be provided by voids or air spaces in the matrix of the fill. Compaction of the material as proposed in the operation plan for disposal should minimize the amount of oxygen present. The high ash content and the amount of fine material seen in the waste rock material appears to allow very good compaction of the material. Precautions to prevent differential compaction and settling during construction should help eliminate cracks or openings allowing air into the fill material.

The amount of combustible material present in the rock waste material will vary as different sources and conditions are encountered in the mine. It can be expected that the amount of coal will be greater than 20% since the need for the waste rock fill is based on 30 CFR:75.400. Federal law states the combustible content of the dust on the roof, floor and ribs cannot exceed 35% in intake air and 20% in return air. Actual combustible content of the waste material or combustivity tests would vary greatly as the waste material is generated. It is not considered practical or economic to sample and test this material. It is reasonable to assume that the amount of combustible material in the fill could be capable of supporting and sustaining combustion if ideal burning conditions allowed. However it is not felt that such conditions would be achieved.

A source of heat is available to the waste fill from the existing coal fire. As waste is placed in the fill, the material will act as an insulator to the heat generated from the nearby fire. It can be expected that there will be a heat buildup in the waste fill from these conditions.

Inspection of the exposed coal seam in the extreme west end of the pit indicated that similar heating of the material had already occurred. The coal in the exposed seam had evidence that the fire had accelerated the oxidation of the coal and that some of the volatiles had been released from the coal due to the heat. Cracks in the coal seam were and had been venting gasses and steam from the underlying fire. No smoke or red dog could be found immediately in the coal seam to conclude that the coal seam itself was actually burning.

It was also difficult to determine how much oxidation of the coal seam had occurred due to the fire. Close proximity to the coal outcrop could also have accounted for much of the weathering observed and may well have been the reason why mining of the coal was halted leaving exposed coal on the west end of the pit with little overburden remaining.

Assuming that the waste fill will undergo similar conditions, it could be expected that the temperature in the waste rock will increase over time as material is placed in the fill and becomes more insulated. This heating can be expected to release some volatile materials contained in the coal waste and that the heat will also enhance any oxidation of the coal from the remaining amount of air left in the matrix of the fill. It is not expected that such heat or conditions will allow ignition or sustained combustion of the coal waste in the fill.

In conclusion, it appears that design of the Scofield Waste Rock Facility is adequate based on the existing conditions. Utah Fuel's obligation for the reclamation of the area is for those areas affected by the waste rock disposal site and are not to include any liabilities from pre-existing conditions. If however, the waste rock disposal site is affected by such unforeseen conditions such as subsidence or fire, it shall be expected that such remedial action will be taken by Utah Fuel in order to maintain safe operation of the disposal site and to achieve satisfactory reclamation of the site upon completion of the operation.

cc: K. Zobell, Utah Fuel  
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