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March 13, 1993

TO: Daron Haddock, Permit Supervisor

FROM: Priscilla Burton, Soils Reclamation Specialist

RE: Second Response to Division Order 92A. Hiawatha Mine. U.S. Fuel Co. ACT/007/011-92A. Carbon County. Utah. Folder #2.

SUMMARY:

U.S. Fuel Co. was issued a permit renewal on 3/13/92 for the Hiawatha Mine. All remaining deficiencies with the R645-301-200 regulations are addressed in this submittal, received 2/24/93. The response to deficiency #5 of R645-301-233.300 entails the potential use of sewage sludge as a cover material. A revision of page 61 of the MRP is requested.

DEFICIENCY REVIEW:

R645-301-233.300. Results of Physical and Chemical Analyses of Overburden and Topsoil

Deficiency #5

Evaluate alternative plans for borrow material sources and borrow reclamation techniques.

Analysis/Compliance:

In a meeting with the Division on 2/9/93, the use of dried, digested sewage sludge as a substitute cover material was discussed. The Division suggested that up to 6 inches of sludge could be applied to the site and subsituted inch for inch for the required 16" of borrowed, substitute topsoil material. Under this scenario, a minimum of 10 inches of borrow material for the 133 acre slurry and refuse areas (Chap 2, pg 57) would be obtained from presently undisturbed areas designated as A, B, C & D within the plan. That is 178,096 yd^3 of borrowed, substitute topsoil and 107,287 yd^3 of sludge.

Since the aforementioned meeting, I have reviewed an laboratory analysis of the sludge which indicates that the material is acidic in nature when non-sulfate sulfur is considered (received 2/9/93 and attached). The material has a pyritic sulfur content of 0.05% sulfur which equates to an acid forming potential of 1.56 Tons/1000 Tons of slurry.

The non-sulfate sulfur content of the slurry has an acid forming potential of 14.37 Tons/1000 tons of slurry. The neutralizing content of the slurry is 5 Tons/1000 tons of slurry (calcium carbonate content is 0.7%). Based upon non-sulfate sulfur, this slurry is acid-forming. In light of this, I am hesitant to recommend reduction of the 16 inch cover requirements over the slurry.

Additionally I have come to realize that a trade of 6 icnhes of sludge for six inches of soil may be short-sighted on the Division's part for the following reasons:

1. The difference in bulk density of sludge in comparison with the density of soil may make this trade-off less than equal. The Division would be trading soil for air.

2. Land application of sludge is based upon nutrient content (especially nitrogen) and most applications are in the 40 - 60 Tons/acre range, probably less than 6 inches, but the volume depends upon bulk density of the sludge.

3. An equivalent weight of soil to a 50 T application of sludge would be approximately 0.3 inches (based upon an acre furrow slice (6" depth) weighing 2 million pounds).

Prior to considering any use of sludge, the Division should be provided with the bulk density of the sludge, the percent moisture at application, the nutrient content of the sludge (nitrogen, phosphorus, and potassium) as well as other chemical constituents required by the 503 regulations.

Deficiency:

At this time, I do not recommend that 6 inches of sludge should be traded for 6 inches of topsoil. Before this commitment on the part of the Division becomes cast in concrete, it is recommended that page 61, "Reclamation Plan - Alternative Topsoil Plan" regarding the trading of 6 inches of sludge for an equivalent volume of soil be stricken from the plan.

CONCLUSION:

Not mentioned in this plan, but discussed at a meeting between U.S. Fuel Co. and the Division on 2/9/93 was the utilization of materials in presently disturbed areas of the storage and rail road yards for a portion of the cover requirements, to reduce the borrow areas in size. The Division should remain involved in any changes to the reclamation plan which may achieve the goal of reducing the borrow area size, while still maintaining adequate cover over the slurry and refuse areas.

The trade of the use of six inches of sludge and equivalent decrease in substitute topsoil should not be pursued due to the nature of the slurry. This divergence from our

earlier agreement was discussed with Mr. Michael Watson of U.S. Fuel by telephone on 3/12/93.

The plan page 61 requires amending.

HIA92A.FIN

cc: HSauer

ACT/007/011
Folder #2

Client : EarthFax Engineering, Inc.
Address : 7324 S. 1300 E., Su. 100
Midvale, UT 84047
Attn. : David Wheeler
Project :
Sample Matrix: Soil
Sample ID: Composite 1
Sample Date Time: 06/30/92

Lab No. : 92-SI/01058
Date Received: 08/06/92

Parameters

Saturation %	40.	%	
pH, saturated paste	5.7	units	1
Conductivity, sat. paste	3.24	mmhos/cm	1
Calcium, soluble	19.5	meq/l	1
Magnesium, soluble	41.0	meq/l	1
Sodium, soluble	.61	meq/l	1
Sodium Absorption Ratio	.1		
Cation Exchange Capacity	10.	meq/100g	
Exchangeable Sodium %	.8	%	
Nitrate as N, soluble	2.4	mg/kg	6
Nitrogen, total kjeldahl	.30	%	
Boron, soluble	1.2	mg/kg	2
Selenium, soluble	.06	mg/kg	2
Sulfur, organic	.41	%	
Sulfur, pyritic	.05	%	
Sulfur, total	.90	%	
Sulfur, sulfate	.44	%	
Neutralization Potential	.7	% as CaCO3	
Acid-Base Potent.(CaCO3)	5.	Tons/1000T	
Coarse Fragments > 2mm	55.9	%	
Sand 2.00 - .062 mm	66.	%	
Silt .062 - .002 mm	19.	%	
Clay -.002 mm	15.	%	
Texture	SL		

1 Saturated Paste Extraction
2 Hot Water Extraction
6 Water Extraction

Remarks: # ABP Calculated From Pyritic Sulfur.
Note: Negative sign "-" denotes that the value is less than "<"

Scott Habermehl, Quality Assurance Officer/S.H.

Frank E. Polniak, Inorganic Laboratory Supervisor/FP

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FEB 01 1993
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