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STATE OF UTAH  
NATURAL RESOURCES  
Wildlife Resources

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*Spiner*  
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Southeastern Region • 455 West Railroad Avenue • Price, UT 84501-2829 • 801-637-3310

July 23, 1987

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DIVISION OF  
OIL, GAS & MINING

Mr. Keith Zobell  
Utah Fuel Company  
Skyline Mine  
P.O. Box 719  
Helper, UT 84526

Dear Keith:

On June 26, 1987 a dark brown colored slime was observed coating the substrate, full length in Eccles creek from the Skyline Mine pad downstream. Also, the water was stained with a dark color. Field inspections by DWR's aquatic ecologists could not determine the cause of the problem, but it was obvious that it originated from the Skyline Mine where a sediment pond continuously discharges into Eccles Creek. The slime is either a bacteria/fungus growth or a gelatinous secretion from existing microorganisms. In either situation, the slime is resulting from water pollution problems. The dark coloration results from mica and coal fines discharging from the sediment pond and adhering to the slime.

On July 7, 1987 DOGM, Skyline Mine and DWR inspected the site to initiate definitive testing to define the problem and appropriate resolve. Macro-invertebrates, as determined from gross inspection, were substantially less in numbers and diversity in Eccles Creek below the mine as compared to above the mine, South Fork or Mud Creek. Electro sampling showed the fish population to be normal.

Water quality measurements in Eccles Creek by DWR showed elevated nitrogen levels as compared to ground water above and below the mine site, 0.29 mg/l and 0.46 mg/l, respectively. The measurement below the mine showed nitrite (NO<sub>2</sub>) and nitrate (NO<sub>3</sub>) to comprise 24% (0.11 mg/l) and 76% (0.35 mg/l) of the total nitrogen. No nitrites were measured above the mine. Additionally, elevated phosphates (0.045 ppm) were detected in the pond and in Eccles Creek below the mine but not above. The phosphates could be associated with bath water (sewage) from the mine. The nitrite is likely present due to a breakdown of ammonia (NH<sub>3</sub>) which is generally associated with domestic pollution (sewage). Further testing by Skyline Mine of the sediment pond showed total (11,000 colif/100ml) and fecal (170 colif/100ml) coliforms to be elevated. Unquestionably, sewage contamination from the mine exists in the sediment pond which continually discharges into Eccles Creek. The probable cause for the inadvertent sewage contamination is that Skyline Mine has doubled its employment since February, 1987. As a result, their 10,000 gallon sewage tank is frequently near full and backed into two manhole connections. Such connections typically leak when liquid is backed into them. These suspected leaks

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allow sewage to migrate through several hundred feet of soil along a utility corridor and into the sediment pond. The material in suspension appears to be primarily mica particles, although substantial amounts of coal fines are present.

The mica probably is present due to a rock dike that was recently mined during coal development within the Skyline Mine. Mine water carrying the mica discharges into the sediment pond. The mica, due to its negative electronic charge, stays in suspension and holds other particles (coal fines) in suspension. The phosphates also tend to reduce surface tension of the water to individual particles, thus adding to the suspension problem.

There are two problems needing resolution:

- (1) Control of suspended solids within the sediment pond such that NPDES Permit standards are not violated.
- (2) Elimination of the sewage contamination source to the sediment pond as well as treatment of the pond for health protection purposes.

The suspension problem in the sediment pond can be corrected by flocculants. A ferric chloride flocculant injected at 20 ppm will create the desired affect. Unfortunately, the pond discharges into Eccles Creek and ferric chloride is toxic to fish at a level of 1 ppm; macroinvertebrates will perish at levels as low as 0.32 ppm. Also, flocculation within the stream with iron compounds can result in a ferric-gel cementing the substrates for years into the future. Considering toxic and environmental effects of ferric chloride, it should not be used.

Several cationic polimers are available as flocculants. Nalco-8109 (medium weight) injected at 2 ppm will produce desired effects in the pond. LD-50 studies of rainbow trout exposed to this product for 96 hours showed mortality at 5.6 ppm. The 95% confidence interval for this test had a range of 3.2 to 10.0 ppm. As a result, Nalco-8109 applied at less than 3 ppm, or products with similar LD-50 characteristics, can be used as flocculants in the pond.

Prevention for the suspension problem is simply to contain mica within the mine and/or treatment of the pond with environmentally acceptable flocculants.

Treatment of the sewage (coliforms) within the sediment pond can be accomplished by chlorination. Great care must be taken to ensure that the pond discharge does not contain chlorine, since it will kill fish at levels as low as 1 ppm. Declorination can be accomplished with sulfur-dioxide (SO<sub>2</sub>), but the pond effluent would need to be oxygenated.

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Prevention for reoccurrence of the sewage problem may take the following course:

- (1) Installation of an electronic monitor/alarm to notify mine personnel when the 10,000 gallon tank is about one-half full. At such time, the contractor should be notified to immediately pump the tank.
- (2) Installation of an automatic/sensor pump to move sewage into a backup holding tank if critical levels are reached.

These measures, along with an increased level of monitoring, should keep sewage levels from reaching the manhole areas where leaks are uncontrollable.

Keith, the Division appreciates the concern and efforts by Skyline Mine to understand and achieve resolve to this problem.

Sincerely,

*John Livesay / HW*

John Livesay, Supervisor  
Southeastern Region

JL/LBD/WKD/dd

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