

**APPENDIX 5-8A
NORTH FORK OF CRANDALL
STREAM SUBSIDENCE MONITORING
AND
STREAM SUBSIDENCE MITIGATION PLANS**

INCORPORATED
EFFECTIVE:

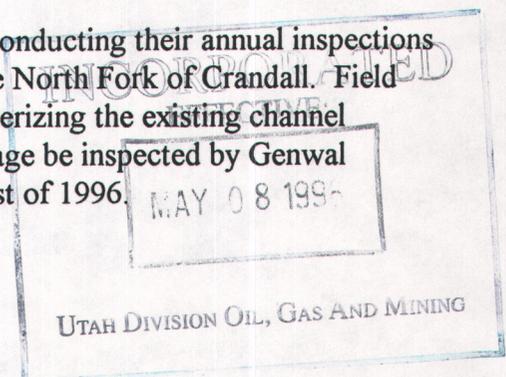
MAY 08 1996

UTAH DIVISION OIL, GAS AND MINING

APPENDIX 5-8A
North Fork of Crandall
Stream Subsidence Monitoring
and
Stream Subsidence Mitigation Plan

Genwal has prepared this response to address concerns associated with a minor amendment to our approved Mining and Reclamation Plan. The minor amendment depicts a longwall panel being located under the upper intermittent portion of the North Fork of Crandall Canyon. These monitoring and mitigation plans prepared by Genwal will ensure that where it naturally exists, the streamflow is maintained within the channel to provide favorable conditions for the discontinuous riparian zones and the last 1.5 miles of the stream (near the confluence with Huntington Canyon) which is considered to be a fishery resource. Thus, Genwal proposes the following actions. They are:

1. Enhance the aerial survey interpretation by establishing a maximum of 10 survey panels along the stream channel in the canyon floor for the area of concern. (Genwal and DOGM have agreed to locate a maximum of 10 new aerial survey panels in the summer of 1996 above the "Forks of Crandall"). During the 1996 fall aerial survey Genwal will gather data which will define the location and elevation of the existing, plus the new panels. In the fall of 1997 the area will receive an aerial photo survey and if the new panels can not be defined to the closest foot with the survey, then in the summer of 1998 the new survey panel points will be established by field survey methods. It is anticipated that the new panels will be located approximately 500 feet apart, conditions permitting. However, because of the ruggedness of the terrain it is also understood that several of the panel points may be much closer or much further away and the final location will be agreed on in the field by Genwal and DOGM representatives.
2. Genwal will conduct annual inspections of the Crandall Canyon Stream channel after mining has occurred for a period of three years. Then, using data from aerial surveys, field inspections, correlations with subsidence events and amounts of subsidence in contiguous areas, Genwal in cooperation with DOGM will determine if additional field inspections need to occur for a defined time period.
3. Genwal will closely monitor the inflow and discharge from the longwall and gob area within the state lease (ML-21568) when it is mined some 4-6 years from now (an accurate flowmeter will be utilized to monitor the discharge from ML-21568). The inflow/discharge data (if any) from ML-21568 will be compared to existing mine inflow data.
4. Genwal will record visual observations when they are conducting their annual inspections after mining has occurred within area ML-21568 on the North Fork of Crandall. Field photo documentation will also be used to aid in characterizing the existing channel conditions. In addition, Genwal suggests that the drainage be inspected by Genwal personnel and a DOGM representative in July or August of 1996.



5. In Genwals approved MRP a commitment has been made and reiterated several times that if and when an impact to either a spring or the surface water are observed then Genwal will notify DOGM, the USFS, the State Engineer, the Division of Wildlife Resources and any affected downstream user (the irrigation company). That commitment to communication and mitigation remains in effect until mining has ceased; the parties agree to different terms; or state and federal laws dictate a change.

STREAM FLOW INTERRUPTION MITIGATION

Genwal Resources, Inc. has submitted mine plans to place long-wall panels in Section 2 (State Lease 21568). Portions of these panels will be in areas which have intermittent drainages for several months due to snowmelt runoff. Genwal is presenting this mitigation plan even though several hundred feet of overburden are present between the coal seam and the surface; the interburden material is primarily shales which have been proven to be self-sealing; and the land and mineral owner is the State of Utah.

If surface flows from the existing drainages are interrupted by subsidence and/or subsequent mine inflows are observed the following mitigation measures will be implemented. They are:

1. Field inspections will be immediately undertaken (within 72-hours) to locate the area of impact and to verify if an impact has occurred. Appropriate regulatory agencies and land owners will be immediately notified upon verification of any verified impact.
2. Using approved methods (horse, hand-carried, helicopter, etc.) to move appropriate materials to repair the stream inflow in the area of impact. It is proposed that a bentonite/cement mix be used with local materials as a backfill material.
3. Hand-excavation methods will be used to excavate the insitu sand, gravel and cobble materials within the inflow zone. (An appropriately sized flexible pipe will be used to bypass the flow while the remediation measures are being installed). The exposed insitu soils will then be mixed with the bentonite/cement mix (5 bentonite and 1 cement with 10 equal volumes of soil/alluvium) and hand compacted. The coarse materials will then be replaced.
4. Where required, geotextile fabric will be used to aid in bank and stream bottom stabilization.
5. The area being remediated will be inspected on a bi-weekly basis for an 8-week period. After the area is considered stable, annual inspections of the remediation work will be conducted for a period of three years..

