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State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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DIVISION OF OIL GAS & MINING
FIELD VISIT FORM
TECHNICAL

Date : August 20, 1996

Time: 2:30p.m. to 4:30p.m.

Mine: Willow Creek Mine

File Number: ACT/007/038, Folder #2

DOG M Staff: Steven M. Johnson and Peter Hess

Other Attendees: Ben Grimes and John Borla (Cyprus Plateau), Bill Bates and Ben Morris (DWR), and Michele Waltz (USACE)

Purpose:
Assessment of Creek Realignment.

Observations:

Flow in Willow Creek has been down and there have not been any major storms to transport sediment into the realigned channel. The upper realigned section was flowing through the rock in the riffles with surface water appearing in the pools. The lower realignment had no water flowing but water was being piped from the culvert to the end of the reworked section.

Two issues were discussed on site. First, the erosion/sediment control on the side slopes. Cottonwood pole plantings had been placed in the upper realignment and upper most part of the lower realignment. There was some success in both areas but the lower realignment poles were showing a lower rate of success. Cyprus has not seeded the channel slope but discussions lead to the need for vegetative sediment control prior to winter and ultimately spring runoff.

The second issue of discussion was the loss of water through the realignment sections. The upper realignment showed water appearing in pools but disappearing in the designed riffles. This was expected when the original designs were drawn. On-the-other-hand, the lower section, which has not had a flow throughout the channel length for a few weeks now, was unexpectedly dry. The loss of water could be attributed to one or more of four probable flaws in the construction of the channel. They are:

- A soil replacement near the right-hand bend of the channel may have greatly

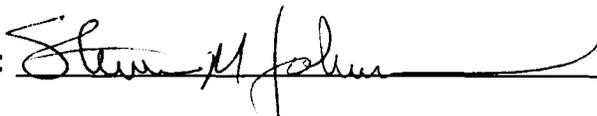
- increased the permeability of the channel bottom;
- A hump in the channel bottom just below the soil replacement area may be pooling water over the highly permeable area;
- The reach after the bend did not have as well defined rock placement as the upper reaches which may have cause water to spread over a large width, increasing the surface area in which water may be infiltrating; and
- The entire reconstructed area may be allowing water to spread across a greater surface area, thus infiltrating into the alluvium.

Further, the transition from the realigned area to the natural (or previous) channel was not completed during original construction. This area was under water at that time so all necessary construction could not be finished, but it is dry now and must be completed before water returns.

Recommendations/Conclusions:

Cyprus will plant and irrigate either most species of the approved seed mix or a sterile grain, depending upon availability, to protect the banks from erosion and deter increases of sediment in the stream. With respect to the water loss in Willow Creek, a three step plan must be enacted. First, to prevent continued lost of stream flow, NOV 96-44-1-1 has been modified to require placement of an impermeable liner in the realigned channel around the location of the contaminated soil replacement. Second, to quantify the amount of water loss and success of the corrective measures the modified NOV will require the commencement of a stream flow monitoring plan. The increase monitoring plan will included the placement of two flow measurement stations, one upstream from the disturbed channel and one down stream, which will be monitored once per week to detect the amount water loss through the realigned channel. Finally, Cyprus must finish the lowest 50 feet of the stream realignment to design specifications.

Signature:
21, 1996



on August

Steven M. Johnson, Reclamation Hydrologist