

NELSON TUNNEL
WATER MANAGEMENT FEASIBILITY STUDY
for the
WILLOW CREEK RECLAMATION COMMITTEE
CREEDE, COLORADO

January 24, 2006

The Willow Creek Reclamation Committee
c/o Kelley Thompson
PO Box 518
Creede, Colorado 81130

**RE: Letter of Transmittal/Summary
Nelson Tunnel Feasibility Study**

Committee Members:

Submitted attached is the Water Management Feasibility Study for overflow waters emanating from the Nelson Tunnel. The Nelson Tunnel flow is acid mine drainage – and is “responsible” for about 75% of the heavy metals contaminants in Willow Creek.

The study develops an optimum treatment system for this water, with estimates of capital and operating costs. A chemical precipitation process plant, located either near the Creede City Hall or the municipal wastewater treatment plant is recommended.

To partially offset the costs of treatment, the feasibility of using the water to generate hydropower and of using the inherent water inherent water temperature to recover heat was also evaluated. Although not necessary to finance/construct at the same time, both electrical generation and heat recovery are recommended. Present, and rising, energy costs will make these additions economically justifiable.


The recommended budget for the treatment facility, intake, and connecting pipeline is \$2,009,750.

The alternate of using the heat and energy to activate the fish hatching was found to be too expensive, primarily because of the capital requirements for the long transmission pipeline. We were impressed with the physical condition of the fish hatchery facilities, and believe that a local (deep) alluvial well probably would result in a less costly water supply.

We will be available to review the study with you.

Respectfully submitted,
McLaughlin Rincón, Ltd.


Ronald C. McLaughlin, P.E. & L.S.


Ronald J. McLaughlin, P.E.

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DRAWING. Location Map (at back of report)

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I. INTRODUCTION

BACKGROUND

The Nelson Tunnel collects water from a vast network of abandoned mine works north of the City of Creede, Colorado. The tunnel entrance is located on West Willow Creek, about 1.5 miles north of town. The collected water, approximately 200 gallons per minute, contains significant heavy metal contamination. Due to this contamination, Willow Creek cannot support a fishery and is detrimental to the valuable fishery in the Rio Grande River.

It has been estimated that the Nelson Tunnel discharge alone is responsible for 75% of the total inorganics (heavy metals) contamination in Willow Creek below the tunnel discharge. Since this single point source is responsible for such a large fraction of the contamination, the Willow Creek Reclamation Committee wishes to investigate the feasibility of capturing and treating this water – as well as the potential benefits and uses for the treated water.

SCOPE OF STUDY

The report will evaluate 3 proposals/goals and recommend a plan for implementation. These are:

1. **Treatment of Nelson Tunnel Discharge.** While there a number of possible processes which could be used to treat the discharge from the Nelson Tunnel; e.g. Chemical, Electrical or Biological precipitation followed by separation has been identified as most likely feasible. Three precipitation methods will be evaluated and comparative preliminary cost estimates prepared. Potential sites for the treatment plant are at the tunnel adit, north edge of town, the Waste Water Treatment Plant site or the Fish Hatchery located south of town.
2. **Recovery of Energy- Hydroelectric.** Once the discharge has been captured in a pipe and conveyed to a discharge point a potential to capture energy, as electricity, will exist. The available energy will depend on the elevation and location of the treatment site and discharge point. This energy could be used to offset power required for treatment, offset power required for municipal buildings