

1991 AQUATICS STUDY PLAN
NEW WORLD MINE

For:

Noranda Minerals Corp.
2501 Catlin, Suite 201
Missoula, MT 59801

By:

Western Technology and Engineering, Inc.
3005 Airport Road
P.O. Box 6045
Helena, MT 59604

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INTRODUCTION

Western Technology and Engineering, Inc. (WESTECH) was hired in 1989 on a subcontract to Hydrometrics, Inc. to conduct a "minimum level baseline aquatics study" for Noranda's New World Mine project. The study plan (POS) for that monitoring effort was approved by the agencies in January 1990. The revised study plan contained herein is part of Noranda's effort to continue collecting data on the quality of streams in the project area prior to mining. The study's objectives are:

- o document the annual diversity and relative abundance of macroinvertebrate species present in streams within the project area;
- o identify indicator species, marker species and species of special concern within the project area and document the annual population status of those species;
- o determine the downstream extent of impacts from Daisy Creek to the Stillwater River;
- o assess the environmental condition of streams in the project area;
- o compare annual data in an effort to depict any significant annual fluctuations.

SCOPE OF WORK

SAMPLING SITES

The eight sampling stations established in 1989 and 1990 will again be sampled in 1991 and include:

- 1--Lower Fisher Creek
- 2--Lower Miller Creek
- 3--Upper Miller Creek
- 4--Stillwater River below Daisy Creek
- 5--Clarks Fork of the Yellowstone
- 6--"Scotch Bonnet" Creek
- 7--Lower Soda Butte Creek
- 8--Upper Soda Butte Creek

In addition, the Stillwater River will be sampled with a kick net at random locations below the confluence with Daisy Creek in an effort to determine the downstream extent of current impacts from Daisy Creek. A lower Stillwater River sampling station will be established below the zone of existing impacts from Daisy Creek.

MACROINVERTEBRATE SAMPLES

Again, benthic sampling will be conducted only during summer since the high elevation limits access to the study area. Four benthic samples will be collected with a 500 micron mesh Surber net. Samples will again be collected from the riffle/run habitats of the streams. In addition, a kick net sample will be collected with a 500 micron mesh bottom kick net. A unit-effort (60 seconds) kick net sample will be collected from the various micro-habitats present at each station. The kick net sample has been added to the 1991 sampling program because it provides a more substantial representation of the benthic community by virtue of the different methods employed in the use of this net versus

the Surber net. The Surber net encloses one square foot of area and is considered a "quantitative" sample. However, because of the relatively small area enclosed, streams with a coarse substrate are not as thoroughly sampled as streams with a smaller more uniform substrate. By comparison, the kick net is held in place and all the substrate within reach just above the net is overturned. Thus, benthic organisms residing under large cobble and small boulders not routinely part of a Surber sample, are collected. The kick net sample is typically considered a "qualitative" sample but because it is a timed effort it can be as quantitative as the restricted Surber sample. The use of both types of samples provides a more comprehensive picture of the benthic communities.

When the benthic samples are collected, notes will be made on water temperature, substrate composition, streambank vegetation, and any noticeable changes in the stream from previous years.

Benthic samples will be preserved in the field with 10% formalin and transported to the WESTECH lab for sorting, identification and enumeration. Representative specimens will be sent to taxonomic experts for verification. A reference collection will be maintained in the WESTECH lab.

A number of parameters will be used to analyze the benthic data including: taxa richness, EPTC (Ephemeroptera, Plecoptera, Trichoptera, Chironomidae) abundance, percent relative abundance for each taxa,

percentage of indicator and/or marker species, annual and site variation, Shannon diversity index, ratio of functional feeding groups, standard deviation and standard error of mean.

TIME SCHEDULE/ANNUAL REPORT

Benthic samples will be stored in the WESTECH lab until fall. At that time, macroinvertebrates will be separated, identified and counted and statistical analyses run. An annual report in winter 1991 will present the data collected during the year, discuss pertinent population dynamics, compare the 1991 data to the previous years' data, and evaluate stream quality.